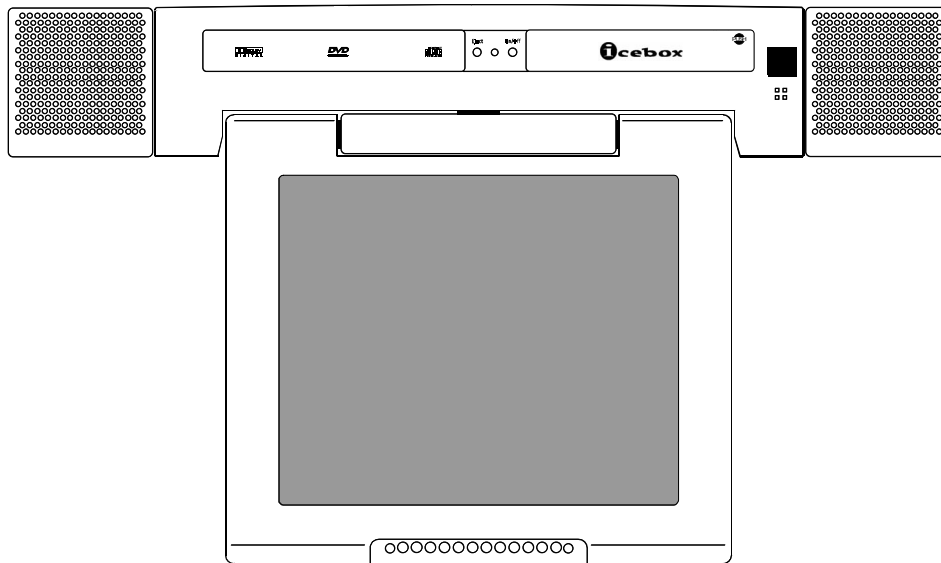




Information, Communication, Entertainment



DRAFT 3

Service Manual



ICEBOX, LLC

1520 Bellevue Avenue

Seattle, WA 98122-2015

www.iceboxllc.com

tel: (800) 897-8554

tel: (206) 448-0354

fax: (206) 448-0359

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1. Safety Precautions

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1. Safety Precautions

When performing maintenance or repair on the ICEBOX™ FlipScreen, please observe these basic precautions to reduce the risk of personal injury or equipment damage.

- Read and understand all instructions.
- Follow all warnings and cautions on the product and in these instructions.
- Disconnect the ICEBOX from AC power.

1.1 Definition of Terms

The following symbols and terms are used throughout this manual:

**WARNING!**

Hazards or unsafe practices that could result in serious personal injury or death.

**CAUTION!**

Hazards or unsafe practices that could result in minor personal injury or product damage.

1.2 Fire and Shock Hazard

Before returning an ICEBOX to the owner, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):

**WARNING!**

Risk of shock. Do not use an isolation transformer during this test.

Use a leakage current tester or a metering system that complies with American National Standards Institute (*ANSI C101.1, Leakage Current for Appliances*), and Underwriters Laboratories (*UL Publication UL1410, 59.7*).

4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

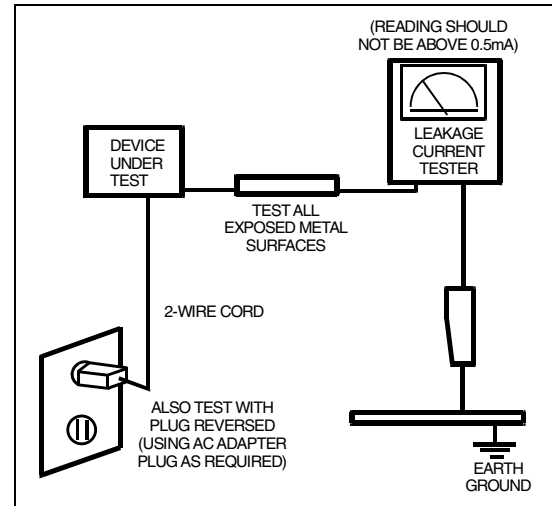


Figure 1-1 Leakage Current Test Circuit

1.3 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by  on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1.4 Servicing Precautions



WARNING!

Risk of personal injury. Read the “Safety Precautions” section of this manual before performing any service on the iCEBOX. If unforeseen circumstances create conflict between the servicing precautions and safety precautions, always follow the safety precautions.



WARNING!

Risk of explosion. An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet, and should be followed closely.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect all test components in parallel with an electrolytic capacitor.

3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the +B voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

1.5 ESD Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESDs). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

**WARNING!**

Risk of shock. Be sure no power is applied to the chassis or circuit and observe all other safety precautions.

8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9.  Indicates ESDs in the schematic diagrams in Section 10 of this manual.

2. Specifications

iCEBOX FlipScreen Basic Specifications.....2-1

2. Specifications

iCEBOX FlipScreen Basic Specifications:

Size (Unit W x D x H):	(Including speakers) 23-5/8 in x 11-7/8 in x 3-7/8 in (600 mm x 300 mm x 97 mm)
Weight:	40 pounds (18.14 kg)
Environment:	Operating Temperature 0°C to 40°C (32°F to 113°F) Storage Temperature -20°C to 45°C (-4°F to 113°F)
Enclosure	Steel with plastic front panel
Power source	110Vac, 60Hz or 230Vac, 50 Hz
Display	800 x 600 12.1-inch TFT-LCD with back light
Speakers	Audio system designed by Redrock Acoustics® Two detachable speakers Speaker channel; L/R bass, mid-range, and treble Power; 10 watts per channel; Resistance 4 ohms
Switch controls	On/Off, Channel +/-, Volume +/-, Play, Eject, Stop, Pause, Previous, Next
Video inputs/outputs	Coaxial CATV Antenna In (F-type jack), Stereo Audio In/Out (RCA type), Composite Video In (CVBS), DVD, Video CD 2.0 and iCEBOX Turbo 2.0
Telephone connection	In/Out RJ-11
Internet connection	56K, V.90 Modem, RJ45 10 Base T ethernet connection
Other connections	Dual USB port, Security unlock, printer (PCL 3), intercom audio out
DVD player	DVD, audio, VCD
TV channels	125 channels, cable ready

3. Circuit Description

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3. iCEBOX Circuit Description

3.1 Controller Board Circuit Description

3.1.1 CPU Hitachi SH3/7709A U35 Sheet 1

The SH3/7709A processor (U35) controls all the functions for the iCEBOX Flipscreen unit. All other devices are slaves to the SH3. On power up, the SH3 boots from flash memory (U50, U51) and loads the code into SDRAM (U33, U34, U60, U61). The code is then executed from the SDRAM.

The SH3 has two crystal controlled clocks. A 14.7456 MHz crystal (Y6) is used to generate the main system clock. The system bus clock (SH_CKIO) runs at 4 times this rate (58.9824 MHz) and the internal CPU clock runs at 8 times this rate (117.9648 MHz). A 32.768 kHz crystal (Y7) generates the Real Time Clock (RTC). The RTC is used for keeping track of elapsed time since power-on as well as internal CPU timing.

The SH3 has a 32-bit data bus that can be sized to interface to either 8, 16, or 32 bit devices. The SH3 has an internal 32-bit address bus, with the lower 26 address bits externally driven out of the chip. Six chip selects are decoded by the device; each addressing up to a 64 Mbyte section of physical memory.

1. **Chip select 0** (SH_CS0_N) is decoded by the Flash Decode EPLD (U43) and selects the flash memory (U50, U51) for booting the unit. Each flash memory device is 16-bits wide and contains 8 Mbytes of storage. The standard configuration is for 1 device, U50 but can be upgraded to 2 devices for a total of 16Mbytes of storage. If jumper JP6 is installed then the unit will boot from the PROM ICE port (JP7). This chip select corresponds to memory addresses 0x0000 0000 to 0x03FF FFFF.
2. **Chip select 2** (SH_CS2_N) is also decoded by the Flash Decode EPLD (U43) and is a secondary chip select mapped to the flash memory. This is used to re-map the flash memory so that flash can be re-programmed when the unit has been booted from the PROM ICE port (JP7). This is a 16-bit port. This chip select corresponds to memory addresses 0x0800 0000 to 0x0BFF FFFF.
3. **Chip select 3** (SH_CS3_N) selects the SDRAM. There are two banks of SDRAM for a total of 64 Mbytes for storage. Each bank is comprised of two SDRAM devices that make up a 32-bit data bus and 32 Mbytes of storage. Bank 1 is comprised of U33 and U34, while Bank 2 is comprised of U60 and U61. The standard flipscreen configuration is to only install Bank 1. This chip select corresponds to memory addresses 0x0C00 0000 to 0x0FFF FFFF.
4. **Chip select 4** (SH_CS4_N) is decoded by the FPGA (U19) and selects I/O devices. This chip select corresponds to memory addresses 0x1000 0000 to 0x13FF FFFF and is a 16 bit port.
5. **Chip select 5** (SH_CS5_N) is decoded by the FPGA (U19) and selects the Graphics Processor (U7). This is a 32-bit port which interfaces to the Graphics Processor's 32 bit PCI interface. This chip select corresponds to memory addresses 0x1400 0000 to 0x15FF FFFF.
6. **Chip select 6** (SH_CS6_N) selects the modem circuitry. This is an 8-bit port. This chip select corresponds to memory addresses 0xB800 0000 to 0xBBFF FFFF.

The CPU has 3 serial ports. Port 0 is used for debugging the unit. The input of port 1 is used to receive data from the IR remote. Port 2 is used to boot the DVD control processor (U3).

3.1.2 CLOCK BUFFER, CYPRESS CY7B991V U26 Sheet 1

U26 generates all the processor clocks on the FlipScreen circuit board. The device is the CY7B991 Cypress programmable skew Clock Buffer. Currently the buffer outputs are set for zero skew.

3.1.3 SERIAL EEPROM, ATMEL AT24C256 U17 Sheet 1

U17 is a serial EEPROM used to store system parameters. It interfaces to the 3V I²C bus.

3.1.4 CPU SDRAM MICRON MT48LC8M16A2TG U33, U34, U60 and U61 Sheet 2, 3

The main memory for the CPU is made up of two banks of SDRAM for a maximum of 64 Mbytes of storage. Each bank contains two 128 Mbit SDRAM memory chips, each with a 16-bit data bus. Together the two chips make a memory data bus that is 32-bits wide. The standard configuration is to have Bank 1 (U33,U34) installed for a total of 32 Mbytes of storage. The SH3 generates all the SDRAM timing. The clock for the memory chips (CKIO_3Q0) is driven by U26, which is the CY7B991 clock buffer.

3.1.5 CPU FLASH MEMORY DA28F640J5-150 U50, U51 Sheet 3

The flash memory stores the program for the iCEBOX when the power is off. The FlipScreen has the capacity for up to two flash ICs. Each IC is 8 Mbytes with a 16-bit data bus for a total capacity of 16 Mbytes of storage. The standard configuration is for one device to be installed.

3.1.6 FLASH DECODE CPLD, ALTERA EPM7032 U43 Sheet 3

U43 is a CLPD that decodes SH_CS0 and SH_CS2 as well as other control signals from the SH3 to drive the Flash Memory devices. It also generates reset signals for the on board C161 (U3, DVD circuit) as well as the GSM C161 reset which is a daughter card that is not currently implemented.

Table 3-1: U43 EPLD Pinouts

FA22	Input	5	SH3 address bit 22
FA23	Input	6	SH3 address bit 23
FA24	Input	8	SH3 address bit 24
FA25	Input	9	SH3 address bit 25
FD0	Bidir	11	PROM data bus bit 0
/BOOTICE_CS	Output	12	PROM-ICE chip select
/FLCS0	Output	14	Flash chip select 0
/FLCS1	Output	16	Flash chip select
/SH_CS0	Input	19	SH3's CS0
/SH_CS0	Input	20	SH3's CS2
BOOT_SEL	Input	21	Boot device select jumper (low=boot from ICE; high=boot from Flash)
SH_CKIO	Input	2	SH3's I/O clock (60Mhz)
/SH_WE_O	Input	43	SH3's write enable 0
/SH_RESET	Input	1	Board wide global reset
/SH_WAIT	Output	41	SH3's input wait signal
/C161_RESET	Output	40	C161's input RESIN* signal

Table 3-1: U43 EPLD Pinouts (Continued)

WRFLSH_FAULT	Output	39	Goes and stays high when write to flash w/o sw flash write enable FF true
/FL_LATENB	Output	33	Latch enable for flash data bus latch
/FL_WR	Output	31	Flash write strobe
/FL_WRLAT	Output	29	Flash data bus latch clock
/FL_RD	Output	28	Flash read strobe
/FADR_LAT	Output	27	Flash address bus latch clock
/SH_RD/WR	Input	26	SH3's rd/wr signal
/SH_WE0	Input	24	SH3's write enable 0

3.1.7 ALTERA GATE ARRAY EPF6024ABC256 U19 Sheet 4, 5

U19 is an Altera FPGA that performs the “glue logic” throughout the Flipscreen system. It generates the PCI interface for U7, the graphics chip. In addition it buffers the host bus address and data buses for 8 and 16 bit applications. It reads the front panel button signals, interprets IR commands and transfers that information to the SH3. It also provides the 3 and 5V I2C interfaces.

3.1.7.(A) CMI FLIPSCREEN PORT DESCRIPTIONS

CHIP SELECT 5 PORTS (32 BIT) 69030 GRAPHICS

0xB400 0000 - 0xB403 FFFF	GRAPHICS PCI CONFIGURATION SPACE
0xB500 0000 - 0xB53F FFFF	MEMORY R/W OF 69030 MEMORY 0x0000 0000 - 0x003F FFFF
0xB544 0000 - 0xB547 FFFF	BYTE 0 R/W OF 69030 MEMORY 0x0040 0000 - 0x0043 FFFF
0xB548 0000 - 0xB54B FFFF	BYTE 1 R/W OF 69030 MEMORY 0x0040 0000 - 0x0043 FFFF
0xB550 0000 - 0xB553 FFFF	BYTE 2 R/W OF 69030 MEMORY 0x0040 0000 - 0x0043 FFFF
0xB560 0000 - 0xB563 FFFF	BYTE 3 R/W OF 69030 MEMORY 0x0040 0000 - 0x0043 FFFF

CHIP SELECT 4 PORTS (16 BIT)

PORTS

0xA000 0100 BUTTON READ PORT

BITS

15	0= AUDIO AMP OK	1= AUDIO AMP OVERLOAD	(R)
14	0= DOOR BELL PUSHED	1= NOT PUSHED	(R)
13	ALWAYS 1		(R)
12	ALWAYS 1		(R)
11	ALWAYS 1		(R)
10	0= EJECT PUSHED	1= NOT PUSHED	(R)
9	0= POWER PUSHED	1= NOT PUSHED	(R)
8	0= PLAY PUSHED	1= NOT PUSHED	(R)
7	0= STOP PUSHED	1= NOT PUSHED	(R)
6	0= PAUSE PUSHED	1= NOT PUSHED	(R)
5	0= PREVIOUS PUSHED	1= NOT PUSHED	(R)
4	0= NEXT PUSHED	1= NOT PUSHED	(R)

3	0= VOLUME UP PUSHED	1= NOT PUSHED	(R)
2	0= VOLUME DOWN PUSHED	1= NOT PUSHED	(R)
1	0= CHANNEL UP PUSHED	1= NOT PUSHED	(R)
0	0= CHANNEL DOWN PUSHED	1= NOT PUSHED	(R)

0xA000 0200 IR DATA READ PORT

BITS

15	0= NO NEW IR CODE	1= NEW IR CODE (Cleared by read)	(R)
14..8	ALWAYS 0		(R)
7..0	IR CODE		(R)

0xA000 0300 USB STATUS / CONTROL

BITS

15	ALWAYS 0		(R)
14	ALWAYS 0		(R)
13	1 MS INTERRUPT	WRITE 1 TO CLEAR	(R/W)
12	ALWAYS 0		(R)
11..0	TIME TO NEXT 1 mS TICK (1 COUNT = .542535 uS)		(R)

0xA000 0400 USB INTERRUPT

BITS

15..6	ALWAYS 0		(R)
5	1= ENABLE USB SOF INTERRUPT (DEFAULT= 0)		(R/W)
4	1= ENABLE 1 MS INTERRUPT (DEFAULT= 1)		(R/W)
3	1= ENABLE USB INTERRUPT (DEFAULT= 1)		(R/W)
2	USB SOF INTERRUPT	WRITE 1 TO CLEAR	(R/W)
1	1 MS INTERRUPT	WRITE 1 TO CLEAR	(R/W)
0	USB INTERRUPT		(R)

0xA000 0500	ETHERNET RECEIVE/TRANSMIT DATA (PORT 0)	(R/W)
0xA000 0502	ETHERNET RECEIVE/TRANSMIT DATA (PORT 1)	(R/W)
0xA000 0504	ETHERNET TRANSMIT COMMAND	(W)
0xA000 0506	ETHERNET TRANSMIT LENGTH	(W)
0xA000 0508	ETHERNET INTERRUPT STATUS QUEUE	(R)
0xA000 050A	ETHERNET PACKET PAGE POINTER	(R/W)
0xA000 050C	ETHERNET PACKET PAGE DATA (PORT 0)	(R/W)
0xA000 050E	ETHERNET PACKET PAGE DATA (PORT 1)	(R/W)

0xA000 0700	TEST READ OF 0x0001	(R)
0xA000 0702	TEST READ OF 0x0002	(R)
0xA000 0704	TEST READ OF 0x0004	(R)
0xA000 0706	TEST READ OF 0x0008	(R)

0xA000 0708	TEST READ OF 0x0010	(R)
0xA000 070A	TEST READ OF 0x0020	(R)
0xA000 070C	TEST READ OF 0x0040	(R)
0xA000 070E	TEST READ OF 0x0080	(R)
0xA000 0710	TEST READ OF 0x0100	(R)
0xA000 0712	TEST READ OF 0x0200	(R)
0xA000 0714	TEST READ OF 0x0400	(R)
0xA000 0716	TEST READ OF 0x0800	(R)
0xA000 0718	TEST READ OF 0x1000	(R)
0xA000 071A	TEST READ OF 0x2000	(R)
0xA000 071C	TEST READ OF 0x4000	(R)
0xA000 071E	TEST READ OF 0x5555	(R)
0xA000 0780	16 BIT TEST REGISTER	(R/W)

CHIP SELECT 6 PORTS (8 BIT)

PORTS

0xB800 0001 INTERRUPT ENABLES

BITS

7.4	ALWAYS 0	(R)
3	0= DISABLE INTERRUPT 3	1= ENABLE INTERRUPT 3 (R)
2	0= DISABLE INTERRUPT 2	1= ENABLE INTERRUPT 2 (R/W)
1	0= DISABLE INTERRUPT 1	1= ENABLE INTERRUPT 1 (R/W)
0	0= DISABLE INTERRUPT 0	1= ENABLE INTERRUPT 0 (R/W)

0xB800 0007 PROGRAMABLE RESET

WRITING 0X5A TO THIS PORT WILL RESET AND REBOOT THE SYSTEM

0xB800 0100	MODEM PORT 0	(R/W)
0xB800 0101	MODEM PORT 1	(R/W)
0xB800 0102	MODEM PORT 2	(R/W)
0xB800 0103	MODEM PORT 3	(R/W)
0xB800 0104	MODEM PORT 4	(R/W)
0xB800 0105	MODEM PORT 5	(R/W)
0xB800 0106	MODEM PORT 6	(R/W)
0xB800 0107	MODEM PORT 7	(R/W)
0xB800 0200	USB PORT 0	(R/W)
0xB800 0201	USB PORT 1	(R/W)

0xB800 0300 SOUND RATE

BITS

7..0 COUNT (FREQ= 1.8432 Mhz / (COUNT + 2) (W)

0xB800 0400 I2C PORTS STATUS / CONTROL

BITS

7	0= DISABLE BIT 6 CHANGE; 1= ENABLE BIT 6 CHANGE	(W)
6	0= 3 VOLT BUS; 1= 5 VOLT BUS	(R/W)
5	0= NOP 1= START READ WITH STOP	(W)
4	0= NOP 1= START READ	(W)
3	1= LAST OPERATION WAS START	(R)
2	1= LAST OPERATION WAS STOP	(R)
1	1= ACKNOWLEDGE RECEIVED	(R)
0	1= READY FOR NEXT OPERATION	(R)

0xB800 0401 I2C READ/WRITE DATA WITH NO START OR STOP (W/R)

0xB800 0402 I2C WRITE DATA WITH START (W)

0xB800 0403 I2C WRITE DATA WITH STOP (W)

0xB800 0500 SH3-C161 BUFFER A STATUS

BITS

7..6	ALWAYS 0	(R)
5	=1 IF SH3 TO C161 DATA BUFFER A IS EMPTY	(R)
4..1	ALWAYS 0	(R)
0	=1 IF C161 TO SH3 DATA BUFFER A IS FULL	(R)

0xB800 0501 SH3-C161 BUFFER A DATA

BITS

7..0	DATA BUFFER A FROM C161	(R)
7..0	DATA BUFFER A TO C161	(W)

0xB800 0502 SH3-C161 BUFFER B STATUS

BITS

7..6	ALWAYS 0	(R)
5	=1 IF SH3 TO C161 DATA BUFFER B IS EMPTY	(R)
4..1	ALWAYS 0	(R)
0	=1 IF C161 TO SH3 DATA BUFFER B IS FULL	(R)

0xB800 0503 SH3-C161 BUFFER B DATA

BITS

7..0	DATA BUFFER B FROM C161	(R)
7..0	DATA BUFFER B TO C161	(W)

0xB800 0700	LED CONTROL
0xB800 0701	TUNER I2C ADDRESS SELECT
0xB800 0702	AUDIO MUX SELECT
0xB800 0703	INTERCOM CONTROL
0xB800 0704	PAL TUNER MODE CONTROL
0xB800 0705	SERIAL MUX SELECT
0xB800 0706	VIDEO MUX SELECT
0xB800 0707	SPEED SELECT

Table 3-2: U19 Gate Array Pinouts

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
BCU_TXD	INPUT	N19	BCU serial input
/C161_CS	INPUT	D16	Chip Select from C161 for C161 to SH3 interface
C161_HA1	INPUT	V2	C161 address bit 1
C161_HA2	INPUT	W1	C161 address bit 2
C161_HA3	INPUT	V3	C161 address bit 3
C161_HA4	INPUT	W2	C161 address bit 4
/C161_HRD	INPUT	R18	C161 read enable
/C161_HWR	INPUT	T18	C161 write enable
C161_RXDD	INPUT	A16	C161 boot and debug port serial input
C161_TXD	INPUT	A17	To external boot and debug port serial output
DBRD_RST	INPUT	D3	GSM Reset (not used)
/DISPLAY_IRQ	INPUT	V1	Interrupt from display controller
ENET_DREQ	INPUT	V17	Ethernet DMA request
/ENET_IRQ	INPUT	B1	Interrupt from Ethernet
IR_BACK	INPUT	B17	IR from back sensor
IR_FRONT	INPUT	B18	IR from front sensor
/MODEM_IRQ	INPUT	D2	Interrupt from modem
/RESET	INPUT	L20	Reset
SH_A_I0	INPUT	D18	SH3 address bit 0
SH_A_I1	INPUT	E17	SH3 address bit 1
SH_A_I2	INPUT	C20	SH3 address bit 2
SH_A_I3	INPUT	D19	SH3 address bit 3
SH_A_I4	INPUT	E19	SH3 address bit 4
SH_A_I5	INPUT	F18	SH3 address bit 5
SH_A_I6	INPUT	G17	SH3 address bit 6
SH_A_I7	INPUT	E20	SH3 address bit 7

Table 3-2: U19 Gate Array Pinouts (Continued)

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
SH_A_I8	INPUT	G18	SH3 address bit 8
SH_A_I9	INPUT	F20	SH3 address bit 9
SH_A_I10	INPUT	G19	SH3 address bit 10
SH_A_I11	INPUT	G20	SH3 address bit 11
SH_A_I12	INPUT	H18	SH3 address bit 12
SH_A_I13	INPUT	H19	SH3 address bit 13
SH_A_I14	INPUT	H20	SH3 address bit 14
SH_A_I15	INPUT	J17	SH3 address bit 15
SH_A_I16	INPUT	J18	SH3 address bit 16
SH_A_I17	INPUT	J19	SH3 address bit 17
SH_A_I18	INPUT	J20	SH3 address bit 18
SH_A_I19	INPUT	K17	SH3 address bit 19
SH_A_I20	INPUT	K18	SH3 address bit 20
SH_A_I21	INPUT	L18	SH3 address bit 21
SH_A_I22	INPUT	L19	SH3 address bit 22
SH_A_I23	INPUT	U18	SH3 address bit 23
SH_A_I24	INPUT	W18	SH3 address bit 24
SH_A_I25	INPUT	U19	SH3 address bit 25
/SH_BE_I0	INPUT	R2	SH3 byte enable 0
/SH_BE_I1	INPUT	T1	SH3 byte enable 1
/SH_BE_I2	INPUT	P4	SH3 byte enable 2
/SH_BE_I3	INPUT	R3	SH3 byte enable 3
/SH_BS_I	INPUT	U16	SH3 bus cycle
SH_CKIO	INPUT	L3	SH3 clock (global)
/SH_CS4	INPUT	T2	SH3 CS4
/SH_CS5	INPUT	U2	SH3 CS5
/SH_CS6	INPUT	T4	SH3 CS6
/SH_DACK0	INPUT	A15	SH3 DMA request 0
/SH_DACK1	INPUT	M19	SH3 DMA request 1
/SH_RD	INPUT	U3	SH3 Read
SH_TXD2	INPUT	C17	To SH3 port 2 serial output
/STOP	INPUT	Y1	PCI Stop
/USB_IRQ	INPUT	E4	Interrupt from USB
/USB_SOF	INPUT	B4	USB SOF (not used)
AMUX_SEL_O0	OUTPUT	M18	Audio Mux select 0
AMUX_SEL_O1	OUTPUT	M17	Audio Mux select 1
AMUX_SEL_O2	OUTPUT	N20	Audio Mux select 2
BCU_RXD	OUTPUT	N18	T0 BCU C161 serial input (not used)
C/BE_O0	OUTPUT	V7	PCI command/byte enable 0
C/BE_O1	OUTPUT	W9	PCI command/byte enable 1
C/BE_O2	OUTPUT	V10	PCI command/byte enable 2

Table 3-2: U19 Gate Array Pinouts (Continued)

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
C/BE_O3	OUTPUT	Y15	PCI command/byte enable 3
CLK1MS	OUTPUT	B14	1Ms clock for USB (not used)
C161_RXD	OUTPUT	A19	To external and debug port serial input
C161_TXDD	OUTPUT	D14	C161 boot and debug port serial output
DPOT_CLK	OUTPUT	W4	Digital Pot Clock
DPOT_DAT	OUTPUT	Y2	Digital Pot Data
/DPOT_RST	OUTPUT	Y19	Digital Pot 1 Select (called reset)
/DPOT2_RST	OUTPUT	U20	Digital Pot 2 Select (called reset)
/ENET_CE	OUTPUT	R19	Ethernet Chip enable
/ENET_DACK	OUTPUT	P18	Ethernet DMA request
/FRAME	OUTPUT	W10	PCI Frame
HBUS_A_O0	OUTPUT	A11	Host bus address bit 0
HBUS_A_O1	OUTPUT	B11	Host bus address bit 1
HBUS_A_O2	OUTPUT	B12	Host bus address bit 2
HBUS_A_O3	OUTPUT	D12	Host bus address bit 3
/HBUS_RD	OUTPUT	B13	Host bus read
/HBUS_WR	OUTPUT	C13	Host bus write
/IRDY	OUTPUT	Y10	PCI Initiator ready
/IRL_O0	OUTPUT	B3	SH3 Interrupt 0
/IRL_O1	OUTPUT	B2	SH3 Interrupt 1
/IRL_O2	OUTPUT	A2	SH3 Interrupt 2
/IRL_O3	OUTPUT	C3	SH3 Interrupt 3
I2C3_SCL	OUTPUT	V18	I2C clock (3V)
I2C5_SCL	OUTPUT	P20	I2C clock (5V)
/LED	OUTPUT	C19	Debug LED
/MODEM_CE	OUTPUT	R20	Modem Chip enable
PAR	OUTPUT	Y9	PCI parity
PCI_CLK	OUTPUT	W17	PCI Clock
/PCI_RESET	OUTPUT	Y18	PCI reset
/PGM_RESET	OUTPUT	M20	Programmable reset
/READ_SW	OUTPUT	W20	Read enable for buttons
/SAA7111_OE	OUTPUT	T17	Video encoder output enable
/SH_DREQ0	OUTPUT	D5	SH3 DMA request 0
/SH_DREQ1	OUTPUT	D10	SH3 DMA request 1
SH_RXD2	OUTPUT	C16	T0 SH3 port 2 serial input
/SH_WAIT	OUTPUT	V20	SH3 Wait
SPARE5	OUTPUT	W3	
SPARE6	OUTPUT	B20	
/USB_CE	OUTPUT	P17	USB chip enable
/WRITE_LED	OUTPUT	V19	Write strobe for LED output bits
/WRITE_MISC	OUTPUT	Y20	Write strobe for GP output bits

Table 3-2: U19 Gate Array Pinouts (Continued)

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
/ZORAN_OE	OUTPUT	C15	Zoran output enable
AD_B0	BIDIR	V4	PCI A/D0
AD_B1	BIDIR	V5	PCI A/D1
AD_B2	BIDIR	U5	PCI A/D2
AD_B3	BIDIR	W5	PCI A/D3
AD_B4	BIDIR	Y4	PCI A/D4
AD_B5	BIDIR	V6	PCI A/D5
AD_B6	BIDIR	Y5	PCI A/D6
AD_B7	BIDIR	W6	PCI A/D7
AD_B8	BIDIR	Y6	PCI A/D8
AD_B9	BIDIR	W7	PCI A/D9
AD_B10	BIDIR	V8	PCI A/D10
AD_B11	BIDIR	Y7	PCI A/D11
AD_B12	BIDIR	W8	PCI A/D12
AD_B13	BIDIR	U9	PCI A/D13
AD_B14	BIDIR	V9	PCI A/D14
AD_B15	BIDIR	Y8	PCI A/D15
AD_B16	BIDIR	Y12	PCI A/D16
AD_B17	BIDIR	W12	PCI A/D17
AD_B18	BIDIR	Y13	PCI A/D18
AD_B19	BIDIR	V12	PCI A/D19
AD_B20	BIDIR	U12	PCI A/D20
AD_B21	BIDIR	W13	PCI A/D21
AD_B22	BIDIR	Y14	PCI A/D22
AD_B23	BIDIR	V13	PCI A/D23
AD_B24	BIDIR	V14	PCI A/D24
AD_B25	BIDIR	W15	PCI A/D25
AD_B26	BIDIR	Y16	PCI A/D26
AD_B27	BIDIR	V15	PCI A/D27
AD_B28	BIDIR	Y17	PCI A/D28
AD_B29	BIDIR	W16	PCI A/D29
AD_B30	BIDIR	U14	PCI A/D30
AD_B31	BIDIR	V16	PCI A/D31
C161_HD_B0	BIDIR	U7	C161 Data bus bit 0
C161_HD_B1	BIDIR	Y3	C161 Data bus bit 1
C161_HD_B2	BIDIR	A3	C161 Data bus bit 2
C161_HD_B3	BIDIR	W14	C161 Data bus bit 3
C161_HD_B4	BIDIR	V11	C161 Data bus bit 4
C161_HD_B5	BIDIR	F19	C161 Data bus bit 5
C161_HD_B6	BIDIR	C18	C161 Data bus bit 6
C161_HD_B7	BIDIR	A20	C161 Data bus bit 7

Table 3-2: U19 Gate Array Pinouts (Continued)

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
C161_HD_B8	BIDIR	B19	C161 Data bus bit 8
HBUS_D_B0	BIDIR	C5	Host Data bus bit 0
HBUS_D_B1	BIDIR	C6	Host Data bus bit 1
HBUS_D_B2	BIDIR	A5	Host Data bus bit 2
HBUS_D_B3	BIDIR	C7	Host Data bus bit 3
HBUS_D_B4	BIDIR	A7	Host Data bus bit 4
HBUS_D_B5	BIDIR	B8	Host Data bus bit 5
HBUS_D_B6	BIDIR	D9	Host Data bus bit 6
HBUS_D_B7	BIDIR	B9	Host Data bus bit 7
HBUS_D_B8	BIDIR	A10	Host Data bus bit 8
HBUS_D_B9	BIDIR	C11	Host Data bus bit 9
HBUS_D_B10	BIDIR	A12	Host Data bus bit 10
HBUS_D_B11	BIDIR	C12	Host Data bus bit 11
HBUS_D_B12	BIDIR	A13	Host Data bus bit 12
HBUS_D_B13	BIDIR	A14	Host Data bus bit 13
HBUS_D_B14	BIDIR	C14	Host Data bus bit 14
HBUS_D_B15	BIDIR	B15	Host Data bus bit 15
H5BUS_D_B0	BIDIR	A4	Host Data bus (5V) bit 0
H5BUS_D_B1	BIDIR	D7	Host Data bus (5V) bit 1
H5BUS_D_B2	BIDIR	B6	Host Data bus (5V) bit 2
H5BUS_D_B3	BIDIR	A6	Host Data bus (5V) bit 3
H5BUS_D_B4	BIDIR	C8	Host Data bus (5V) bit 4
H5BUS_D_B5	BIDIR	A8	Host Data bus (5V) bit 5
H5BUS_D_B6	BIDIR	C9	Host Data bus (5V) bit 6
H5BUS_D_B7	BIDIR	A9	Host Data bus (5V) bit 7
I2C3_SDA	BIDIR	W19	I2C Data (3V)
I2C5_SDA	BIDIR	P19	I2C Data (5V)
SH_D_B0	BIDIR	C1	SH3 Data bit 0
SH_D_B1	BIDIR	D1	SH3 Data bit 1
SH_D_B2	BIDIR	E3	SH3 Data bit 2
SH_D_B3	BIDIR	E2	SH3 Data bit 3
SH_D_B4	BIDIR	G4	SH3 Data bit 4
SH_D_B5	BIDIR	F2	SH3 Data bit 5
SH_D_B6	BIDIR	F1	SH3 Data bit 6
SH_D_B7	BIDIR	G3	SH3 Data bit 7
SH_D_B8	BIDIR	G2	SH3 Data bit 8
SH_D_B9	BIDIR	G1	SH3 Data bit 9
SH_D_B10	BIDIR	H3	SH3 Data bit 10
SH_D_B11	BIDIR	H2	SH3 Data bit 11
SH_D_B12	BIDIR	H1	SH3 Data bit 12
SH_D_B13	BIDIR	J4	SH3 Data bit 13

Table 3-2: U19 Gate Array Pinouts (Continued)

SIGNAL NAME	PIN TYPE	PIN NO.	PIN DESCRIPTION
SH_D_B14	BIDIR	J3	SH3 Data bit 14
SH_D_B15	BIDIR	J2	SH3 Data bit 15
SH_D_B16	BIDIR	J1	SH3 Data bit 16
SH_D_B17	BIDIR	K2	SH3 Data bit 17
SH_D_B18	BIDIR	K3	SH3 Data bit 18
SH_D_B19	BIDIR	K1	SH3 Data bit 19
SH_D_B20	BIDIR	L4	SH3 Data bit 20
SH_D_B21	BIDIR	M1	SH3 Data bit 21
SH_D_B22	BIDIR	M2	SH3 Data bit 22
SH_D_B23	BIDIR	M3	SH3 Data bit 23
SH_D_B24	BIDIR	M4	SH3 Data bit 24
SH_D_B25	BIDIR	N1	SH3 Data bit 25
SH_D_B26	BIDIR	N2	SH3 Data bit 26
SH_D_B27	BIDIR	N3	SH3 Data bit 27
SH_D_B28	BIDIR	P1	SH3 Data bit 28
SH_D_B29	BIDIR	P2	SH3 Data bit 29
SH_D_B30	BIDIR	R1	SH3 Data bit 30
SH_D_B31	BIDIR	P3	SH3 Data bit 31
/TRDY	BIDIR	U11	PCI Target Ready

3.1.8 GRAPHICS PROCESSOR B69030 U7 Sheet 4

The graphic processor is Chips & Technology B69030 which has an integrated SDRAM frame buffer. The input to the graphic processor is a tri-stated 16-bit digital video bus which is either driven by the DVD processor or NTSC video decoder. It takes the YUV 4:2:2 16-bit digital video streams from the TV and DVD and places them in the frame buffer for display on the LCD monitor. The graphics processor also adds message overlays and renders the Internet data. It interfaces directly to U19, the Altera FPGA which implements the PCI interface. The Altera FPGA, U19, decodes chip select 5 (SH_CS5_N) for the graphics processor. The reference clock for the graphics processor is derived from a 14.31818 MHz oscillator (U8).

3.1.9 VIDEO CLOCK/SYNC MULTIPLEXER TI SN74LVC157AD U62 Sheet 4

The two video input sources (TV and DVD) to the graphics processor. Each has its own video clock that must be individually sent to the video processor. A multiplexer (U62) is used to direct the proper clock to the video processor for TV or DVD mode.

3.1.10 LVDS TRANSMITTER TI SN75LVDS84A U59 Sheet 4

The LVDS transmitter converts the 18-bit RGB data, HSYNC, VSYNC and pixel clock from the graphics processor into low voltage differential signals to be transmitted to the LCD display through J23 and J24 connectors.

3.1.11 DUAL DIGITAL POTENTIOMETER DS1803E-010 U69 Sheet 4

U69 is an addressable dual digital 10K potentiometer which is used to control the brightness of the LCD display. Control of the digital potentiometer is through the 3V I²C bus.

3.1.12 IR RECEIVER MODULE TSOP 1238 U58 Sheet 5

U58 is an Infrared Remote Control Receiver Module that is used to receive the remote keyboard data.

3.1.13 MCU for MODEM CONEXANT L2800-38 U31 Sheet 6

U31 is the 8-bit microcontroller for the modem chipset. Y8 is a 28.22MHz crystal that drives the IC.

3.1.14 MDP for MODEM CONEXANT R6764-61 U41 Sheet 6

U41 provides the modem data pump functionality.

3.1.15 SRAM for MODEM MCU ISSI IS61C1024 U30 Sheet 6

U30 provides the 1Mbit (128K x 8) SRAM required for firmware execution.

3.1.16 EPROM for MODEM AMD AM29F002NB U29 Sheet 6

U29 provides the 2Mbit (256K x 8) EEPROM required for firmware execution.

3.1.17 CPU for DVD SEIMENS C161O-L16M U3 Sheet 7

The CPU used to control the DVD is an Infineon C161O-L16M. This is a 16-bit processor running code from SRAM. On reset the CPU waits for the initial boot code to be loaded using the serial port. After loading this code is run and used to load the main C161 code and the Zoran Vaddis III code. This code is loaded using the SH3 to C161 interface in the Altera gate array. The C161 is reset by a port pin (C161_RESET_N) from the SH3. The clock for the C161 is generated by using the 16 MHz crystal (Y2).

1. **Chip select 0** (RAMCS_N) is used to select the static memory for the C161. The memory is 512K x 16-bits wide.
2. **Chip select 1** (C161_CS1_N) is used to select the C161 to SH3 interface in the Altera gate array. The gate array port is 8-bits wide. When reading data from the SH3 bit-15 of the C161 is used as a data ready status.
3. **Chip select 2** (DVDCS_N) is used to select the Zoran Vaddis III chip. The port is 8-bits wide.
4. **Chip select 3** is not used.

3.1.18 EEPROM for DVD CPU ATMEL AT24C01 U2 Sheet 7

The 512 x 8 EEPROM is used to store the user options for the DVD operation. The EEPROM is interfaced to the C161 using a serial I2C bus. The operation of this bus is performed using software in the C161 processor.

3.1.19 SRAM for DVD CPU K6R4008C1C-JC12 U9, U12 Sheet 7

The memory for the C161 is made using two 512K x 8 SRAM chips. Because all the C161 code is run from these memories they must be reloaded after each reset of the C161 processor. Chip select 0 from the C161 is used to select the SRAM. Separate write enables are used to write the high and low bytes of the 16-bit word.

3.1.20 DVD DECODER ZORAN ZR36710 U4 Sheet 8

The Zoran Vaddis III ZR36710 is used to play the DVD discs. The chip is initialized and controlled by the C161. The crystal Y1 generates the 27MHz clock used by the DVD Decoder. Filtered power for the chips clock circuit is provided by R148, C112, and C4. The filter capacitor for the PLL is C117. The C161 controls the Vaddis III via an 8-bit data bus and 4 address bits. The ATAPI interface provides data on an 8-bit path. The video output is 16-bit data clock at 13.5 MHz. The data format used for the video data is YUV 4:2:2 16-bit.

3.1.21 SDRAM for DVD DECODER MICRON MT48LC1M16A1TG Sheet 8

The memory for the Zoran Vaddis III is made from two SDRAM chips. The chips are 1M x 16-bit SDRAM chips. The DVD player has a total of 4 MB (1M x 32) of memory. The Vaddis III provides all the signals to interface to the SDRAM chips.

3.1.22 ATAPI INTERFACE for DVD ZR36701 U1 Sheet 9

The ZR36701 is used to interface the ATAPI DVD drive to the Zoran Vaddis III chip. This chip connects to all the ATAPI DVD lines. The C161 processor provides control for the DVD drive and the data goes to the Vaddis III chip. The DVD drive is provided filtered power by the connector J16.

3.1.23 AUDIO -5V POWER SUPPLY LINEAR TECH. LTC1046 U25 Sheet 10

A switching power supply is used to produce the -5V supply for the audio circuitry from the 5V supply. Having a -5V power supply allows the circuit to have a ground reference.

3.1.24 DVD AUDIO DAC CS4338-KS IC2 Sheet 10

The audio DAC takes the serial digital audio stream from the DVD chip (U4) and converts it into 2 analog stereo audio channels. The audio outputs pass through an RC filter to remove the high frequency digitizing noise.

3.1.25 AUDIO ANALOG MUX CD4051BCM U15, U23 Sheet 10

U15 and U23 are analog multiplexers (right and left respectively) for the audio sources of the flipscreen. The sources are auxiliary audio, microphone, DVD, TV, CPU, and modem. The three select inputs are controlled by the CPU through the Altera CPLD.

3.1.26 DIGITAL POT DALLAS SEMICONDUCTOR U68 DS1267E-10 Sheet 10

U68 is a digital potentiometer used to normalize the input audio sources after the audio multiplexers (U15, U23).

3.1.27 AUDIO AMP NATIONAL LM4832M U20 Sheet 10

U20 is a digitally controlled tone and volume circuit with a stereo audio power amplifier and microphone preamp stage. The audio inputs come from the equalizing digital pot (U68). Filtered power for the audio amp is provided by R231, C161, C40, C164, C50 and C80. Control of the audio amp is provided by the 5V I²C bus.

3.1.28 INTERCOM OUTPUT SPEAKER AMP LM386M-1 U37 Sheet 10

The audio signal from the microphone preamp is supplied to the intercom speaker power amplifier (U37 pin 3). The amplified signal (U37 pin 5) then goes through the intercom speaker multiplexer before going to the speaker. Speakers used in external intercom “door call” units are typically 16 to 20 Ω speakers.

3.1.29 INTERCOM SPEAKER MULTIPLEXER QS4A1010 U36 Sheet 10

The switching of the external intercom “door call” speaker between talk and listen is done with quad analog switch U36. Three of the four switches are in parallel to drive the external speaker to reduce the resistance for the signal going to the speaker. The fourth switch is used to connect the preamp (U20) output to the speaker amplifier (U37).

3.1.30 INTERCOM BUTTON DETECT 74LCX14MX U27 2/6 Sheet 13

A circuit using two Schmitt trigger inverters detects the external intercom “door call” button pushes. Capacitor C79 is used to isolate the button detect circuit from the amplifiers and speaker. A 3.3V bias is provided by R282 to the wire going to the external speaker. When the intercom button is pushed this wire is grounded. The two inverters and the RC circuit (R243 and C58) form a debounce filter for the button. The diode D7 protects the circuit from over voltage when audio is on the line. The output (U27 pin 6) will go low when the intercom button is pushed.

3.1.31 INTERCOM LATCH DRIVER 74LCX14MX U27 1/6 Sheet 13

The door latch relay driver circuit is made using an inverter (U27), transistor (Q1), and relay K1. The DOORLATCH_EN line is pulled low by the SH3 to energize the relay and open the door. In this way the door latch will not inadvertently open when the SH3 output is tristated on reset.

3.1.32 TV TUNER U72 Sheet 11

The TV tuner is a module that takes the antenna/CATV in and outputs composite video and the TV audio. The tuner is powered by 5V. The tuner I²C interface is controlled by the SH3 through the 5V I²C bus driven by the Altera CPLD.

3.1.33 VIDEO DECODER SAA7111AH U22 Sheet 11

The TV composite video is converted CCIR-656 16-bit digital video by the SAA7111A decoder. The chip contains a video multiplexer to select either the tuner composite video or the external video source. The decoder I²C interface is controlled by the SH3 through the 3.3V I²C bus driven by the Altera CPLD. Crystal Y4 generates 24.576 MHz video decoder clock. The digital and analog sections of the chip each has its own isolated 3.3V supply.

3.1.34 DIGITAL THERMOMETER/THERMOSTAT DALLAS DS1621S U63 Sheet 12

U63 is a digital thermometer/thermostat used to control the operation of the fan. The SH3 controls U68 by the 3V I2C bus. When the temperature is measured at 55° C the fan power is enabled. When the temperature falls below 50° C, the fan power is disabled.

3.1.35 1.8V and 3.3 V SH3 REGULATORS U70, U71 Sheet 12

The SH3 utilizes two power voltages; 3.3V and 1.8V. On power up, the voltages must adhere to a specific power-on sequence. The 3.3V power supply should be powered on first, followed by the 1.8V supply *within 100us*. In order to accomplish this, two regulators, 1.8V and 3.3V were added. Both voltages are derived from the 5V supply. In addition to these regulators, FETs were added to control the delay between the 3.3V and 1.8V supplies. If this sequencing is not adhered to, the board will have intermittent power-up problems.

Please refer to Hitachi's Technical Update # TN-SH7-217, March 8,2000.

U70, LT1761ES5-3.3, is a low noise, low dropout linear regulator and is used to produce the 3.3V supply for the SH3 from the 5V supply.

U71, LT1763CS8, is a low noise, low dropout linear regulator and is used to produce the 1.8V supply for the board from the 5V supply.

3.1.36 RESET GENERATOR TPS3307-33D U44 Sheet 12

The power-on reset for the FlipScreen ICEBOX is generated by U44. This part monitors the 1.8V, 3.3V and 5V supplies. When all supplies reach full voltage the chip resets for about 200 milliseconds.

3.1.37 ETHERNET CONTROLLER CRYSTAL SEMI U40 Sheet 13

U40 is a single chip IEEE 802.3 Ethernet controller. It is initialized and control by the CPU via the Altera CPLD. The Altera CPLD implements a 16-bit ISA bus for communication. Y8 generates the 20MHz clock which drives the Ethernet controller. Isolated, filtered analog power is provided by FB19, C88, C189, C195, C202 and C210.

3.1.38 ETHERNET EEPROM ATMEL AT93C46 U46 Sheet 13

U46 provides 1Kbit of serial EEPROM and interfaces to the Ethernet controller. It is used to store the Ethernet MAC address.

3.1.39 USB HOST/SLAVE CONTROLLER SCANLOGIC SL811HS U38 Sheet 14

U38 is a USB Host/Slave Controller that conforms to USB Specification 1.1. The Altera CPLD decodes Chip Select 6 and communicates over an 8 bit parallel bus. The 48Mhz clock used to run the device is generated by U54.

3.1.40 USB HUB CONTROLLER ATMEL AT43301 U55 Sheet 14

U55 is a 5-port USB hub chip supporting one upstream and four downstream ports. The 48Mhz clock used to run the device is generated by U54.

3.1.41 BASS DIGITAL POTENTIOMETER DALLAS DS1267E U21 Sheet 15

U21 is a dual digital potentiometer used to adjust the gain of the audio bass signals.

3.1.42 OP-AMP NATIONAL SEMI LMC660CM U73 Sheet 15

U73 is an op-amp with +/-5V power supplies. It buffers the bass signals and provides a Gain of 2 to the signal.

3.1.43 QUAD AUDIO AMP PHILLIPS SEMI TDA8569Q U10 Sheet 15

U10 is an audio power amplifier powered by the 12V power supply. It contains 4 amplifiers in BTL configuration, each with a Gain of 26dB.

3.1.44 OPTO-ISOLATOR NEC PS2701-1 U6 Sheet 15

U6 is a high isolation voltage photo coupler used for Mute control. It has been implemented to prevent ground loops in the audio signals. C27 slows down the edge of the Mute signal to eliminate any "pops" in the output audio signal.

3.2 Modem Board Circuit Description

3.2.1 Data Access Arrangement Chip Set K2950G U1, U2

The DAA chipset consists of K951C, U2, and K952C, U1. In addition to these ICs, six isolation capacitors, K935U are also included in the chipset (C4, C6, C9, C11, C14, and C15). This chipset, along with the associated external components, provides the necessary line monitoring, filtering, isolation, protection, and signal conversion functions for the connection of high speed analog modem devices to the telephone network.

3.2.2 IR Receiver Module TSOP 1238 U5

U5 is an Infrared Remote Control Receiver Module that receives the remote keyboard data.

3.2.3 USB Power Switch TPS2042D U4

U4 is a Dual Power Distribution Switch that controls the USB power to external USB devices.

3.2.4 Photocoupler PS2701-1 U3

U3 is an optically coupled isolator that isolates the DAA_MODE signal from high voltage telephone circuitry.

3.3 LVDS Daughter Board Circuit Description

3.3.1 Low Voltage Differential Receiver SN75LVDS86A U1

U1 is a LVDS receiver that converts the low voltage differential LCD signals from the front panel to low voltage TTL signals.

4. Disassembly / Reassembly

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4. Disassembly / Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the Flipscreen iCEBOX and its subassemblies.

**WARNING!**

Risk of electrical shock. High voltages may be present. Disconnect the unit from mains power before beginning any disassembly procedure.

Before beginning:

- Disconnect the iCEBOX from mains power.
- Begin with the screen closed flat.
- Verify how many connections are routed to the back panel (may include: TV coaxial cable, telephone/modem, ethernet, audio and video, security, 2 USB connections on bottom panel. Refer to Figure 4.1 below.)

Required tools:

- 5mm allen wrench or hex screw driver
- Small phillips screw driver
- Flat screw driver
- 7/32 (5.5mm) socket wrench
- 13mm socket wrench

4.1 Removing the iCEBOX from the Installation Site

1. At the bottom rear of the unit, remove the cable tray (3 phillips screws) (Figure 4-1).

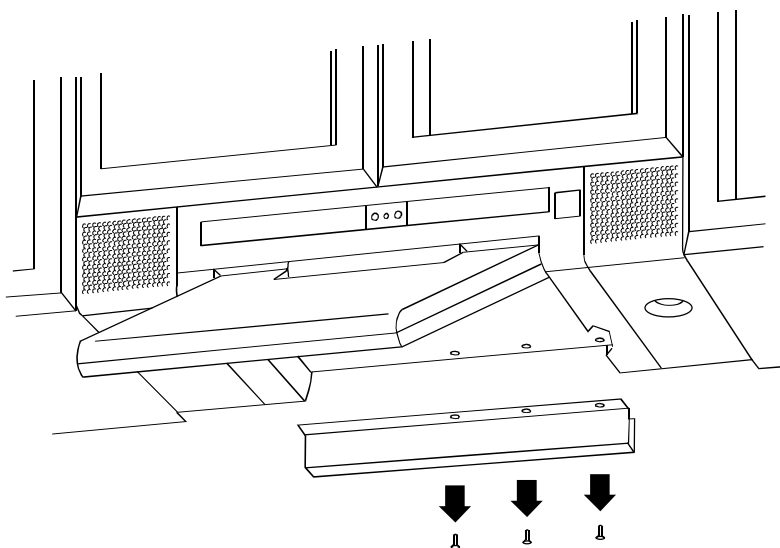


Figure 4-1 Removing the cable tray

- Using either your fingers or a flat screw driver, reach behind the back panel to unscrew and loosen the 2 steel lock pins. This will allow the unit to slide forward on the mounting bracket (Figure 4-2).

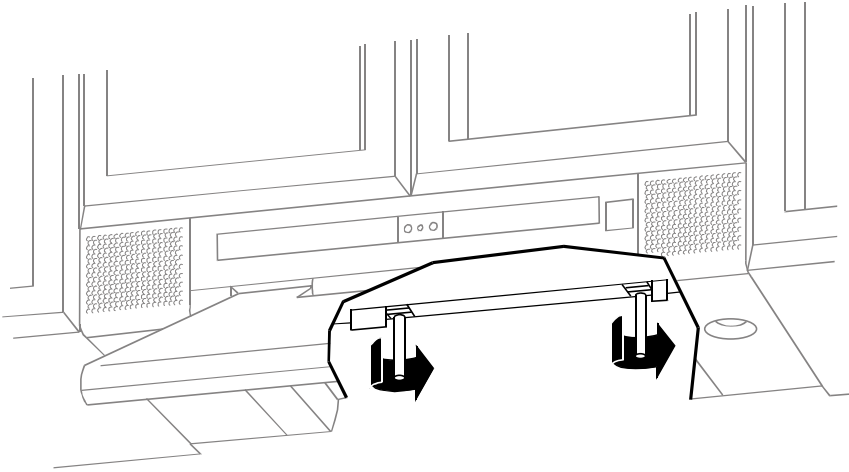


Figure 4-2 Loosening the lock pins

- Slide the unit slightly forward. While supporting the chassis with one hand, reach behind the unit and unplug all connections to the rear panel. Refer to Figure 4-3 for locations of rear panel connectors.

Note: It is not necessary to disconnect the iCEBOX's integral speakers from the rear panel.

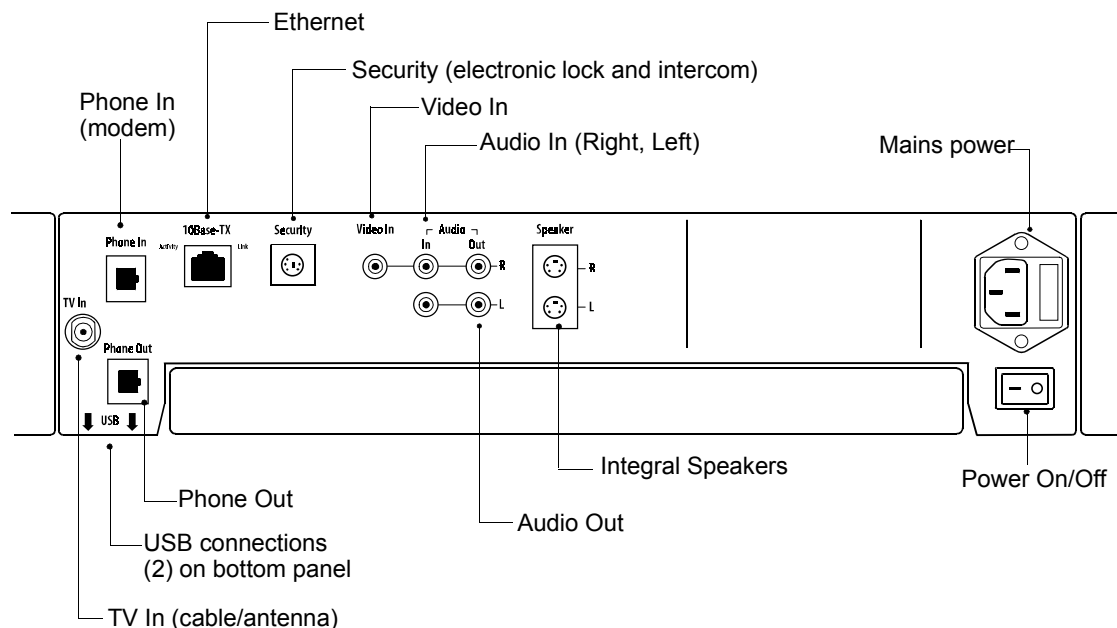


Figure 4-3 Flipscreen iCEBOX rear panel connections

4.2 Disassembly

4.2.1 Chassis Disassembly


WARNING!

Risk of electrical shock. High voltages may be present. Disconnect the unit from mains power before beginning any disassembly procedure.

Notes:

- Removing the integral speakers from the chassis will facilitate disassembly.
- Before beginning disassembly, remove the iCEBOX from the installation site.
- Refer to Figure 4-5 for an exploded view of the main chassis assembly.

4.2.1.(A) REMOVING THE TOP COVER

1. Remove 13 hex screws from the top cover.
2. Remove 3 phillips screws each from the left and right side panels.
3. Lift the top cover away.

4.2.1.(B) REMOVING THE FRONT PANEL

1. On the front panel, open the push button door (push PUSH). Remove 2 hex screws (Figure 4-4).
2. Open the disc tray door by inserting a 1/16-inch x 2-inch rod (1.58mm x 50.8mm), or similar object, into the small hole below the DVD logo on the disc tray door. Remove 1 hex screw.
3. Remove the DVD tray cover by gently lifting the tray cover while pushing down against the DVD tray.
4. Carefully separate the front panel from the chassis, disconnect the microphone cable, and lift the front panel away.

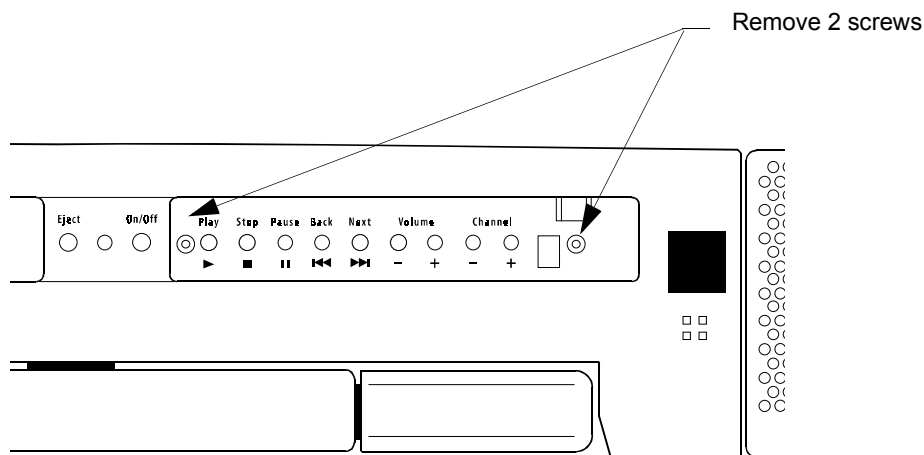


Figure 4-4 Push button panel, shown with door open

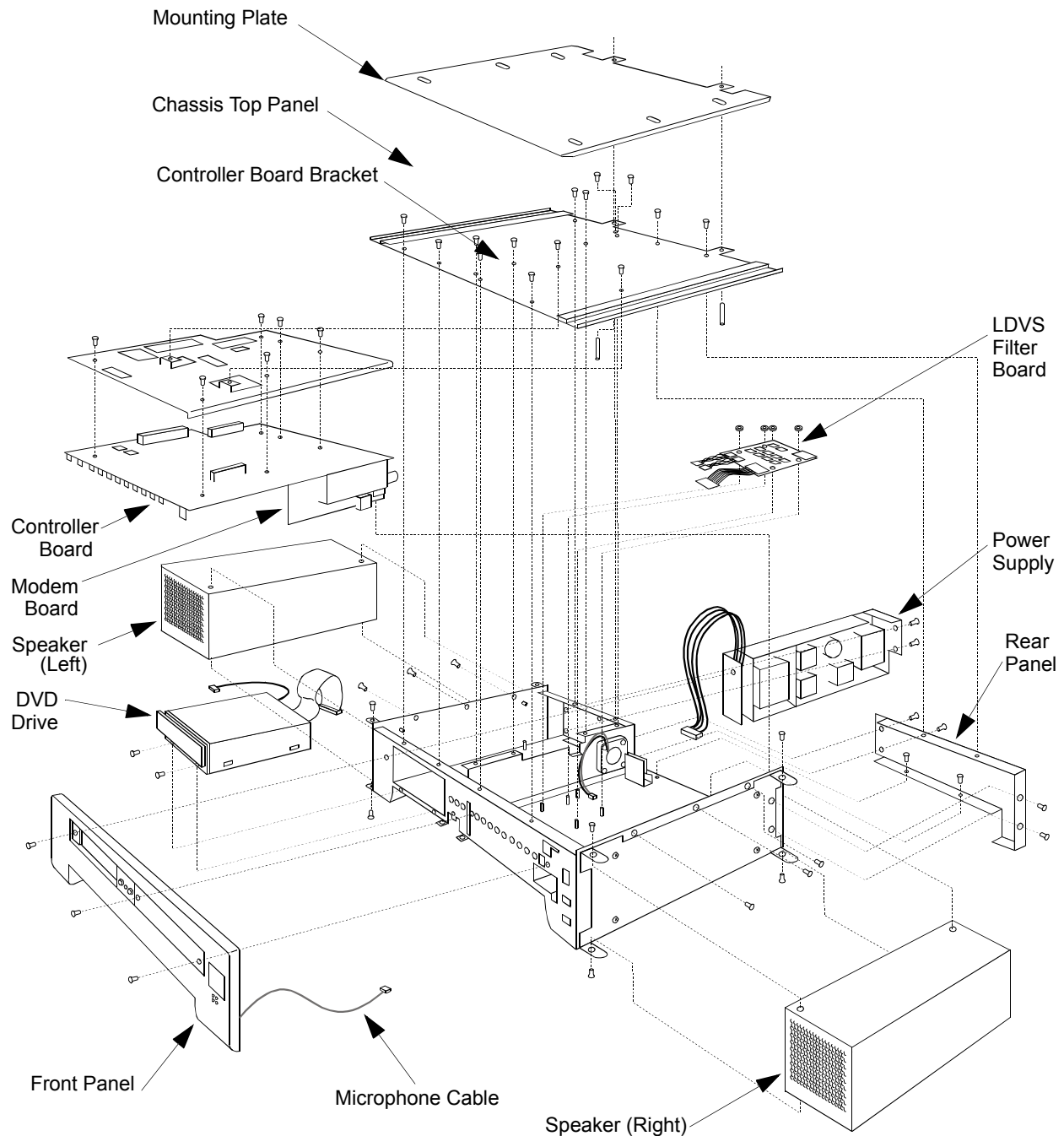


Figure 4-5 Main Chassis, Exploded View

4.2.1.(C) REMOVING THE CONTROLLER BOARD / MODEM BOARD / REAR PANEL ASSEMBLY

First remove top cover [4.2.1.(A)]

1. Carefully remove copper tape (over the DVD cables) and save for reuse.
2. Disconnect all the connectors on the back side of the Controller Board, accessible through the sheet metal bracket:

- J15 ATAPI connector (40-pin, grey ribbon cable) to DVD drive.
 - J14 (red, black, yellow wires) from power supply.
 - J16, DVD power cable
3. On the back panel remove:
 - 2 hex screws to the right (when viewed from the rear) of the speaker connector (J6)
 - 2 phillips screws from right side
 - 2 phillips screws from bottom, near the USB connectors
 4. Slide the sheet metal bracket attached to the back of the Controller PCB out of the slots on the chassis front panel and tilt the Controller PCB out of the chassis.
 5. On the component side of the Controller PCB assembly disconnect:
 - J10 to the microphone
 - J25 to the fan
 - J4 (black) to Backlight Inverter PCB, J1
 - Controller PCB connectors to LVDS Filter PCB
 - J24 (grey) to J3 (grey)
 - J23 (black) to J2 (black)
 6. Remove the Controller PCB from the chassis.
 7. Remove the rear panel:
 - Remove 3 hex screws and 1 phillips screw
 - Using a 13mm socket, remove the coaxial cable connector nut.
 - Pull the back panel away from the Controller PCB assembly.
 8. To remove the Modem board, remove 1 phillips screw and disconnect the edge connector (J13, Controller PCB to J2 Modem board).
 9. To remove the sheet metal bracket from the back of the Controller PCB, remove the 5 remaining hex screws.

4.2.1.(D) REMOVING THE LVDS FILTER BOARD

First remove the top cover [4.2.1.(A)], and the Controller/Modem PCB/Rear Panel Assembly [4.2.1.(C)]:

1. Using a 7/32 (5.5mm) socket, remove 4 hex nuts from the corners of the LVDS Filter PCB.
2. Lift the board away from the chassis and remove 4 spacers.
3. Disconnect J6 (black), J5 (grey), and J4 (black).
4. Remove the board from the chassis.

4.2.1.(E) REMOVING THE DVD DRIVE

First remove the top cover [4.2.1.(A)] and the front panel [4.2.1.(B)].

1. Disconnect DVD cables (J15, J16 to controller board).
2. Remove 2 hex screws from the front panel.
3. Using a 7/32 (5.5mm) socket, remove 2 hex nuts at the rear of the drive.
4. Slide the DVD drive through the opening in the front panel.

4.2.1.(F) REMOVING THE POWER SUPPLY ASSEMBLY

First remove the top cover [4.2.1.(A)].

1. Unplug cable to Controller PCB.
2. Remove 2 hex screws next to the rear panel.
3. Loosen the screws holding the left speaker bracket to the chassis.
4. Pressing firmly, slide the Power Supply subassembly through the opening in the rear panel.

4.2.1.(G) REMOVING THE DISPLAY ASSEMBLY

First remove the top cover [4.2.1.(A)], front panel [4.2.1.(B)] and the Controller/Modem PCB/Rear Panel Assembly [4.2.1.(C)].

Refer to Figure 4-6.

1. Remove 3 hex screws (including the ground wire under the spade lug) from the top of the pivot shield.
2. Disconnect the shielded grey and black cables from the LVDS Filter Board. Remove the grounding clamps.
3. Rotate the display to allow access to the 3 phillips screws on the bottom of the flange. Remove the 3 phillips screws.
4. While sliding the display away from the mounting flanges, thread display assembly cables through the opening in the front panel.

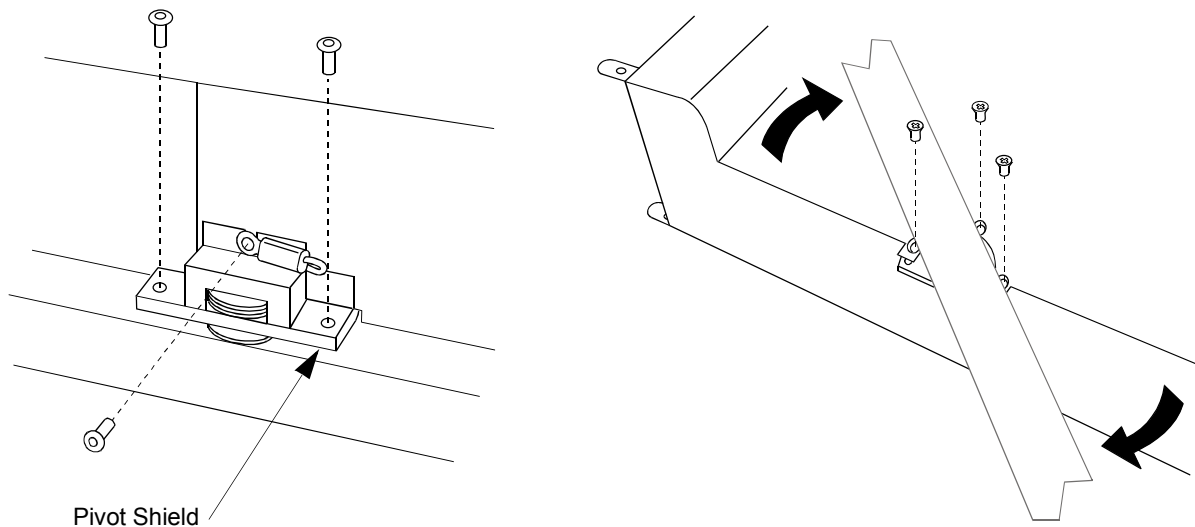


Figure 4-6 Removing the Display Assembly

4.2.2 Display Disassembly

First remove the Display Assembly from the chassis [4.2.1.(G)].

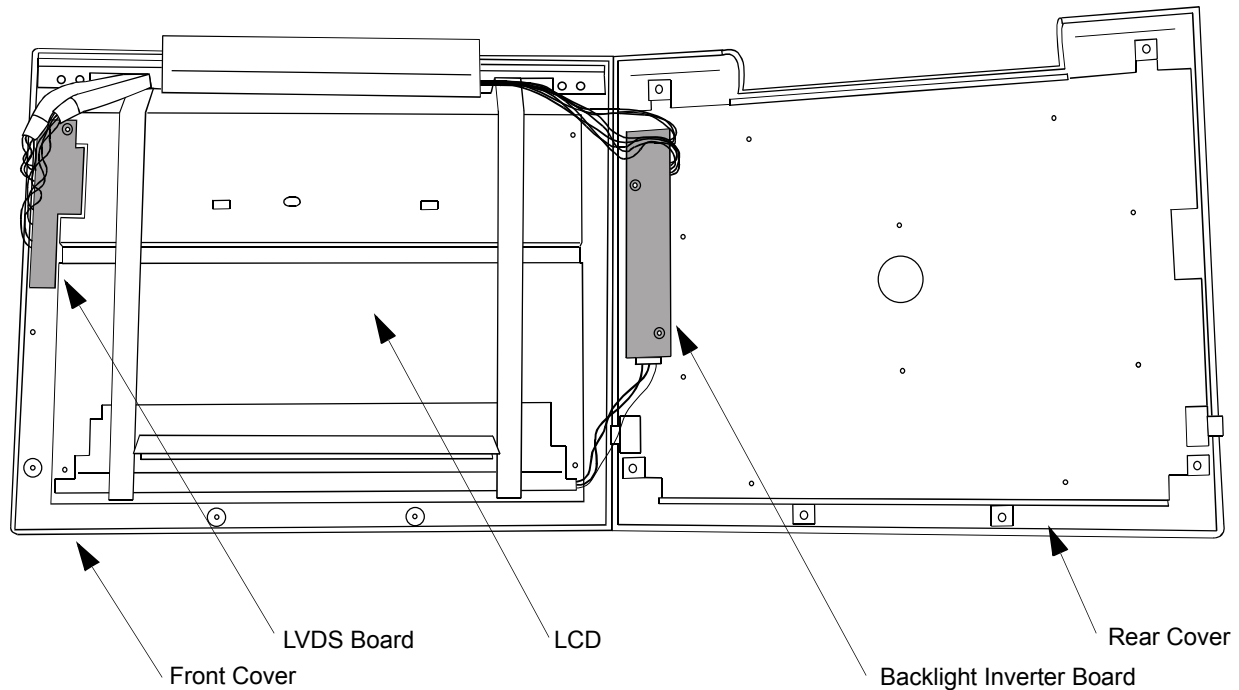


Figure 4-7 Display Assembly, Interior View

4.2.2.(A) SEPARATING THE FRONT AND BACK OF THE DISPLAY CHASSIS

1. Remove 2 phillips screws from the front, bottom edge of the display.
2. On the back of the display remove 4 phillips screws.
3. With the screen facing up, slightly separate and gently jockey the front and back covers of the display chassis to release the detent locking tabs along the left and right edges. Do not force the front and back apart.
4. With the front and back still slightly separated, disconnect (3-pin, white) from Backlight Inverter Board to LCD panel.
Note: During reassembly, take care not to pinch wires.
5. Partially separate the front and back. Remove the 2 phillips screws from the Backlight Inverter Board.
6. Lift the PCB away from the display rear cover. The front and rear covers of the display chassis can now be completely separated.

4.2.2.(B) REMOVING THE LCD SCREEN

To remove the LCD screen, place the display front cover, viewing surface down, on a soft, non-abrasive surface.

1. Remove 4 phillips screws from each corner of the screen.
2. Lift aside LVDS Board.
3. Remove the screen from the display chassis.

4.2.2.(C) DISASSEMBLING THE PIVOT HINGE

First separate the front and back halves of the display chassis [4.2.2.(A)].

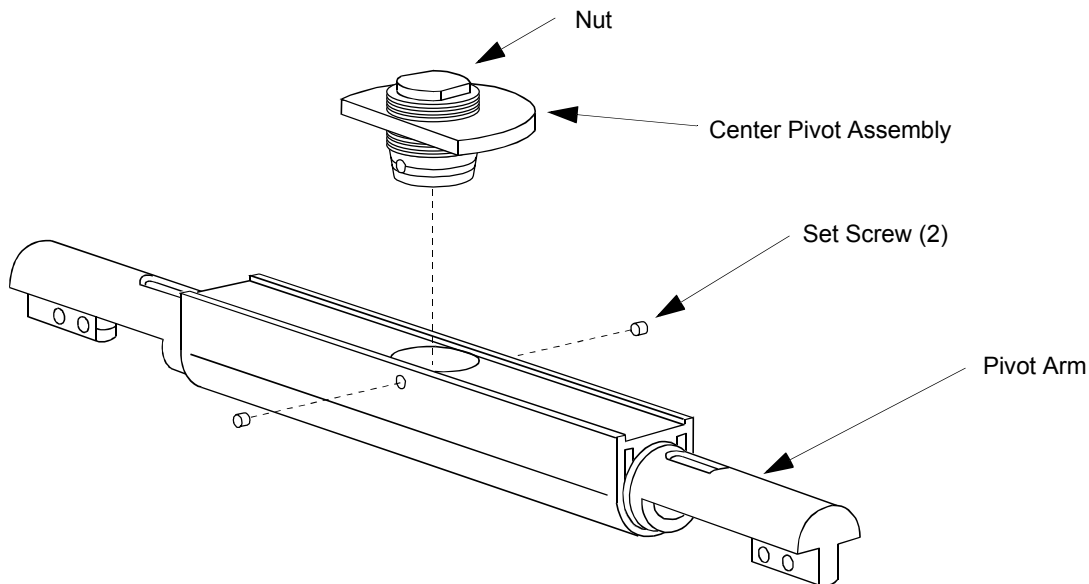


Figure 4-8 Hinge Assembly, Explode View

Refer to Figure 4-8.

1. Remove 1 phillips screw from each corner of the pivot arm (2 total).
2. Gently pry the pivot arm away from the lower edge of the display chassis. Lift the pivot arm away from the chassis.
3. Remove the cables from the Center Pivot Assembly (item #):
 - (a) Using a 1/16-inch (1.5mm) allen wrench, loosen the set screws on the front and back center of the pivot arm (item #).
 - (b) Using a 5/8-inch (16mm) allen wrench, loosen the nut in top of the center pivot assembly. Lift the center pivot assembly out of the pivot arm. Remove the cables.
4. Remove the 2 LVDS cables (black and grey), the inverter cable, and the display ground cable.

4.3 Reassembly

Reassembly is accomplished by reversing the order of disassembly.

Note: Before replacing the top cover, replace the copper tape as shown in Figure 4-9.

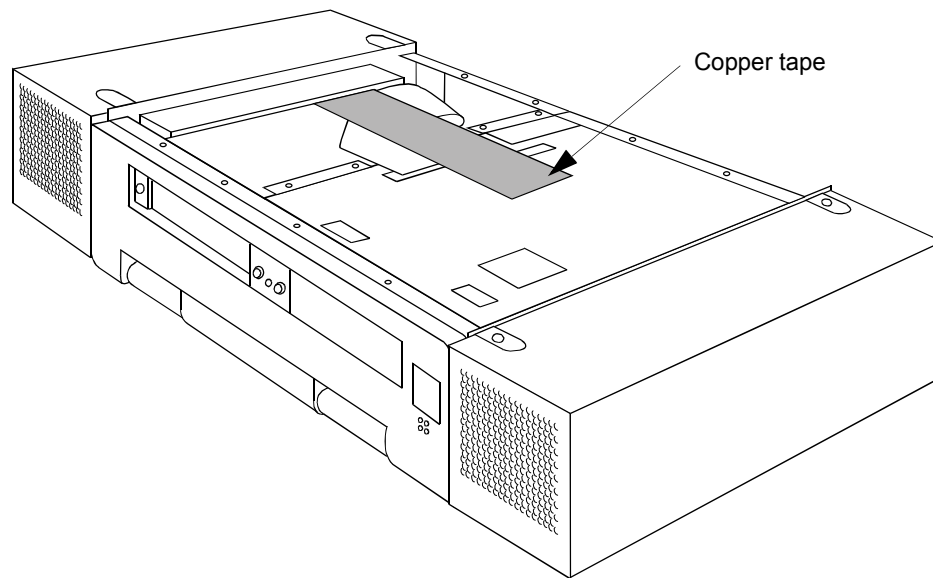


Figure 4-9 Replacing the copper tape

4.4 Reinstalling the iCEBOX FlipScreen

1. Install the iCEBOX onto the mounting bracket taking care to align the guide rails on the bracket with the rails on top of the iCEBOX. Slide the unit about half way back onto the rails.
2. Plug the cables into the appropriate connectors. (Refer to step 3 in paragraph 4.1 "Removing the iCEBOX from the Installation Site" on page 4-1.)
3. Making sure no cables will be pinched or crimped, slide the iCEBOX all the way onto the mounting bracket. Ensure that the slotted tabs at the top rear of the unit are fully engaged with the lock pins.
4. Replace the cable tray, gathering the cables behind the unit into the tray.
5. When installation is complete, the face of the unit should be flush with or slightly recessed from the face of the cabinets.

5. Updating the Operating System

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 - Performing the CD Update5-1
 - Verifying the Update5-1
 - CD Update Procedure Notes5-1
- PromICE / Controller Board Opreating System Update 5-2**
 - Performing the PromICE Update5-2

5. Updating the Operating System

The iCEBOX FlipScreen operating system can be updated using an iCEBOX-supplied CD or by downloading software from a PC via a PromICE adapter.

5.1 CD Operating System Update

To update the unit's operating system with the iCEBOX-supplied CD, the unit must be functioning normally.

During the update procedure:

- Do not attempt to use any iCEBOX features. Do not turn the unit on or off.
- Do not use the remote control or keyboard. Use only the controls on the front panel.
- To avoid interrupting this procedure, set the remote and keyboard out of range or cover the IR receivers on the front and bottom of the unit with a piece of black electrical tape.
- When the procedure is complete, be sure to remove the Update CD from the DVD drive.

5.1.1 Performing the CD Operating System Update:

1. Plug the unit into mains power and turn it on. (Use the ON/OFF button on the front panel.)
2. Press EJECT (on the front panel) to open the disc tray and place the Update CD in the tray (printed side up). Do not push the tray closed. Press PLAY on the front panel to close the DVD tray.
3. After a 10 - 15 second delay, UPDATE CD and a countdown indicator (99 - 0) will appear on the screen. If the indicator does not appear, press PLAY again to begin the process.
4. The operating system update lasts approximately 8 minutes. When the countdown indicator reaches "0" the green LED on the front panel will flash for one minute before the unit shuts off automatically.
5. After the unit shuts down, wait 10 - 15 seconds, then press the ON/OFF button to turn the unit back on.
6. Press EJECT once to remove the Update CD. The unit may delay several seconds before opening the DVD tray. Do not press EJECT again.

Note: VERY IMPORTANT! Remove the Update CD from the unit when the procedure is complete.

7. If necessary, remove the material covering the IR sensors. After the update procedure is complete, the remote and keyboard may be used normally.

5.1.2 Verifying the Update:

- Press NET on the remote or keyboard to go into Internet mode. Press NET again.
- The displayed software version should match the version printed on the Update CD.

5.1.3 CD Update Procedure Notes:

- Please follow the procedure exactly.
- There may be a delay of several seconds before the unit recognizes the Update CD and begins the update procedure.

- If the update process was interrupted at any point before being completed, you may have to start over from step 1.
- If UPDATE CD and the countdown indicator do not appear on the screen after performing steps 1 through 3, the operating system update is not occurring. If UPDATE CD and the countdown indicator fail to appear, try pressing 'PLAY' again to start the update procedure. If this does not work, shut off the unit and start over from step 1.
- To verify the software version, follow the procedure in paragraph 5.1.2 on the previous page.

Note: If the Update CD is inadvertently left in the DVD tray and the unit begins the update procedure a second time, you can stop the process by ejecting the disc before the countdown indicator reaches 0.

5.2 PromICE / Controller Board Operating System Update

This operating system update procedure can be used on non-functioning units.

This procedure requires:

- A custom serial adapter available from iCEBOX, LLC.
- A PromICE unit available from Grammar Engines, Inc. (Please refer to the GEI Web site: www.gei.com, or contact iCEBOX customer service for more information.).
- A PC with Windows 95/98 or Windows NT/2000.

Before beginning this procedure you need to:

- Create an Update directory on the PC with the iCEBOX software.
- Download software from the iCEBOX FTP site at: ftp.iceboxllc.com.
- Copy the downloaded files into the Update directory.
- Download and install the PromICE program according to the instructions provided at the GEI Web site (www.gei.com).

5.2.1 Performing the PromICE Update:

1. Turn the unit off and disconnect the power cord.
2. To access the PromICE header (JP7) on the top of the Controller Board:
 - Remove 13 hex screws from the chassis top panel.
 - Remove 3 phillips screws each from the left side and right side panels.
 - Lift the top cover away.
3. Connect the iCEBOX custom serial adapter to the PC's serial port. Connect the other end to: Debug-J56 to Controller Board-J20 and Debug-J57 to Controller Board-J21. Set Switch 16 to ICE position (refer to Figure 5-1).
4. Plug the PromICE cable into JP7 on the Controller Board.

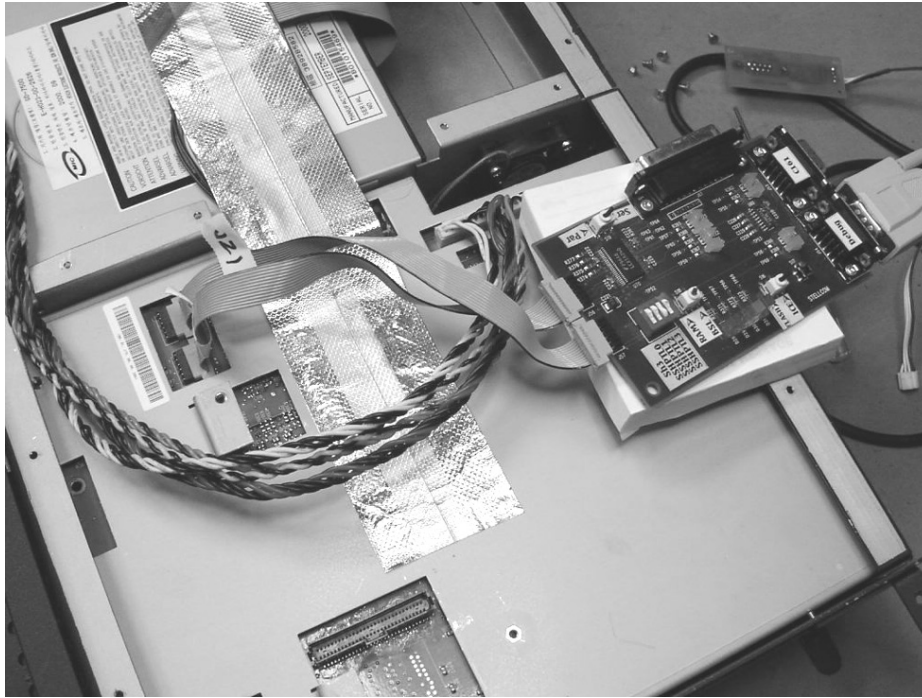


Figure 5-1 Connecting the serial adapter to J20 and J21 on the Controller Board

5. On the PC, open a DOS window in the Update directory. At the prompt type `LOADICE <return>`. The program loads the firmware hex files into the PromICE module connected to JP7.
6. Open a HyperTerminal window. Select **FILE > PROPERTIES**.
7. In the **CONNECT USING** selection box, select the Com port (COM1 or COM2) that the serial adapter is connected to (see step 3).
8. (Refer to Figure 5-2) Select **CONFIGURE** and set:
 - Bits per second: 38400
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
9. Ensure that switch S16 on the serial adapter is in the "ICE" position. Plug the iCEBOX into mains power.

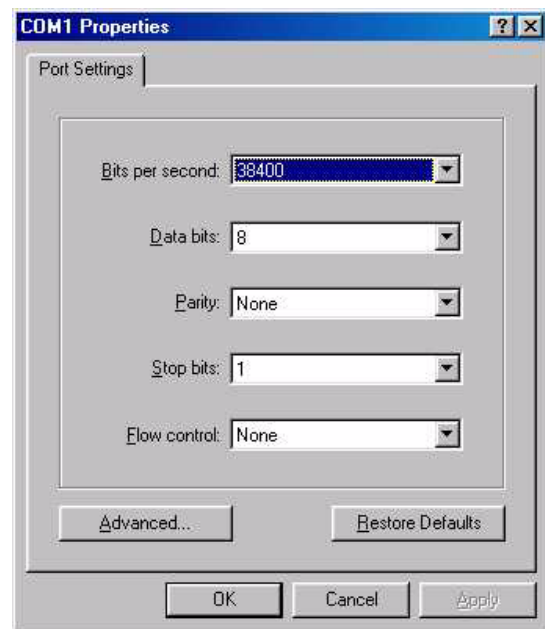


Figure 5-2 Hyperterminal settings window



WARNING!

Risk of electrical shock. High voltages may be present. Use caution while the unit is plugged into mains power.

6. Troubleshooting

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6. Troubleshooting

6.1 General Troubleshooting

The following sections cover the troubleshooting procedures for the major functions of the iCEBOX FlipScreen product.

6.1.1 Troubleshooting Setup

The troubleshooting trees in the General Troubleshooting sections are meant to be used by service personnel in a test laboratory or electronic servicing facility. The service engineer will need the following tools, equipment, and materials to complete these troubleshooting procedures for the iCEBOX FlipScreen product:

1. FlipScreen power cable
2. 10/100 baseT Ethernet port or hub
3. Standard ethernet cable
4. TV antennae or cable TV service
5. Analog telephone line
6. DVD disc
7. USB cable
8. External Audio/Video input source (i.e. Video Camera, VCR, TV, DVD player, etc.)
9. iCEBOX Flipscreen compatible Intercom and electronically controlled lock
10. iCEBOX Flipscreen compatible USB printer

The service engineer must ensure that all test equipment, cables, etc. are in good working order before commencing with the troubleshooting procedures.

Note: The service engineer must perform a Power-On reset before beginning each of the General Troubleshooting procedures that follow below.

6.1.2 Power On Troubleshooting

Follow the procedure detailed in Figure 6-1 to aide in troubleshooting Power-On faults.

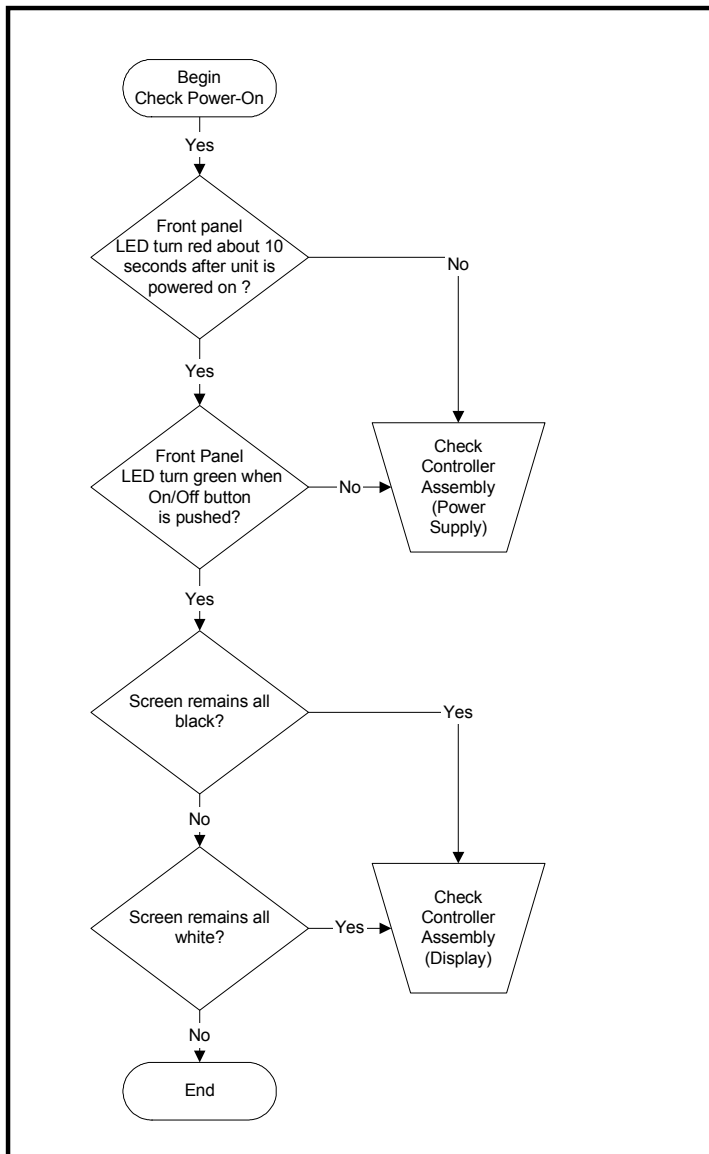


Figure 6-1 Power-On Troubleshooting Tree

6.1.3 TV Mode Troubleshooting

Follow the procedure detailed in Figure 6-2 to aid in troubleshooting TV Mode faults.

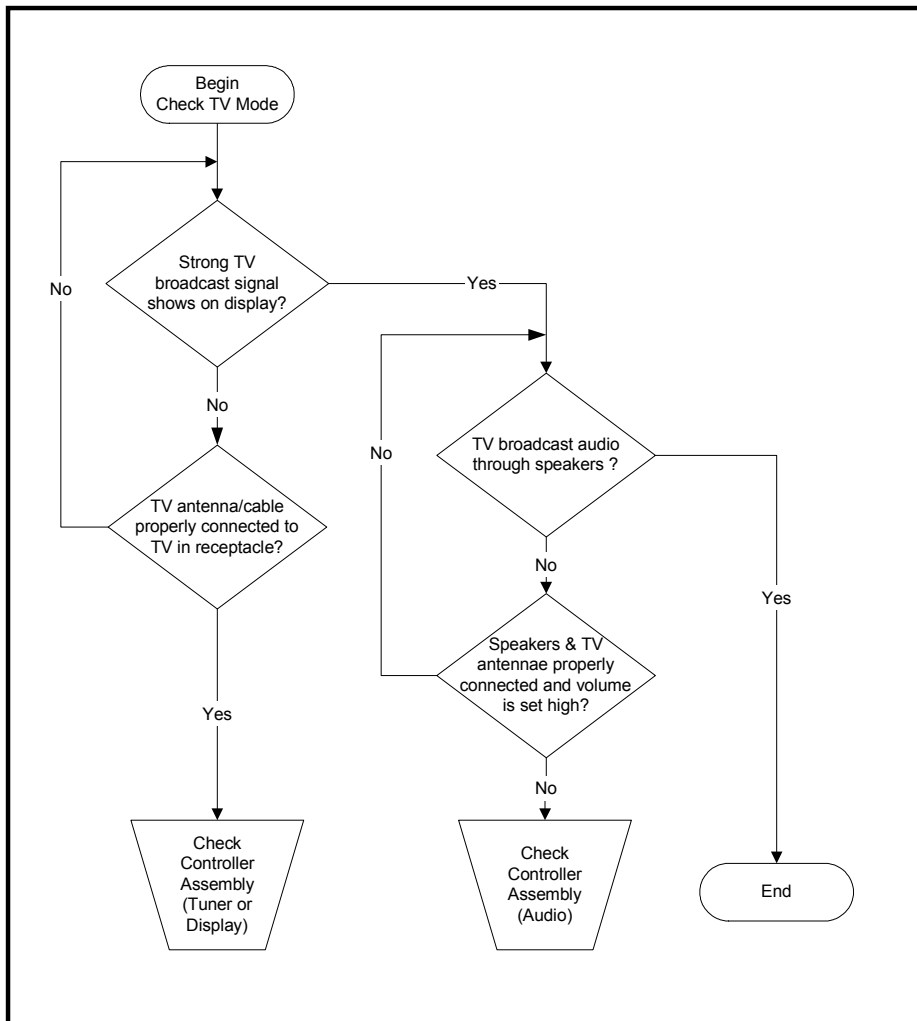


Figure 6-2 TV Mode Troubleshooting Tree

6.1.4 DVD Mode Troubleshooting

Follow the procedure detailed in Figure 6-3 to aide in troubleshooting DVD Mode faults.

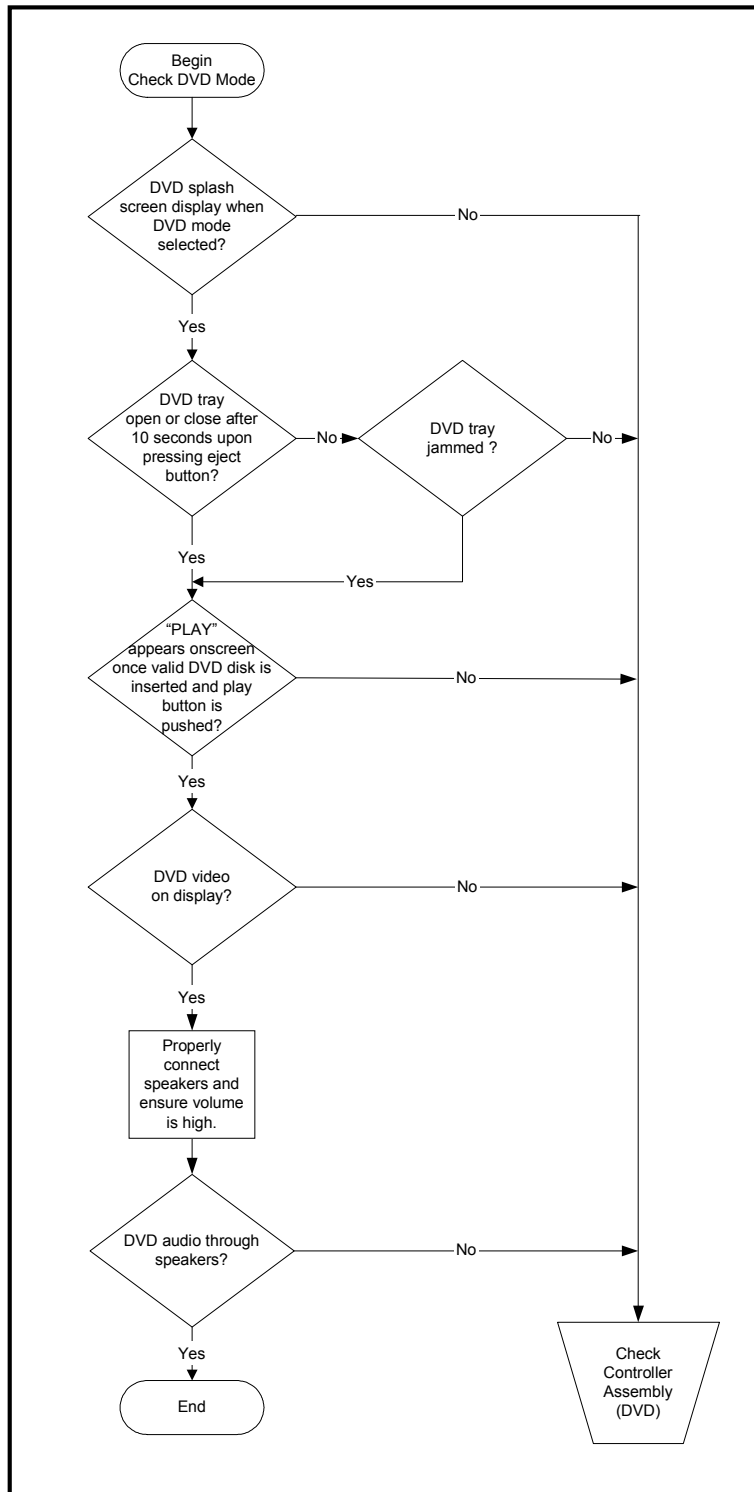


Figure 6-3 DVD Mode Troubleshooting Tree

6.1.5 Internet Mode Troubleshooting, Ethernet Connection

Follow the procedure detailed in Figure 6-4 to aid in troubleshooting Internet Mode faults when connected via Ethernet.

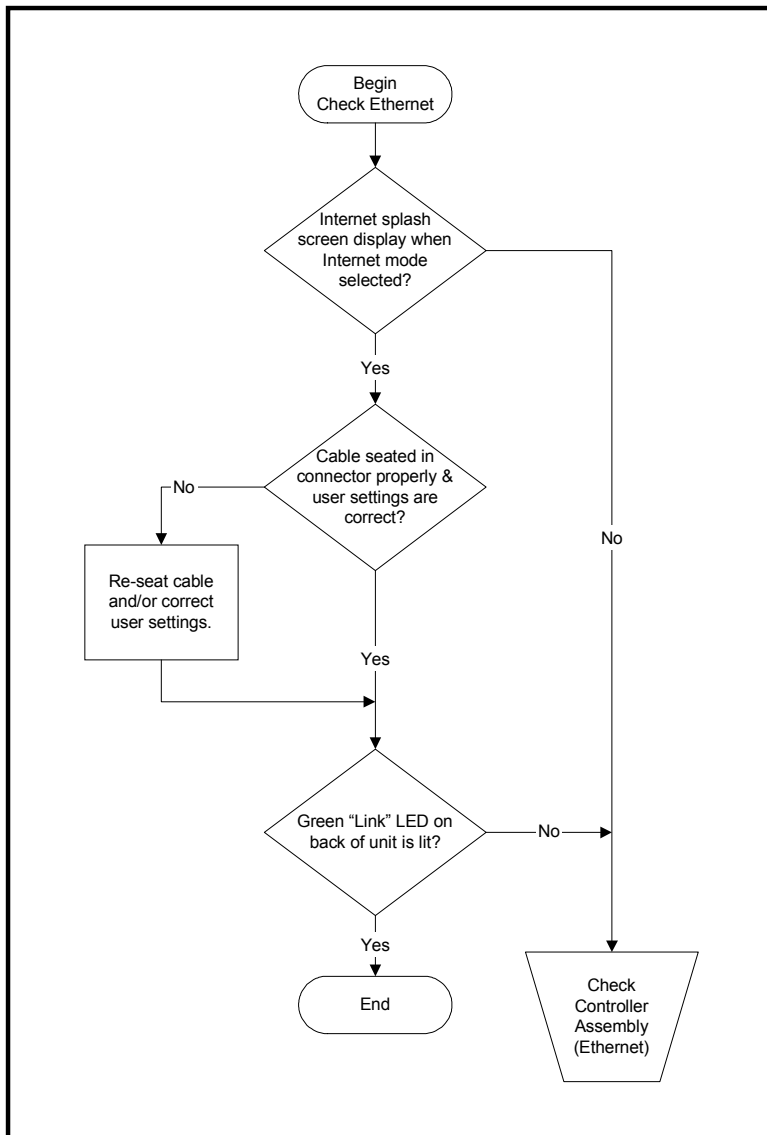


Figure 6-4 Internet Mode (Ethernet) Troubleshooting Tree

6.1.6 Internet Mode Troubleshooting, Modem Connection

Follow the procedure detailed in Figure 6-5 to aid in troubleshooting Internet Mode faults when connected via telephone line modem.

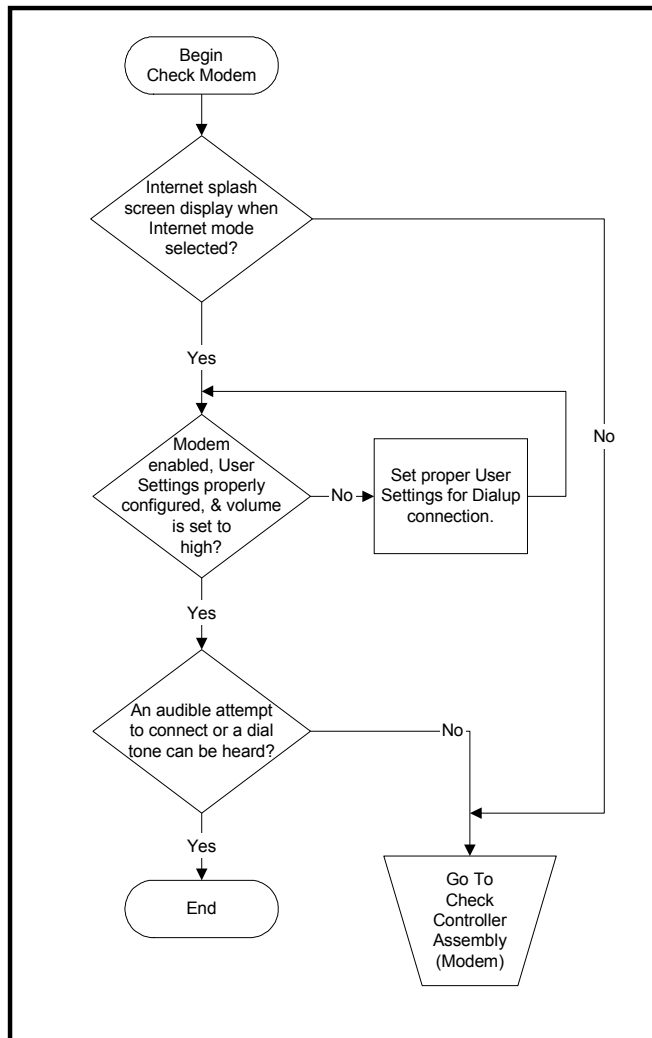


Figure 6-5 Internet Mode (Modem) Troubleshooting Tree

6.1.7 Monitor Mode Troubleshooting

Follow the procedure detailed in Figure 6-6 to aide in troubleshooting Monitor Mode faults.

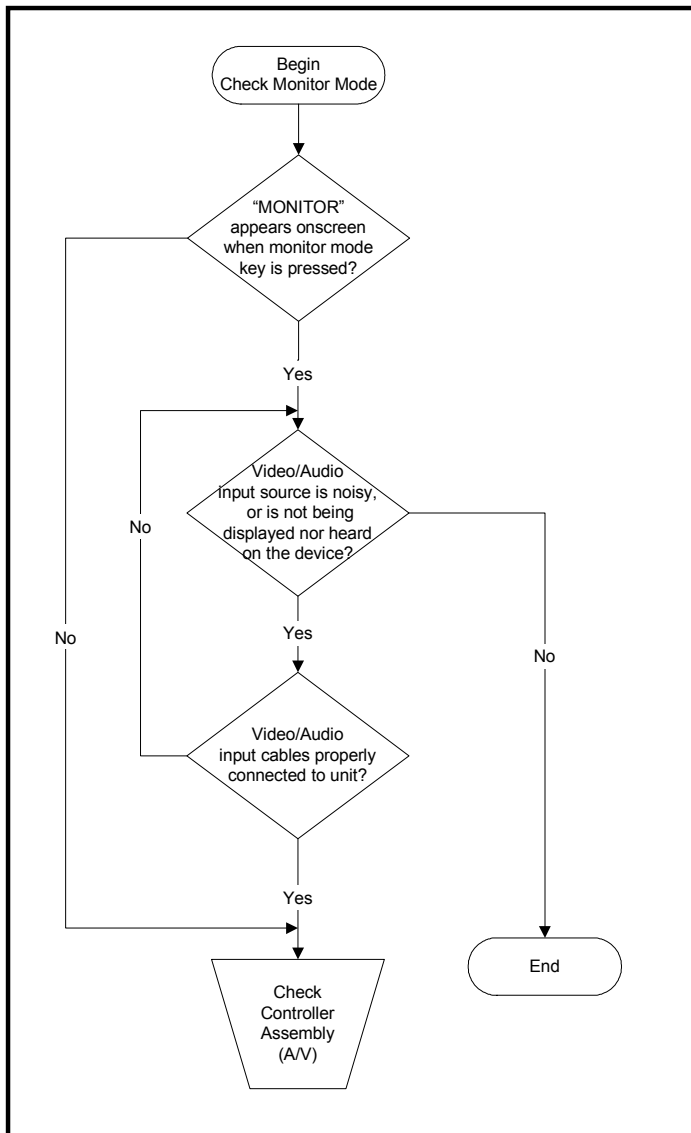


Figure 6-6 Monitor Mode Troubleshooting Tree

6.1.8 Security Troubleshooting

Follow the procedure detailed in Figure 6-7 to aid in troubleshooting Security Mode faults.

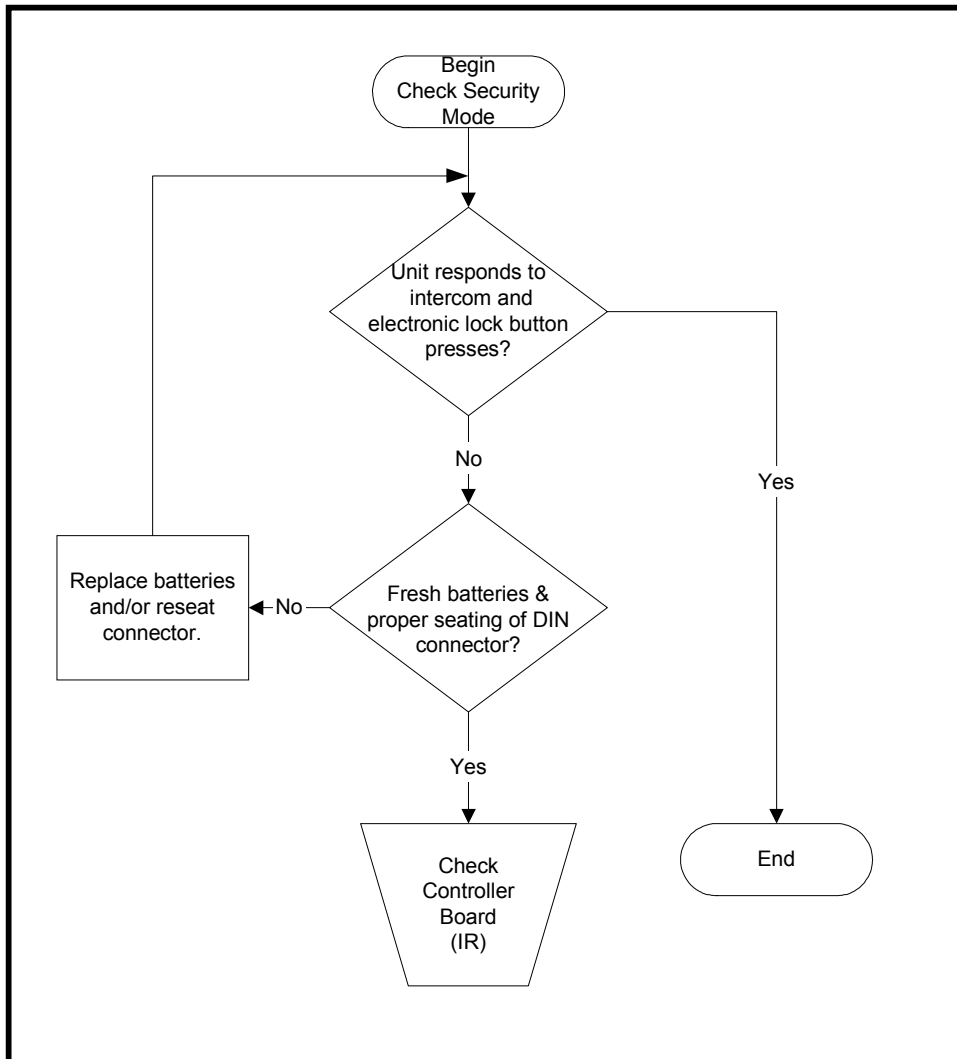


Figure 6-7 Security Mode Troubleshooting Tree

6.1.9 Keyboard/Remote Control Troubleshooting

Follow the procedure detailed in Figure 6-8 to aid in troubleshooting IR faults when using Keyboard or Remote Control to control the device.

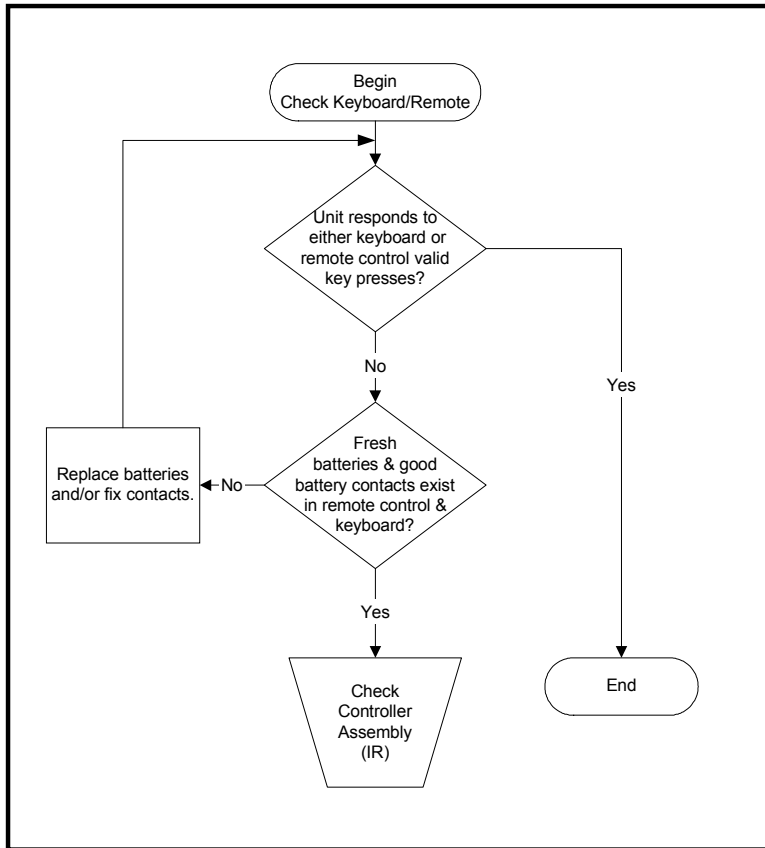


Figure 6-8 Keyboard/Remote Troubleshooting Tree

6.1.10 Print Troubleshooting

Follow the procedure detailed in Figure 6-9 to aide in troubleshooting USB connectivity when connected to compatible printers.

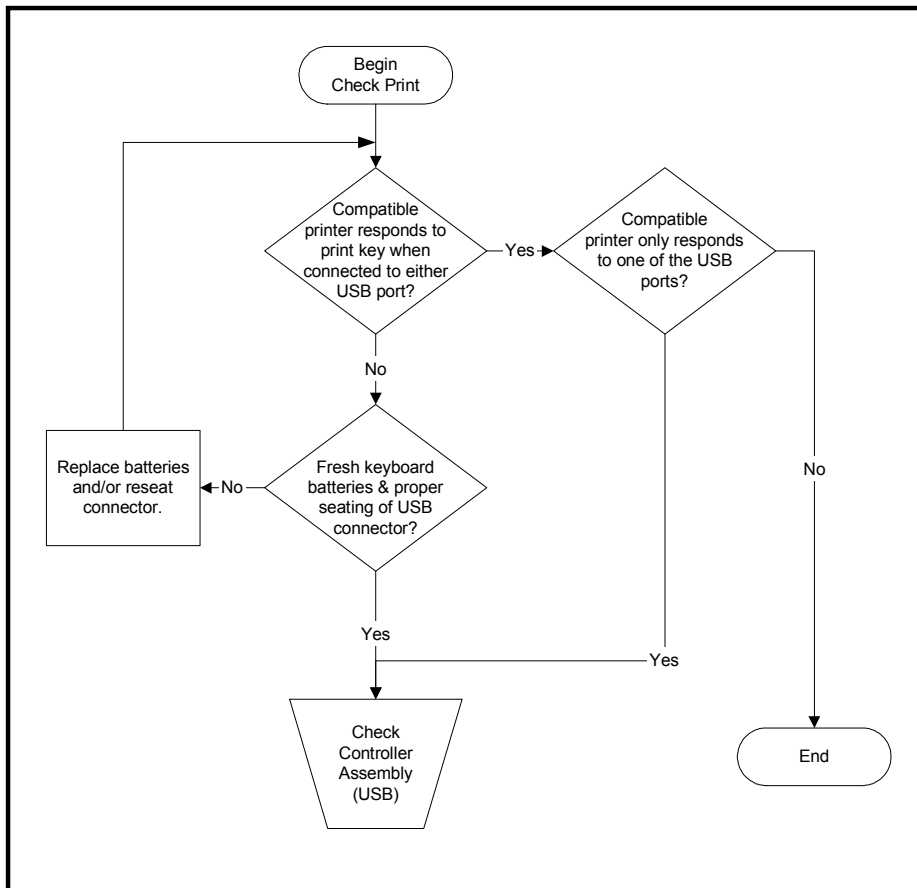


Figure 6-9 Print Troubleshooting Tree

6.2 Controller Assembly Troubleshooting

Controller Assembly Troubleshooting includes procedures for debugging the controller board, modem daughter board, DVD drive, power supply, front panel display, and LVDS daughter board components.

6.2.1 Troubleshooting Setup

The troubleshooting trees in the Controller Assembly Troubleshooting sections should be used by service personnel in a test laboratory or electronic servicing facility. In addition to the equipment listed in the General Troubleshooting section, the service engineer will need the following tools, equipment, and materials to complete the Controller Assembly troubleshooting procedures:

1. Oscilloscope and two probes
2. Voltmeter
3. Hex screwdriver (various sizes)
4. Medium sized Phillips Head Screwdriver
5. Small sized Phillips Head Screwdriver
6. Medium Regular Head Screwdriver

The service engineer must ensure that all test equipment, cables, etc. are in good working order before commencing with the troubleshooting procedures.

Note: Before disassembling the unit to perform the remainder of the Controller Assembly troubleshooting, Power Supply troubleshooting (as described below) is highly recommended.

6.2.2 Power Supply Troubleshooting

The voltages coming off the Power Supply module can be easily accessed and measured at RJ14 without removing the controller board from the chassis. Measure and verify the voltage at each pin of RJ14 as specified in Table 6-1.

Table 6-1: RJ14 Pin Layout and Voltages

RJ14 Pin #	Wire Color	Signal Name	Valid Voltage Range:	Measured with respect to RJ14 Pin(s):
1	Yellow	AUDIO_VP12	11.8 to 12.2 V	Pins: 3, 4 (AUDIO_GND)
2	Yellow	AUDIO_VP12	11.8 to 12.2 V	Pins: 3, 4 (AUDIO_GND)
3	Black	AUDIO_GND	n/a	n/a
4	Black	AUDIO_GND	n/a	n/a
5	Black	GND	n/a	n/a
6	Black	GND	n/a	n/a
7	Black	GND	n/a	n/a
8	Black	GND	n/a	n/a
9	Yellow	VCC12	11.8 to 12.2V	Pin 8
10	Red	VCC5	4.75 to 5.25V	Pins: 5, 6, 7
11	Red	VCC5	4.75 to 5.25V	Pins: 5, 6, 7
12	Orange	VCC3	3.1 to 3.5V	Pin 14
13	Orange	VCC3	3.1 to 3.5V	Pin 14
14	Black	GND	n/a	n/a

6.2.3 CPU Troubleshooting

The CPU controls all the functions for the iCEBOX Flipscreen unit. All other Controller Assembly devices are slaves to the CPU. The CPU has two crystal control clocks and requires two different supply voltages. It can interface directly with up to 64MB of SDRAM.

6.2.3.1 CPU Hitachi SH3-7709A, U35

The CPU (U35) is powered by VCC_SH3 and is isolated from the main 3.3V supply. SH_AVCC is the ADC supply. Each of supplies should measure the same as the 3.3V VCC supply (3.1 to 3.5V).

There is a 1.8 V core supply required for the CPU as well. The +1.8V should measure between 1.7 to 1.9V.

6.2.3.1.(a) Main CPU Clock, Y6

Crystal oscillator Y6 generates the main CPU clock.

To measure the frequency of the main CPU clock, probe U35-155 (XTAL). It should measure between 14.74 MHz and 14.76 MHz as shown in Figure 6-10.

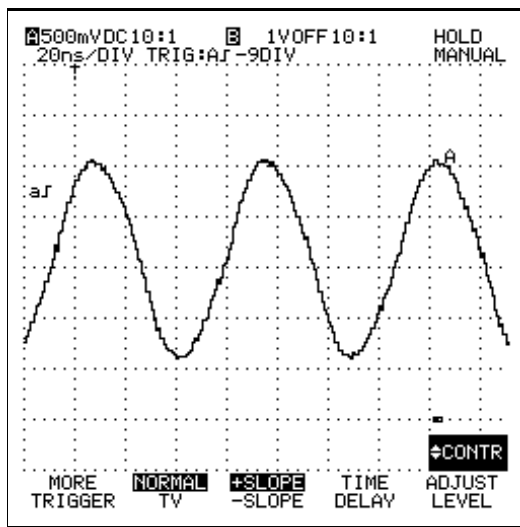


Figure 6-10 Main CPU Clock, U35-155

6.2.3.1.(b) SH_CKIO, U35-162

SH_CKIO (U35-162) is derived from the main CPU clock. It should measure between 58.96 MHz and 59.00 MHz as shown in Figure 6-11.

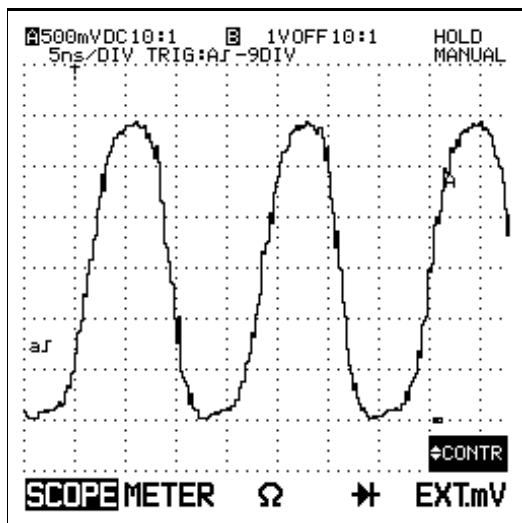


Figure 6-11 SH_CKIO, U35-162

Note: Bandwidth of oscilloscope in these examples is limited to 100Mhz.

6.2.3.1.(c) CPU Real-Time Clock, Y7

Crystal oscillator Y7 generates the CPU real-time clock.

To measure the frequency of the CPU real-time clock, probe U35-4 (XTAL). It should measure between 32.752 kHz and 32.784 kHz and look like Figure 6-12.

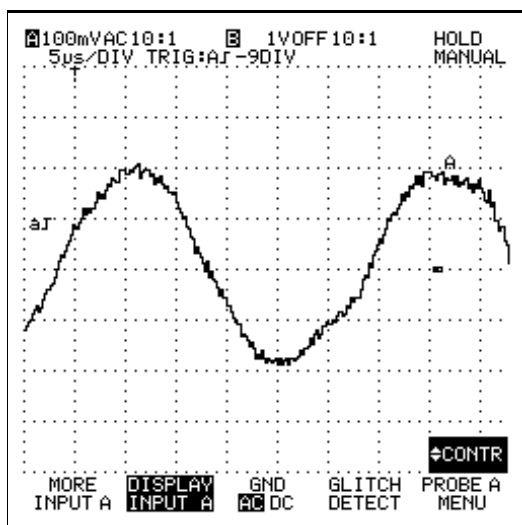


Figure 6-12 CPU Real-Time Clock, U35-4

6.2.3.2 CPU SDRAM, U33 and U34

The SDRAM is accessed by multiplexing the address lines using the SH_RAS and SH_CAS lines. These signals (U33-18 and U33-17 or U34-18 and U34-17) usually appear as shown in Figure 6-13.

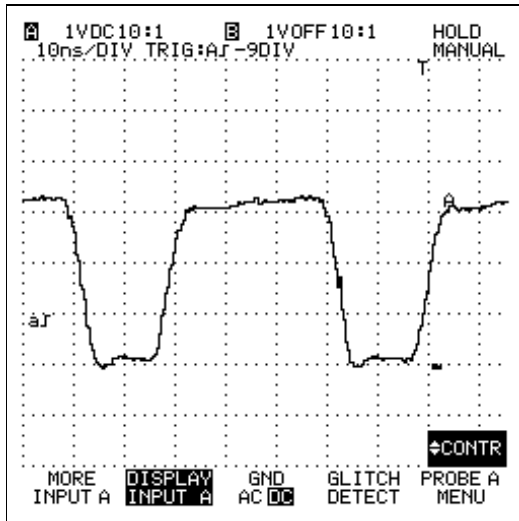


Figure 6-13 CPU SDRAM

6.2.3.3 CPU Flash Memory, U50

The Flash memory device is accessed only for the first 3 seconds during boot-up of the Controller board. The device is enabled by the CE pin (U50, pin 1 active low). A typical waveform for this pin during boot-up is shown in Figure 6-14.

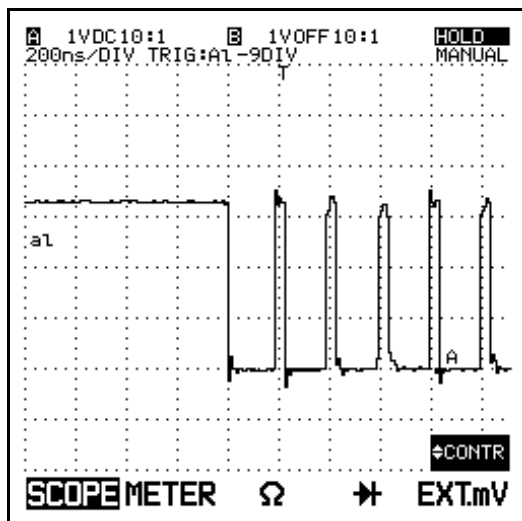


Figure 6-14 CPU Flash Memory, U50-1

6.2.3.4 CPU Power Voltage Regulators, U70 and U71

Measure and verify VCC3_SH3 at Q925-3 is between 3.1 and 3.5V.

Measure and verify +1.8V at Q926-3 is between 1.7 and 1.9V.

Figure 6-15 shows the required CPU power-up sequence for VCC3_SH and +1.8V. The top trace is VCC3_SH measured at Q925-3, the lower trace is +1.8V measured at Q926-3.

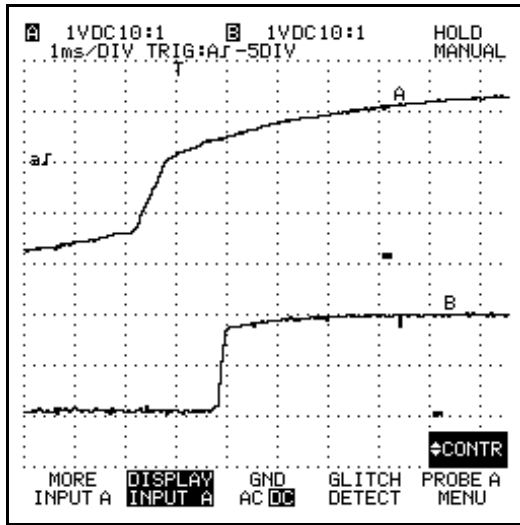


Figure 6-15 CPU Power Up Sequence

6.2.3.5 Reset Generator, U44

Verify that U44-5 transitions low after power on for 200 to 300 milliseconds and then transitions high. Verify that U44-6 transitions high after power on for 200 to 300 milliseconds and then transitions low.

6.2.3.6 Fan Control, U63

Touch fan control body with tip of hot soldering iron or heat gun to a temperature above 55°C, U63-3 should transition to high.

6.2.3.7 Serial EEPROM, U17

6.2.3.8 Front Panel Button Control, FPGA

6.2.4 Video

6.2.4.1 Graphics Processor, U7

The Graphics Processor takes the 16-bit digital video stream from the output of the video decoder (U22) or DVD and places them in the frame buffer for display on the LCD monitor.

6.2.4.1.(a) Graphics Processor Main Clock

The main clock for the graphics processor is generated from crystal oscillator U8. The waveform on U8-3 should measure between 14.31 MHz and 14.32 MHz as shown in Figure 6-16.

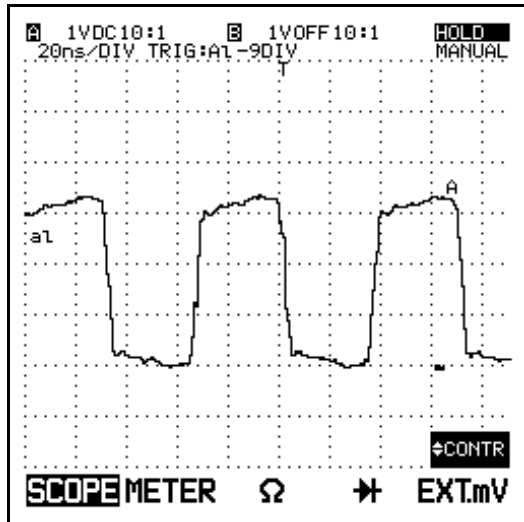


Figure 6-16 Graphics Processor Main Clock, U8-3

6.2.4.1.(b) Graphics Processor Pixel Clock

The pixel clock (VCLK) strobes the streaming digital video data (VP0-15) into the graphics processor. This clock comes from either the video decoder (U22) or the DVD MPEG decoder (U4) multiplexed by U62. Figure 6-17 shows the waveform on U62-9 with a strong TV signal.

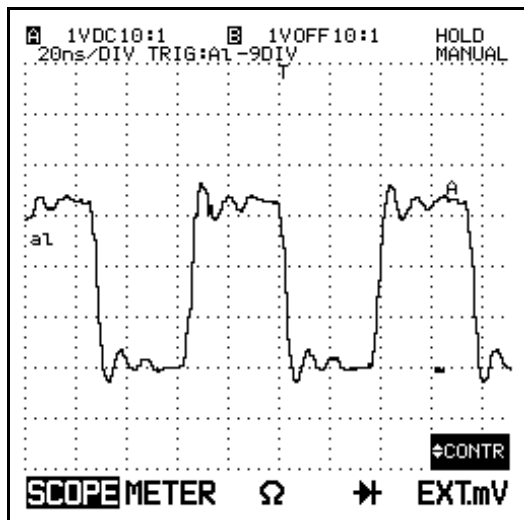


Figure 6-17 Graphics Processor, U62-9, With Strong TV Signal Tuned

Figure 6-18 shows the waveform on U62-9 with the unit in DVD mode with no disk inserted in the DVD drive. The jitter in DVD mode comes from the variable timing out of the MPEG decoder.

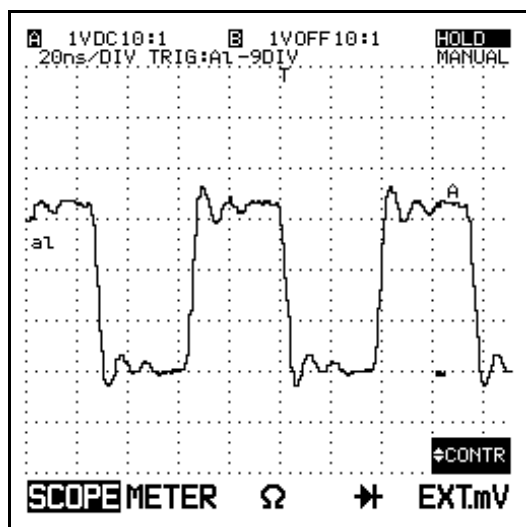


Figure 6-18 Graphics Processor, U62-9, in DVD Mode, No Disk Inserted

6.2.4.1.(c) HREF and VREF

Horizontal (VIDHREF) and vertical (VIDVREF) syncs are the same for TV/Monitor, DVD, and Internet modes. The VIDVREF waveform measured at U69-4 should appear as shown in Figure 6-19. The VIDHREF waveform measured at U69-7 should appear as shown in Figure 6-20.

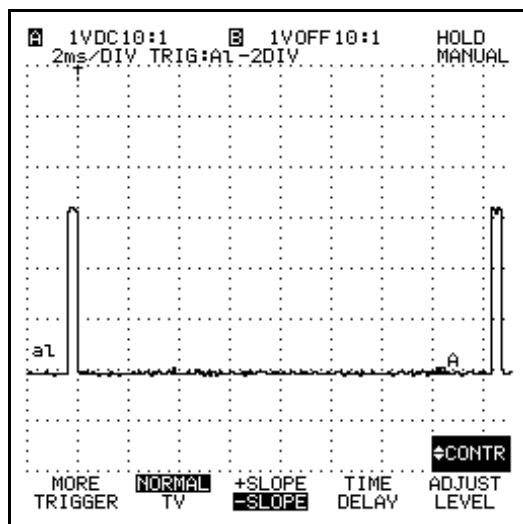


Figure 6-19 VIDVREF, U69-4, in TV/Monitor Mode

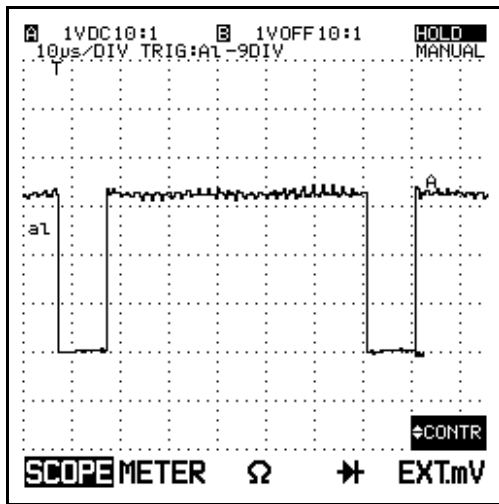


Figure 6-20 VIDHREF, U69-7, in TV/Monitor Mode

6.2.5 Display

6.2.5.1 LVDS Transmitter, U59

The LVDS transmitter converts the digital video data and control signals from the graphics processor into low voltage differential signals transmitted to the LCD display. The isolated input voltage, PLL_VCC at U59-29 should measure within 3.1 to 3.5V.

The LVD_CLK at U59-26 should be as shown in Figure 6-21.

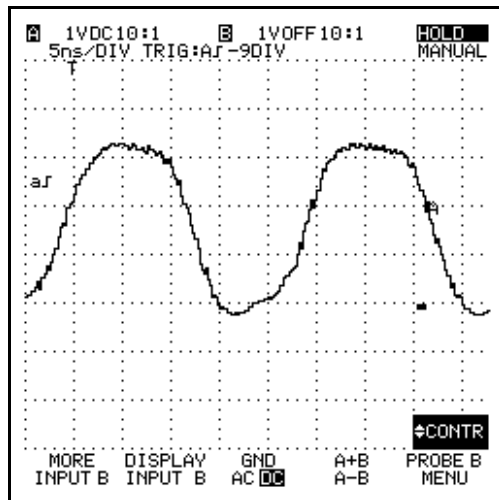


Figure 6-21 LVDS transmitter, U59-26

6.2.5.2 LVDS Receiver, U1 (LVDS Daughter Board)

The LVDS receiver converts the low voltage differential LCD signals from the LCD display front panel assembly to low voltage TTL signals.

The LVD_CLK at U1-23 should be as shown in Figure 6-22.

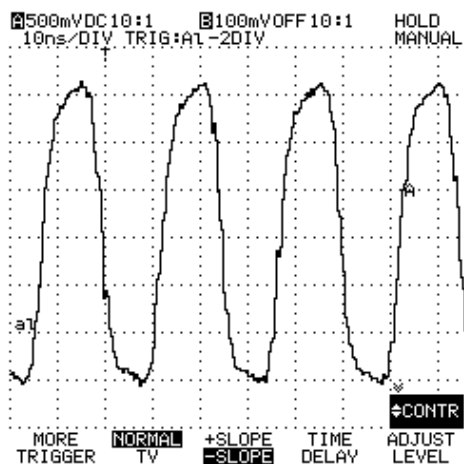


Figure 6-22 LVDS transmitter, U1-23

6.2.6 DVD

6.2.6.1 CPU for DVD, U3

The DVD controller circuitry can accept either a 5V rated C161O processor (U3), or a 3.3V rated part. If a 5V rated part is used, then R427 is installed, and VCC_C161 would measure 4.75 to 5.25V. If a part rated for 3.3V is used, then R426 is installed, and VCC_C161 measures 3.1 to 3.5V.

The main clock for the DVD control microprocessor is generated from crystal oscillator Y2. The waveform on U3-3 should measure between 15.99 MHz and 16.01 MHz and appear as shown in Figure 6-23.

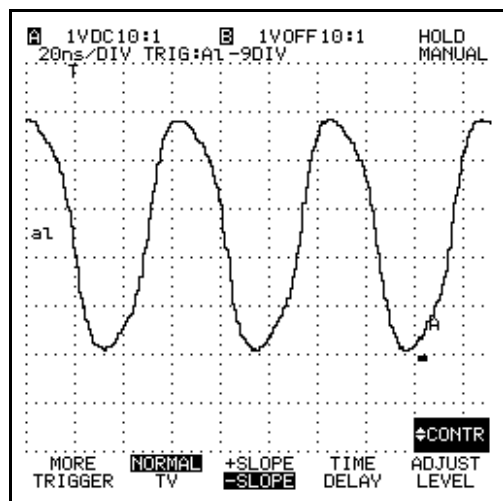


Figure 6-23 DVD Control Microprocessor Main Clock, U3-3

The reset (U3-65) for the DVD control microprocessor is pulsed low every time the unit is turned On or Off. The waveform should appear as shown in Figure 6-24.

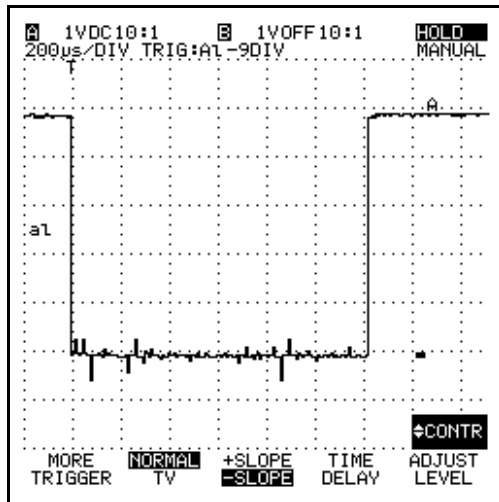


Figure 6-24 DVD Control Microprocessor Reset, U3-65

6.2.6.2 SRAM for DVD CPU, U9 and U12

The SRAMs for the DVD control microprocessor are selected with a low going signal on CS (U9-6, U12-6). For a read operation, OE (U9-31, U12-31) is low. For a write operation, WE (U9-13, U12-13) is low.

6.2.6.3 ATAPI INTERFACE for DVD, U1

VCC12 at J16-1 should measure between 11.8 and 12.2V.

VCC5 at J16-4 should measure between 4.75 and 5.25V.

6.2.6.4 DVD DECODER ZORAN, U4

DVD decoder clock supply voltage at U4-138 should measure between 3.1 and 3.5V.

The main DVD decoder clock (U4-129) should measure between 26.99 MHz and 27.01 MHz and look like Figure 6-25.

Diagnostic LED D1 comes on at power on and remains on.

Diagnostic LED D2 briefly flashes after power on, and comes on when the unit is playing a disk.

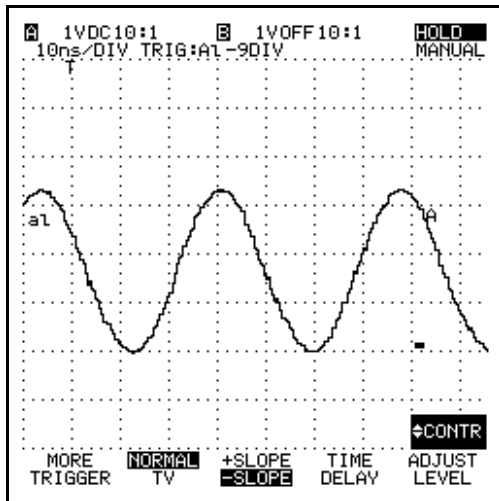


Figure 6-25 DVD Decoder Clock, U4-129

6.2.6.5 SDRAM for DVD DECODER, U11 and U16

The SDRAMs for the DVD decoder are selected with a low going signal on MCS0 (U16-18) and MCS1 (U11-18). For a write operation, MWE (U11-15 and U16-15) is low. The SDRAM is accessed by multiplexing the address lines using the MRAS and MCAS lines.

6.2.6.6 VIDEO CLOCK, U62

See Video section, “Graphics Processor, U7” component.

6.2.7 TV

6.2.7.1 TV TUNER, U72

The video signal out of the tuner (VID OUT pin 8) is NTSC format and looks like Figure 6-26 (beginning with the start of the even frame).

VCC5 at U72-2 and U72-9 should measure between 4.75 and 5.25V.

Note: If TV audio or picture is excessively noisy, check for noise on U72-2 and U72-9. If U72-2 or U72-9 are noisy, check L22, L23, and VCC5 from power supply for source of noise.

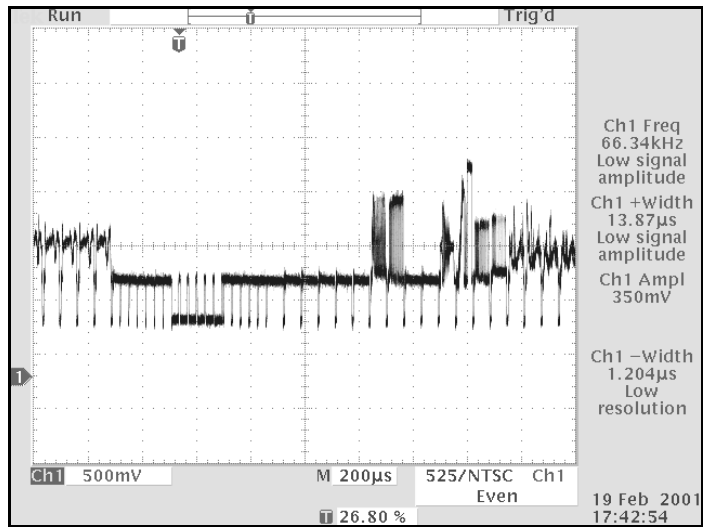


Figure 6-26 Video Out Signal, VID OUT pin 8

6.2.7.2 VIDEO DECODER, U22

VCC3_PA and VCC3_PD should measure between 3.1 and 3.5V.

The decoder clock (U22-54) should measure between 24.57 MHz and 24.58 MHz and look like Figure 6-27.

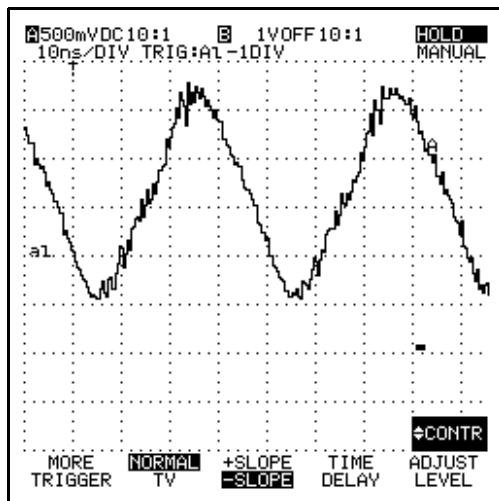


Figure 6-27 Video Decoder, U22-54

6.2.8 Audio

6.2.8.1 DVD AUDIO DAC, U18

VCC5-DAC at IC2-7 should measure between 4.75 and 5.25V.

6.2.8.2 AUDIO POWER AMP, U10

AUDIO_VP12 at U10-16 should measure between 11.8 and 12.2V.

6.2.8.3 AUDIO -5V POWER SUPPLY, U25

VCC5-DAC at U25-8 should measure between 4.75 and 5.25V.

VCC5-DAC at U25-5 should measure between -5.25 and -3.5V.

6.2.8.4 MORE AUDIO ?

6.2.9 Infrared

6.2.9.1 Infrared Receivers, U58 and U5 (Modem Board)

Verify U58-2 and U5-2 measure between 4.75 and 5.25V.

With no IR signal applied, verify U58-3 and U5-3 measure between 4.75 and 5.25V.

Verify U58-3 and U5-3 transition low when keyboard or remote IR signal is applied and looks like Figure 6-28.

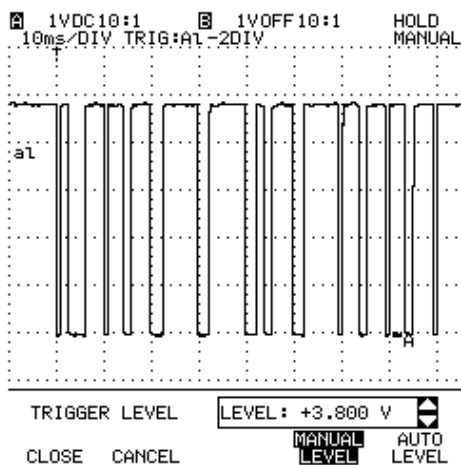


Figure 6-28 IR Receiver response to IR signal, U58-3 and U5-3

6.2.10 Intercom**6.2.10.1 Intercom Speaker, U36****6.2.10.2 Intercom Speaker Multiplexer, U36****6.2.10.3 Intercom Button and Latch Drivers, U27****6.2.11 Modem****6.2.11.1 Modem MCU, U31****6.2.11.2 Modem MDP, U41****6.2.11.3 Modem SRAM, U30****6.2.11.4 Modem EEPROM, U29****6.2.11.5 Telephone Line Data Access, U1 and U2 (Modem Board)****6.2.11.6 PhotoCoupler, U3 (Modem Board)****6.2.12 Ethernet****6.2.12.1 Ethernet Controller, U40****6.2.12.2 Ethernet EEPROM, U46****6.2.13 USB****6.2.13.1 USB Host/Slave Controller, U38****6.2.13.2 USB Hub Controller, U55****6.2.13.3 USB Power Switch, U4 (Modem Board)**

7. Mechanical Views and Parts Lists

Chassis Assembly 7-1

Display Assembly 7-3

Pivot Assembly 7-5

7. Mechanical Views and Parts Lists

7.1 Chassis Assembly

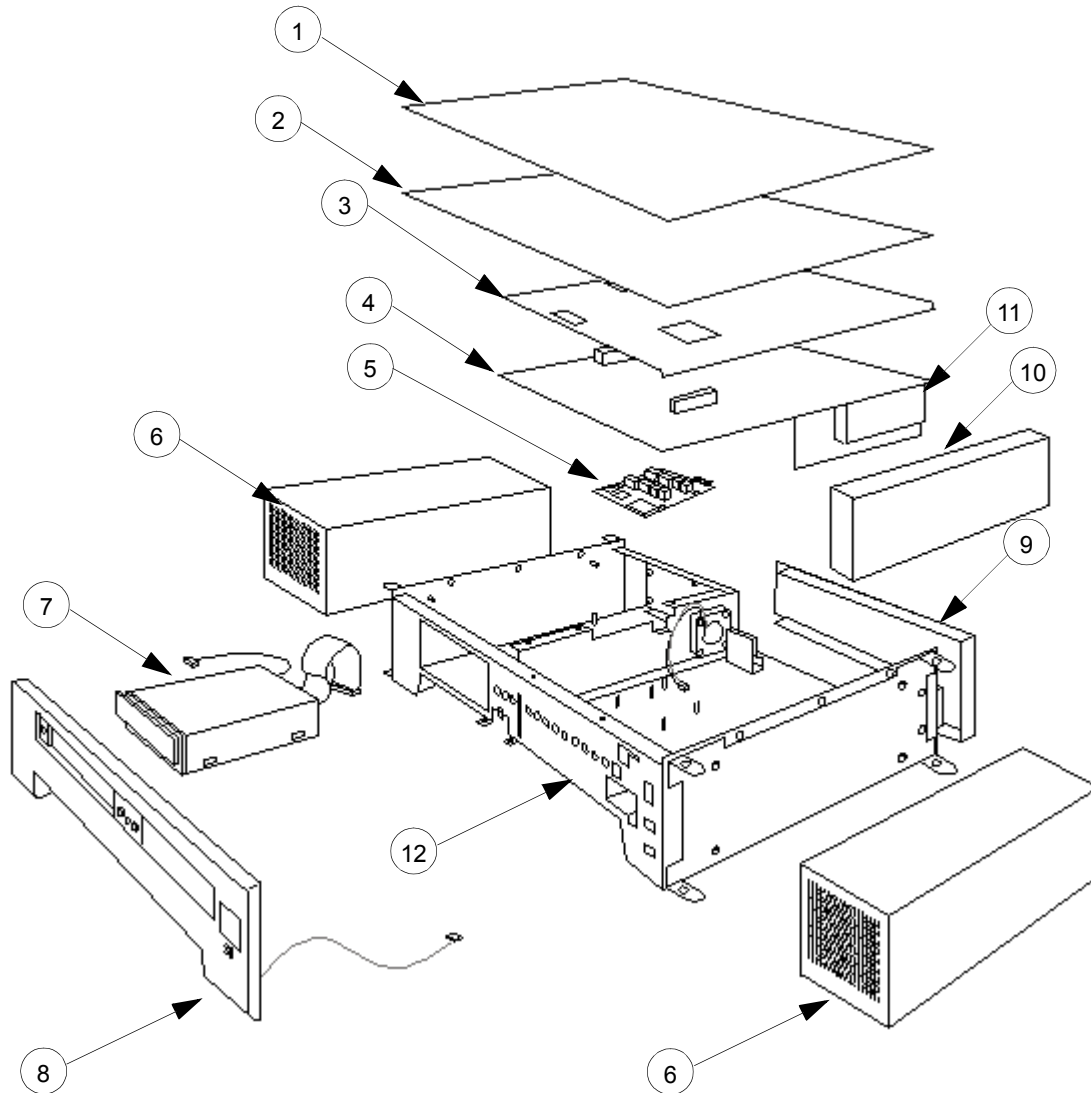


Table 7-1: Chassis Assembly Parts List

Item No.	Part No.	Description	Qty
1	CMi-CHAS-108	BRACKET - MOUNTING	1
2	CMi-CHAS-109	COVER - TOP	1
3	CMi-CPCB-006	CONTROLLER PCB SUPPORT ASSEMBLY	1
4	CMi-CPCB-070	CONTROLLER PCB ASSEMBLY	1
5	CMi-DISP-112	LVDS FILTER PCB ASSEMBLY	1

Table 7-1: Chassis Assembly Parts List (continued)

Item No.	Part No.	Description	Qty
6	CMI-SPKR-081	SPEAKER ASSEMBLY	2
7	CMI-DVD-079	DVD DRIVE ASSEMBLY	1
8	CMI-FC-047	FRONT PANEL ASSEMBLY	1
9	CMI-CPCB-007	CONTROLLER REAR PANEL	1
10	CMI-PS-077	POWER SUPPLY ASSEMBLY	1
11	CMI-CPCB-074	MODEM PCB ASSEMBLY	1
12	CMI-CHAS-069	CHASSIS WELDMENT	1

7.2 Display Assembly

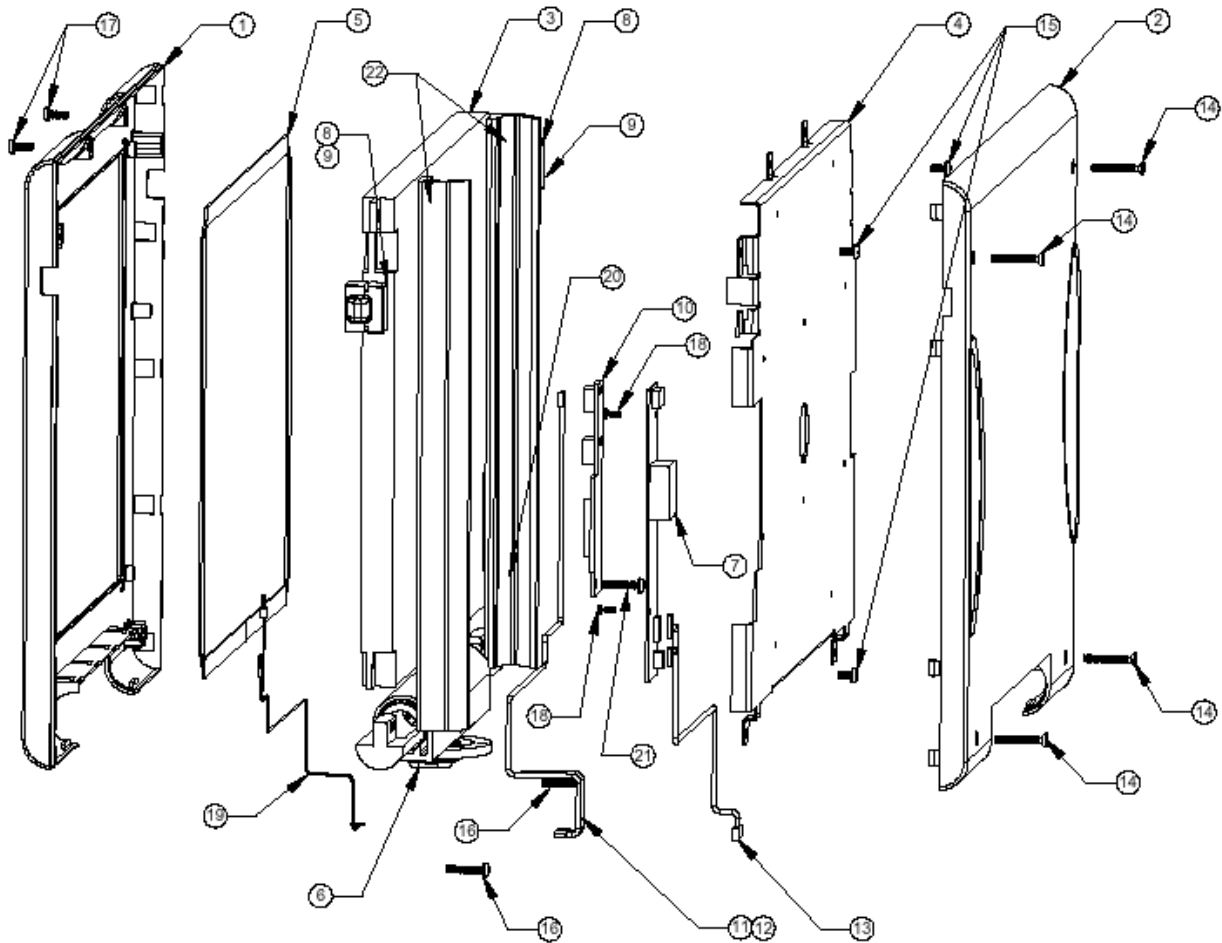


Table 7-2: Display Assembly Parts List

Item No.	Part No.	Description	Qty
1	CMI-DISP-030	FRONT DISPLAY COVER	1
2	CMI-DISP-036	REAR DISPLAY COVER	1
3	CMI-DISP-037	LCD DIPLSAY - NEC	1
4	CMI-DISP-038	DISPLAY STIFFENER - METAL	1
5	CMI-DISP-039	DISPLAY GASKET	1
6	CMI-DISP-034	PIVOT ASSEMBLY	1
7	CMI-DISP-040	BACKLIGHT INVERTER ASSEMBLY	1
8	CMI-DISP-041	LATCH - MOLDED	2
9	CMI-DISP-042	LATCH - SPRING	2
10	CMI-DISP-110	LVDS PCB ASSEMBLY	1
11	CMI-DISP-045-1	LVDS CABLE - BLACK	1
12	CMI-DISP-045-2	LVDS CABLE - GRAY	1

Table 7-2: Display Assembly Parts List (continued)

Item No.	Part No.	Description	Qty
13	CMI-DISP-046	BACKLIGHT INVERTER CABLE	1
14	CMI-SRW-00005	PT KA30 X 20mm FLAT HD SCREW	4
15	CMI-SRW-00001	PT KA30 X 6mm OVAL HD SCREW	3
16	CMI-SRW-00007	PT KA30 X 12mm OVAL HD SCREW	2
17	CMI-SRW-00004	PT KA30 X 8mm OVAL HD SCREW	2
18	CMI-SRW-00009	PT KA22 X 6mm OVAL HD SCREW	2
19	CMI-DISP-093	DISPLAY GROUND CABLE	1
20	CMI-DISP-111	SPACER - LVDS PCB	1
21	CMI-SWR-00026	PT KA30 X 16mm OVAL HD SCREW	1
22	CMI-EMI-00002	EMI GASKET - 9.3 inches (236mm) L SCHLEGEL SYSTEMS PN E3215T00930 ALTERNATIVE: CHROMERICS 82-121-740010-00930	2

7.3 Pivot Assembly

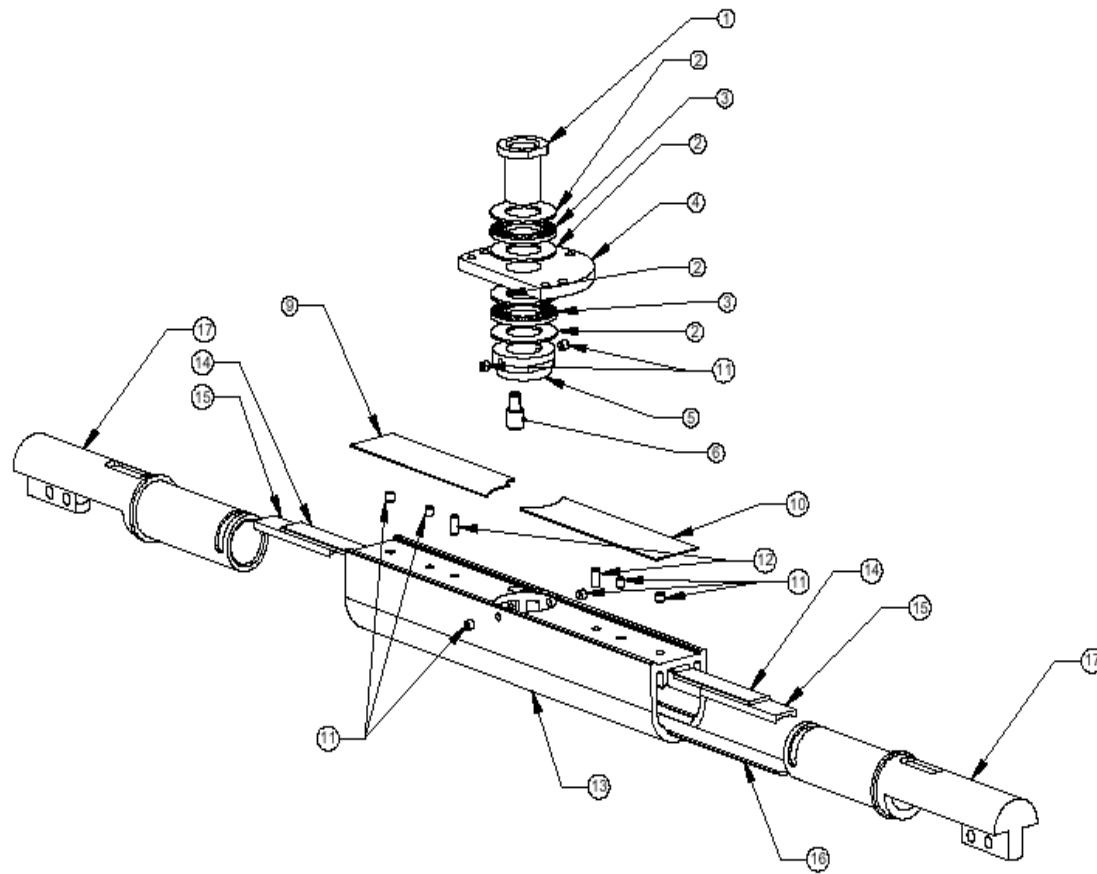


Table 7-3: Pivot Assembly Parts List

Item No.	Part No.	Description	Qty
1	CMI-PIV-023	PIVOT CENTER CORE	1
2	CMI-PIV-019	THRUST BEARING WASHER	4
3	CMI-PIV-018	THRUST NEEDLE ROLLER BEARING	2
4	CMI-PIV-020	PIVOT SUPPORT PLATE	1
5	CMI-PIV-022	PIVOT CENTER RING	1
6	CMI-PIV-024	ROTATION STOP PIN	1
9	CMI-PIV-031	PIVOT BLOCK COVER - RIGHT	1
10	CMI-PIV-032	PIVOT BLOCK COVER - LEFT	1
11	CMI-SRW-00002	M3 X 0.5 - 3.0 FLAT POINT SOCKET SETSCREW	8
12	CMI-SRW-00003	M3 X 0.5 - 6.0 FLAT POINT SOCKET SETSCREW	2
13	CMI-PIV-021	PIVOT BLOCK	1
14	CMI-PIV-029	CLUTCH PAD BREAKING PLATE	2
15	CMI-PIV-027	CLUTCH PAD - UPPER	2
16	CMI-PIV-028	CLUTCH PAD - LOWER	1
17	CMI-PIV-033	HORIZONTAL PIVOT FOLLOWER	2

8. Parts Lists

FlipScreen iCEBOX Top Assembly	8-1
FlipScreen iCEBOX Controller Board	8-9
FlipScreen iCEBOX LVDS Board	8-20
FlipScreen iCEBOX LVDS Filter Board	8-21
FlipScreen iCEBOX Modem Board	8-22

8. Parts Lists

8.1 iCEBOX FlipScreen Top Assembly

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
1	1	CMI-FLIP-090	FLIPSCREEN TOP ASSEMBLY	ELTECH	
2	1	CMI-FLIP-080	CHASSIS TOP ASSEMBLY	ELTECH	
3	1	CMI-CHAS-069	CHASSIS WELDMENT	Trend	
13	1	CMI-FC-047	FRONT COVER ASSEMBLY	ELTECH (M)	
14	1	CMI-FC-048	FRONT COVER MOLDED	Fleck	CMI-FC-048
15	1	CMI-FC-049	PUSHBUTTON ACCESS DOOR ASSEMBLY	Fleck	CMI-FC-049
18	1	CMI-FC-052	PUSHBUTTON ACTUATOR 2 POSITION	Fleck	CMI-FC-052
19	1	CMI-FC-053	PUSHBUTTON ACTUATOR 9 POSITION	Fleck	CMI-FC-053
20	9	CMI-FC-054	PUSHBUTTON 4.6mm DIAMETER	Fleck	CMI-FC-054
21	2	CMI-FC-055	PUSHBUTTON 5.6mm DIAMETER (EJECT)	Fleck	CMI-FC-055
22	1	CMI-FC-056	PUSHBUTTON ACCESS COVER AXLE	WPC	CMI-FC-056
23	1	CMI-FC-057	PUSHBUTTON ACCESS COVER AXLE RETAINER	Kwan Yuen	CMI-FC-057
24	1	CMI-FC-058	PUSHBUTTON ACCESS DOOR CLUTCH ASSEMBLY	ELTECH (M)	CMI-FC-058
25	1	CMI-FC-059	PUSHBUTTON ACCESS DOOR CLUTCH GEAR	Fleck	CMI-FC-059
26	1	CMI-FC-060	PUSHBUTTON ACCESS DOOR CLUTCH GEAR CORE	Fleck	CMI-FC-060
27	A/R		GREASE- WHITE LITHIUM	Molykote	EM50L Synthetic Grease
28	1	CMI-FC-061	TOUCH LATCH	Sugatsune	PR4PK-B
29	1	CMI-FC-062	PUSHBUTTON ACCESS DOOR SPRING	Kato Spring	CMI-FC-062
30	1	CMI-FC-063	DVD TRAY FRONT COVER	Fleck	CMI-FC-063
31	1	CMI-FC-064	LIGHT PIPE	Fleck	CMI-FC-064
32	1	CMI-FC-065	IR WINDOW	Fleck	CMI-FC-056

8.1 iCEBOX FlipScreen Top Assembly (continued)

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
33	1	CMI-FC-066	MICROPHONE WITH CONNECTOR	Pecko	212451
39	0	CMI-FC-067	PUSHBUTTON 5.6mm DIAMETER (POWER)		
40	3	CMI-SRW-00001	PT KA30 X 6mm OVAL HEAD SCREW	Bossard	BN 13577 Type H
41	1	CMI-SRW-00016	M3 X 0.5-8 SOCKET BUTTON HEAD CAP SCREW	Bossard	BN 19
42	1	CMI-DISP-035	DISPLAY ASSEMBLY	ELTECH (M)	CMI-DISP-035
43	1	CMI-DISP-030	FRONT DISPLAY COVER	Fleck	CMI-DISP-030
44	1	CMI-DISP-036	REAR DISPLAY COVER	Fleck	CMI-DISP-036
45	1	CMI-DISP-037	LCD DISPLAY - NEC	NEC	NL8060BC3 1-17
46	1	CMI-DISP-038	DISPLAY STIFFNER - METAL	Robex	CMI-DISP-038
47	1	CMI-DISP-039	DISPLAY GASKET	HLN Rubber	CMI-DISP-039
48	1	CMI-PIV-034	PIVOT ASSEMBLY	ELTECH (M)	
49	1	CMI-PIV-023	PIVOT CENTER CORE	WPC	CMI-PIV-023
50	4	CMI-PIV-019	THRUST BEARING WASHER	Exim	12.70 x 23.80 x 0.7
51	2	CMI-PIV-018	THRUST NEEDLE ROLLER BEARING	Exim	MC-RXS-1250
52	1	CMI-PIV-020	PIVOT SUPPORT PLATE	WPC	CMI-PIV-020
53	1	CMI-PIV-022	PIVOT CENTER RING	WPC	CMI-PIV-022
54	1	CMI-PIV-024	ROTATON STOP PIN	WPC	CMI-PIV-024
55	0	CMI-PIV-025	ROTATION DRAG PIN		
56	0	CMI-PIV-026	ROTATION DRAG PIN SPRING		
57	1	CMI-PIV-031	PIVOT BLOCK COVER - RIGHT	Laser	CMI-PIV-031
58	1	CMI-PIV-032	PIVOT BLOCK COVER - LEFT	Laser	CMI-PIV-032
59	8	CMI-SRW-00002	M3 X 0.5-3.0 FLAT POINT SOCKET SETSCREW	Bossard	BN 28

8.1 iCEBOX FlipScreen Top Assembly (continued)

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
60	2	CMI-SRW-00003	M3 X 0.5-6.0 FLAT POINT SOCKET SETSCREW	Bossard	BN 28
61	1	CMI-PIV-021	PIVOT BLOCK	Trend	CMI-PIV-021
63	2	CMI-PIV-029	CLUTCH PAD BACKING PLATE	Trend	CMI-PIV-029
64	2	CMI-PIV-027	UPPER CLUTCH PAD		
65	1	CMI-PIV-028	LOWER CLUTCH PSD	Fleck	CMI-PIV-028
66	2	CMI-PIV-033	HORIZONTAL PIVOT FOLLOWER	WPC	CMI-PIV-033
67	1	CMI-DISP-040	BACKLIGHT INVERTER ASSEMBLY	NEC	121PW111
68	2	CMI-DISP-041	LATCH (MOLDED)	Fleck	CMI-DISP-041
69	2	CMI-DISP-042	LATCH SPRING	Kato Spring	CMI-DISP-042
70	1	CMI-DISP-110	LVDS PCB NEC -17 TYPE LCD PANEL	ELTECH (M)	CMI-DISP-110
71	1	CMI-DISP-111	SPACER - LVDS PCB (NEC-17 LCD)	EXIM	X-R-AN-QO1430250 037
72	1	CMI-DISP-112	LVDS FILTER PCB ASSEMBLY	ELTECH (M)	
73	1	CMI-DISP-113-1	LVDS FILTER PCB CABLE (GRAY)	Pecko	212499
77	1	CMI-DISP-113-2	LVDS FILTER PCB CABLE (BLACK)	Pecko	212500
81	1	CMI-DISP-114	LVDS FILTER PCB TO CONTROLLER PCB CABLE	Pecko	212501
85	1	CMI-SCRW-00026	PT KA30 X 16mm OVAL HEAD SCREW	Bossard	BN 13577
86	1	CMI-DISP-045-1	LVDS CABLE - GRAY	Pecko	212452
92	1	CMI-DISP-045-2	LVDS CABLE - BLACK	Pecko	212453
98	1	CMI-DISP-046	BACKLIGHT INVERTER CABLE	Pecko	CMI-DISP-046
104	1	CMI DISP-093	DISPLAY GROUND CABLE	Pecko	CMI-DISP-093
107	4	CMI-SRW-00005	PT KA30 X 20mm FLAT HEAD SCREW	Bossard	BN 13576 Type H

8.1 iCEBOX FlipScreen Top Assembly (continued)

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
108	4	CMI-SRW-00001	PT KA30 X 6mm OVAL HEAD SCREW	Bossard	BN 13577 Type H
109	2	CMI-SRW-00007	PT KA30 X 12mm OVAL HEAD SCREW	Bossard	BN 13577 Type H
110	2	CMI-SRW-00004	PT KA30 X 8mm OVAL HEAD SCREW	Bossard	BN 13577 Type H
111	2	CMI-SRW-00009	PT KA22 X 6mm OVAL HEAD SCREW	Bossard	BN 13577 Type H
112	2	CMI-EMI-00002	EMI Gasket	Chomerics	82-121-74010-00930
113	1	CMI-CPCB-070	CONTROLLER ASSEMBLY	ELTECH (M)	
114	1	CMI-CPCB-007	CONTROLLER REAR PANEL	Trend	
116	1	CMI-CPCB-006	CONTROLLER PCB SUPPORT ASSY	Cowden	
118	4	CMI-CPCB-014	REAR PANEL BRACKET	Cowden	
119	1	CMI-CPCB-012	AMPLIFIER HEAT SINK CLIP	Trend	
120	1	CMI-CPCB-072	AMPLIFIER HEAT SINK PAD	HLN Rubber	
121	1	CMI-CPCB-099	MODEM PCB BRACKET	Cowden	
122	1	CMI-CPCB-073	CONTROLLER PCB ASSEMBLY	ELTECH (M)	
123	1	CMI-CPCB-074	MODEM PCB ASSEMBLY	ELTECH (M)	
124	12	CMI-SRW-00010	M3 X 0.5-6 SOCKET BUTTON HEAD CAP SCREW	Bossard	BN 19
125	1	CMI-SRW-00011	PT KA30 X 10 Oval Head Screw	Bossard	BN 6000
126	2	CMI-NUT-00002	M3 X 0.5-0.8 HEX NUT (ZINC PLATED)	Bossard	BN 1983
127	2	CMI-WSH-00003	M3 [DIN 125] FLAT WASHER (ZINC PLATED)	Bossard	BN 715
128	1	CMI-EMI-00001	EMI Washer	Laird Technologies	8912-0125-46
129	1	CMI-CHAS-009	MOUNTING PLATE-DVD	Cowden	
130	1	CMI-DVD-079	DVD DRIVE ENCLOSURE (HITACHI)	Hitachi	GD7500BV

8.1 iCEBOX FlipScreen Top Assembly (continued)

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
131	1	CMI-CPCB-101	ATAPI DVD 40 CONDUCTOR CABLE	Pecko	CMI-CPCB-101
132	1	CMI-CPCB-102	ATAPI DVD POWER CABLE	Pecko	CMI-CPCB-102
133	1	CMI-CHAS-100	FAN-BULKHEAD	Pabst	
134	1	CMI-CHAS-076	PIVOT SHIELD	Cowden	
135	1	CMI-PS-077	POWER SUPPLY ASSEMBLY - CMI	CUI Stack	650-90010
146	1	CMI-CHAS-109	CHASSIS COVER WITH GUIDE RAILS	Trend	
149	3	CMI-SRW-00025	M3.5 X 0.6 -6 PHIL FLAT HEAD SCREW	Bossard	BN 388 Type H
150	3	CMI-SRW-00016	M3 X 0.5-8 SOCKET BUTTON HEAD CAP SCREW	Bossard	BN 19
151	3	CMI-SRW-00017	M3 X 0.5-5 SOCKET BUTTON HEAD CAP SCREW	Bossard	BN 19
152	14	CMI-SRW-00018	M3 X 0.5-5 PHIL FLAT HEAD SCREW	Bossard	BN 388 Type H
153	3	CMI-SRW-00019	M3 X 0.5-6 PHIL FLAT HEAD SCREW		
154	4	CMI-SRW-00020	M3 X 0.5-25 PHIL PAN HEAD SCREW	Bossard	BN 384 Type H
155	2	CMI-NUT-00002	M3 X 0.5-0.8 HEX NUT (ZINC PLATED)	Bossard	BN 1983
156	34	CMI-SRW-00010	M3 X 0.5-6 SOCKET BUTTON HEAD CAP SCREW	Bossard	BN 19
157	2	CMI-FGC-00001	Clamp	InterMark	FGC-5
158	2	CMI-SPKR-081	SPEAKER ASSEMBLY	Sonavox	CMI-SPKR-081
169	2	CMI-CHAS-016	SPEAKER MOUNTING BRACKET	Cowden	
170	16	CMI-SRW-00024	M2.5 X 0.45-5 PHIL FLAT HEAD SCREW	Bossard	BN 388 Type H
171	1	CMI-CHAS-108	SYSTEM MOUNTING PLATE ASSEMBLY	Trend	
174	2	CMI-CHAS-091	CHASSIS LOCKING SCREW	WPC	
175	2	CMI-WSH-00002	M4 [DIN 6797 TYPE J] INTERNAL TOOTHED LOCK WASHER	Bossard	BN 782
177	1	CMI-CHAS-104	CABLE TRAY	Trend	
178		CMI-LBL-00001	PRINTED AGENCY RATING LABEL		

8.1 iCEBOX FlipScreen Top Assembly (continued)

Item	Qty	iCEBOX P/N	Description	Mfg	Mfg P/N
180	1	CMI-CHAS-115	SERIAL No LABEL		
181	2	CMI-EMI-00003	EMI Gasket	Chomerics	82-121- 74010-0030

8.2 iCEBOX FlipScreen Controller Board - Rev. F

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
2	1	CMI-PCB-C_B	BOM11	PWB	KCE	C010021-05F
7	74	CMI-CAP-00002	BP9 BP39 BP60 BP63 BP86 BP139 BP140 BP141 BP143 C2 C3 C11 C68 C109 C111 C112 C115 C119 C123 C138 C139 C142 C146 C147 C150 C161 C164 C165 C166 C171 C183 C187 C205 C211 C212 C213 C214 C217 C222 C223 C224 C225 C228 C230 C236 C237 C238 C239 C240 C241 C242 C243 C244 C245 C246 C257 C258 C259 C263 C264 C272 C274 C275 C277 C278 C280 C281 C282 C283 C290 C297 C299 C304 C305	0.1UF	POLA	PCC0805R1 04K050NR
8	171	CMI-CAP-00004	BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP10 BP11 BP12 BP13 BP14 BP15 BP16 BP17 BP18 BP19 BP20 BP21 BP22 BP23 BP24 BP25 BP26 BP27 BP28 BP29 BP30 BP31 BP32 BP33 BP34 BP35 BP36 BP37 BP38 BP40 BP41 BP42 BP43 BP44 BP45 BP46 BP47 BP48 BP49 BP50 BP51 BP52 BP53 BP54 BP55 BP56 BP57 BP58	0.01UF	POLA	PCC0805R1 03K050NR
			BP59 BP61 BP62 BP64 BP65 BP66 BP67 BP68 BP69 BP70 BP71 BP72 BP73 BP74 BP75 BP76 BP77 BP78 BP79 BP80 BP81 BP82 BP83 BP84 BP85 BP87 BP88 BP89 BP90 BP91 BP92 BP93 BP94 BP95 BP96 BP97 BP98 BP99 BP100 BP101 BP102 BP103 BP104 BP105 BP106 BP107 BP108 BP109 BP110 BP111 BP112 BP113 BP114 BP115 BP116 BP117 BP118 BP119 BP120 BP121 BP122 BP123 BP124 BP125 BP126 BP127 BP128 BP129 BP130 BP131 BP132 BP133 BP134 BP135 BP136 BP137 BP138 C100 C122			

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
			C126 C127 C136 C137 C145 C149 C151 C152 C154 C155 C156 C158 C159 C167 C172 C179 C182 C188 C189 C190 C195 C198 C199 C202 C203 C204 C206 C209 C210 C266 C287 C291 C292 C293 C294 C295			
9	37	CMI-CAP-00001	C1 C6 C9 C10 C15 C33 C40 C45 C50 C53 C54 C56 C58 C60 C65 C69 C70 C71 C73 C74 C75 C77 C78 C81 C85 C89 C90 C91 C92 C93 C108 C232 C233 C234 C267 C270 C296	10UF_16V	Hitano	E5R100M16 B
10	3	CMI-CAP-00013	C4 C28 C29	47UF	Hitano	E5R470M25 B
11	1	CMI-CAP-00014	C5	33PF	POLA	PCC0805G3 30J050NR
12	3	CMI-CAP-00015	C7 C27 C247	10UF_25V	Hitano	E5R100M25 B
13	7	CMI-CAP-00016	C12 C13 C17 C19 C22 C25 C26	.47UF_25V	POLA	PCC1206R4 74K025NR
14	4	CMI-CAP-00017	C14 C18 C20 C23	.22UF_25V	POLA	PCC1206R2 24K025NR
15	5	CMI-CAP-00018	C21 C24 C30 C31 C84	4.7UF	Hitano	E5R4R7M25 B
16	9	CMI-CAP-00019	C34 C35 C101 C220 C221 C261 C262 C276 C279	100UF_16V	Hitano	E5R101M16 B
17	2	CMI-CAP-00020	C36 C52	3.3UF_25V	Hitano	ENR3R3M25 B
18	15	CMI-CAP-00021	C37 C43 C44 C47 C48 C55 C57 C61 C62 C63 C64 C66 C67 C76 C235	10UF_16V	Hitano	ENR100M16 B
19	1	CMI-CAP-00022	C38	2200UF_25V	NIC	NRSZ222M2 5V16X25
20	2	CMI-CAP-00023	C39 C51	1500PF	Panasonic	ECH- U1H152GB5
21	4	CMI-CAP-00024	C41 C42 C162 C163	0.0082UF	POLA	PCC0805R8 22K050NR
22	6	CMI-CAP-00009	C59 C72 C218 C219 C265 C268 C269	1UF	Hitano	E5R1R0M50 B
23	1	CMI-CAP-00025	C79	330UF	Hitano	ECR331M16 B
24	2	CMI-CAP-00026	C80 C117	0.047UF	POLA	PCC0805R4 73K050NR

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
25	1	CMI-CAP-00027	C82	560 PF_ 50V	POLA	PCC0805G5 61J050NR
26	2	CMI-CAP-00012	C88 C106	22UF_16V	Hitano	E5R220M16 B
27	1	CMI-CAP-00028	C104 C107	0.27UF	Panasonic	ECW- U1C274JC9
28	4	CMI-CAP-00029	C105 C168 C173 C174	220PF	POLA	PCC0805G2 21J050NR
29	18	CMI-CAP-00030	C110 C116 C120 C121 C124 C125 C128 C129 C130 C131 C132 C133 C134 C135 C140 C141 C143 C144	15PF	POLA	PCC0805G1 50J050NR
30	3	CMI-CAP-00031	C113 C114 C118	22PF	POLA	PCC0805G2 20J050NR
31	6	CMI-CAP-00032	C160 C170 C184 C193 C194 C197	10PF	POLA	PCC0805G1 00J050NR
32	12	CMI-CAP-00003	BP142 C169 C226 C227 C229 C231 C288 C289 C298 C300 C301 C302	0.001UF	POLA	PCC0805R1 02K050NR
33	4	CMI-CAP-00033	C175 C176 C177 C178	0.022UF	POLA	PCC0805R2 23K050NR
34	2	CMI-CAP-00034	C180 C181	18PF	POLA	PCC0805G1 80J050NR
35	10	CMI-CAP-00035	C185 C186 C306 C307 C308 C309 C310 C311 C312 C313	470PF_ 5%	POLA	PCC0805G4 71J050NR
37	1	CMI-CAP-00036	C196	2.2UF	POLA	PCC1206V2 25Z025NR
38	1	CMI-CAP-00037	C216	0.0022UF	POLA	PCC0805R2 22K050NR
39	3	CMI-CAP-00038	C256 C260 C273	1000UF_25V	Hitano	EHR102M25 B
41	2	CMI-CAP-00039	C284 C285	100PF	POLA	PCC0805G1 01J050NR
42	1	CMI-CAP-00040	C286	470UF_6.3V	Toshin	0JVC- BS471M
43	1	CMI-DIO-00004	D1	LED-RED	Kingbright	KPL-3015EC
44	1	CMI-DIO-00005	D2	LED- YELLOW	Kingbright	KPL-3015YC
45	1	CMI-DIO-00006	D3	LN11WP23	Kingbright	L-59EGW
46	3	CMI-DIO-00007	D4 D5 D6	BAV99	Central Semi.	CMPD7000

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	ICEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
47	2	CMI-DIO-00008	D7 D8	BAT54S	Philips Semiconduct or	BAT54S
48	1	CMI-DIO-00009	D9	1N4001	Philips Semiconduct or	1N4001G
49	2	CMI-DIO-00010	D10 D11	1N4148	Philips Semiconduct or	1N4148-133
50	4	CMI-DIO-00011	D12 D13 D14 D16	LED	Kingbright	KPL-3015SGC
51	3	CMI-FB-00001	FB1 FB9 FB10	BLM31A700S	Tai-Tech	FCB3216K-700T05
52	44	CMI-FB-00001	FB2 FB3 FB5 FB6 FB8 FB13 FB14 FB15 FB16 FB17 FB18 FB19 FB20 FB21 FB22 FB23 FB24 FB25 FB26 FB27 FB28 FB29 FB30 FB31 FB32 FB33 FB34 FB36 FB37 FB38 FB39 FB40 FB41 FB42 FB43 FB44 FB45 FB46 FB47 FB48 FB49 FB50 FB51 FB52	BLM31A700S	Tai-Tech	FCB3216K-700T05
54	1	CMI-CON-00008	J16	WS21-04-1-0-W	Astron	AT-WS21-04-1-0-W
55	1	CMI-CON-00009	J4	HEADER8	Molex	22-10-2081
56	1	CMI-CON-00010	J6	DUAL_DIN4	Kycon	KMDG-4S/4S-S4N
59	1	CMI-CON-00012	J10	WS21-03-1-0-W	Astron	AT-WS21-03-1-0-W
60	1	CMI-CON-00013	J11	RJ624	Transpower	RJ624
61	1	CMI-CON-00014	J12	HDR10	Molex	10-89-1101
62	1	CMI-CON-00015	J13	HDR50_2MM	Molex	79109-0224
63	1	CMI-CON-00016	J14	HDR14S_2.5MM	Leoco	2521P14V000
64	1	CMI-CON-00017	J15	ATAPI	Electronic Specialty Markets/3M	2540-6002UB
66	2	CMI-CON-00019	J20 J21	HDR12_2MM	Leoco	2037P12U000
67	2	CMI-CON-00002	J23 J24	CON10AP_RA HDR	Hirose	DF11-10DP-2DS(22)

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
68	1	CMI-CON-00020	J25	HEADER 2	Molex	22-27-2021
70	1	CMI-CON-00022	J27	RCAX4	Kycon	KLP42-61-WW/RR
71	1	CMI-CON-00023	J28	RCA JACK	Kycon	KLP-0848A-2-Y
72	1	CMI-CON-00024	J29	MDJ-003-5PC	Singatron	2MJ-0003A110
74	1	CMI-JPR-00003	JP9	JUMPER	Dupont	65474-010
75	1	CMI-K-00001	K1	JS1A-12V	Matsushita	JS1A-12V
76	1	CMI-IND-00003	L1	2.7UH	Tai-Tech	FCI2520-2R7J
77	1	CMI-IND-00004	L2	10UH	Tai-Tech	FCI2520-100K
78	10	CMI-IND-00005	L4 L9 L10 L11 L12 L13 L14 L16 L17 L18	EMI_FILTER	Panasonic	EXC-EMT103DT
79	5	CMI-IND-00006	L5 L6 L7 L8 L19 L20 L21 L26 L27 L28 L29 L30 L31 L32 L33	FERRITE BEAD	Tai-Tech	HCB2012K-380T40
80	1	CMI-IND-00007	L15	PSM4-402Z-20B	Spectrum Control	PSM4-402Z-20T
81	4	CMI-IND-00008	L22 L23 L24 L25	3.3UH	Jantek	JW11008C-3R3K
84	2	CMI-XSTR-00005	Q1 Q2	MMBT2222	On-Semi	MMBT2222L T1
85	2	CMI-XSTR-00006	Q925 Q926	SI2305DS	Vishay Siliconix	Si2305DS-T1
86	2	CMI-XSTR-00007	Q927 Q928	SI2302DS	Vishay Siliconix	Si2302DS-T1
87	29	CMI-RES-00023	R1 R2 R3 R4 R5 R6 R7 R9 R10 R11 R12 R17 R18 R20 R21 R25 R26 R31 R32 R36 R37 R39 R40 R48 R49 R53 R54 R55 R150	22	ASJ	CR21-220-JF
88	22	CMI-RES-00003	R13 R22 R27 R29 R33 R51 R132 R133 R162 R163 R165 R167 R178 R179 R184 R188 R304 R376 R377 R392 R395 R396 R397 R415	33	ASJ	CR21-330-JF
89	1	CMI-RES-00024	R14	5.6K	ASJ	CR21-562-JF

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
90	56	CMI-RES-00025	R15 R16 R19 R60 R63 R86 R92 R98 R122 R146 R149 R152 R157 R159 R160 R161 R166 R168 R170 R171 R172 R173 R175 R176 R177 R181 R182 R183 R187 R207 R208 R209 R210 R211 R212 R213 R214 R259 R263 R264 R275 R276 R294 R299 R316 R337 R338 R398 R399 R400 R417 R423 R428 R429 R430 R431	4.7K	ASJ	CR21-472-JF
91	92	CMI-RES-00006	R23 R43 R44 R45 R47 R50 R69 R72 R73 R75 R82 R83 R90 R94 R95 R100 R101 R102 R103 R104 R105 R107 R109 R110 R111 R116 R118 R136 R153 R158 R164 R180 R189 R190 R193 R199 R204 R205 R206 R216 R221 R224 R225 R228 R229 R230 R237 R238 R239 R240 R241 R242 R244 R257 R260 R261 R269 R271 R274 R277 R278 R279 R280 R281 R282 R286 R300 R301 R303 R306 R307 R308 R310 R312 R317 R318 R319 R320 R325 R329 R330 R331 R347 R363 R366 R367 R368 R369 R370 R393 R401 R414	10K	ASJ	CR21-103-JF
92	9	CMI-RES-00026	R24 R28 R30 R34 R35 R38 R84 R243 R262	2.2K	ASJ	CR21-222-JF
93	7	CMI-RES-00005	R41 R46 R108 R121 R200 R231 R292 R382 R383 R384 R385 R386 R387 R388 R389 R390 R391	10	ASJ	CR21-100-JF
94	25	CMI-RES-00020	R42 R52 R81 R106 R119 R145 R151 R155 R174 R194 R201 R202 R203 R215 R223 R234 R235 R249 R258 R270 R284 R293 R305 R322 R413	1K	ASJ	CR21-102-JF
95	1	CMI-RES-00027	R56	523_ 1%	ASJ	CR21-5230-FF
96	9	CMI-RES-00028	R58 R59 R70 R71 R195 R220 R227 R236 R416	100K	ASJ	CR21-104-JF
97	2	CMI-RES-00029	R61 R67	56K	ASJ	CR21-563-JF
98	2	CMI-RES-00030	R62 R68	560	ASJ	CR21-561-JF

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
99	4	CMI-RES-00031	R85 R97 R129 R254	100	ASJ	CR21-101-JF
100	4	CMI-RES-00021	R78 R79 R80 R137 R424 R425	47	ASJ	CR21-470-JF
101	5	CMI-RES-00010	R91 R142 R143 R357 R359	470	ASJ	CR21-471-JF
102	1	CMI-RES-00032	R93	2.7K	ASJ	CR21-272-JF
103	14	CMI-RES-00033	R112 R113 R131 R134 R298 R321 R333 R334 R335 R336 R339 R340 R341 R342	15K	ASJ	CR21-153-JF
104	4	CMI-RES-00034	R123 R124 R125 R128	330	ASJ	CR21-331-JF
105	1	CMI-RES-00035	R130	390	ASJ	CR21-391-JF
108	1	CMI-RES-00038	R148	2.2	ASJ	CR21-2R20-FF
109	2	CMI-RES-00039	R154 R169	220	ASJ	CR21-221-JF
110	1	CMI-RES-00040	R156	150	ASJ	CR21-151-JF
111	3	CMI-RES-00041	R185 R192 R198	75	ASJ	CR21-75R0-FF
113	5	CMI-RES-00016	R191 R345 R394 R421 R427	0	ASJ	CR21-000-ZK
114	2	CMI-RES-00042	R233 R328	68	ASJ	CR32-680-JF
115	1	CMI-RES-00007	R226	20K	ASJ	CR21-203-JF
116	1	CMI-RES-00043	R232	680K	ASJ	CR21-684-JF
117	5	CMI-RES-00044	R138 R139 R140 R141 R252	27	ASJ	CR21-270-JF
118	1	CMI-RES-00045	R253	510	ASJ	CR21-511-JF
119	11	CMI-RES-00011	R283 R287 R288 R289 R290 R291 R295 R302 R332 R358 R362	47K	ASJ	CR21-473-JF
120	2	CMI-RES-00046	R296 R297	8.2	ASJ	CR21-8R20-FF
121	1	CMI-RES-00047	R309	4.99K	ASJ	CR21-4991-FF
122	1	CMI-RES-00012	R311	100K_1%	ASJ	CR21-1003-FF

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	ICEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
123	1	CMI-RES-00048	R313	1.0M_1%	ASJ	CR21-1004-FF
124	2	CMI-RES-00049	R314 R315	49.9	ASJ	CR21-49R9-FF
126	2	CMI-RES-00050	R360 R361	22K	ASJ	CR21-223-JF
128	1	CMI-RES-00051	R372	6.65K_ 1%	ASJ	CR21-6651-FF
129	1	CMI-RES-00052	R373	10K_1%	ASJ	CR21-1002-FF
130	10	CMI-RES-00053	R374 R375 R432 R433 R434 R435 R436 R437 R438 R439	100	ASJ	CR21-101-JF
133	2	CMI-RES-00009	R135 R405	1.5K_ 1%	ASJ	CR21-1501-FF
134	5	CMI-RES-00008	R406 R407 R409 R411 R412	1K_ 1%	ASJ	CR21-1001-FF
135	1	CMI-RES-00054	RN1	10K	CTS	742163C103 JCT
136	2	CMI-RES-00055	RN2 RN5	10K	CTS	742C083103 J
137	2	CMI-RES-00056	RN3 RN4	33	CTS	742C083330 JCT
138	12	CMI-SW-00002	S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12	SW_PB_4	C&K	PTS645VL31
144	1	CMI-IC-00007	U1	ZR36701	Zoran Corporation	ZR36701TQ C
145	1	CMI-IC-00008	U2	AT24C01A	Atmel	AT24C01A-10SC-2.7
146	1	CMI-IC-00009	U3	C161O	Siemens	Q67121-C1061/SAB-C161O-L16M
147	1	CMI-IC-00010	U4	ZR36710	Zoran	ZR36710TQ C
148	1	CMI-IC-00011	U5	NE5532A	Philips Semiconductor	NE5532AD8
149	1	CMI-IC-00012	U6	SINGLE_OP TO_ISO	NEC	PS2701-1-F3
150	1	CMI-IC-00013	U7	B69030	Asilant	B69030
151	1	CMI-XTAL-00008	U8	14.31818MHZ	Epson	SG-636PCE-14.3181MC2 100PPM
152	2	CMI-IC-00015	U9 U12	K6R4008C1 C-JC12	Samsung	K6R4008V1 C-JC12T00

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
153	1	CMI-IC-00016	U10	TDA8569Q	Philips Semiconduct or	TDA8569Q
154	2	CMI-IC-00017	U11 U16	MT48LC1M1 6A1TG-7S	Elite MT	M12L16161C -6T
155	2	CMI-IC-00018	U15 U23	4051	Philips Semiconduct or	HEF4051BT- T
156	1	CMI-IC-00019	U17	24C256	Atmel	AT24C256- 10PI-2.7
157	1	CMI-IC-00020	U18	CS4338-KS	Cirrus Logic	CS4338-KS
158	1	CMI-IC-00021	U19	EPF6024AB C256-3	Altera	EPF6024AB C256-3
159	1	CMI-IC-00022	U20	LM4832	National Semi	LM4832M
160	2	CMI-IC-00060	U21 U68	DS1267E- 010	Dallas Semiconduct or	DS1267E- 010
161	1	CMI-IC-00024	U22	SAA7111AH	Phillips	SAA7111AH
162	1	CMI-IC-00025	U24	74LVXT14	Philips Semiconduct or	74LV14D
163	1	CMI-IC-00026	U25	LTC1046	Linear Tech	LTC1046CS8
164	1	CMI-IC-00027	U26	CY7B991V	Cypress Semiconduct or	CY7B991V- 2JC
165	1	CMI-IC-00028	U27	MM74C14M	Philips Semiconduct or	PC74HC14D
166	1	CMI-IC-00029	U28	74HCT125	TI	SN74HCT12 5D
167	1	CMI-IC-00030	U29	AM29F002N BB-55JC	AMD	AM29F002N BB-55JC
168	1	CMI-IC-00031	U30	IS61C1024- 12TR	ISSI	IS61C1024- 12TR
169	1	CMI-IC-00032	U31	L2800-38	Conexant	L2800-38
170	1	CMI-IC-00033	U32	74LCX16543	Texas Instruments	SN74ALVCH 16543DL
171	2	CMI-IC-00034	U33 U34	MT48LC8M1 6A2TG-8E	Micron	MT48LC8M1 6A2TG-75
172	1	CMI-IC-00035	U35	SH3_7709	Hitachi	HD6417709A F133BX
173	1	CMI-IC-00036	U36	QS4A101Q	IDT	IDTQS4A101 Q8

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
174	1	CMI-IC-00037	U37	LM386M-1	National Semi	LM386MX-1
175	1	CMI-IC-00038	U38	SL811HS	ScanLogic Corp.	SL811HS
176	1	CMI-IC-00039	U39	DS9094F	Dallas Semiconductor	DS9094F-000
177	1	CMI-IC-00040	U40	CS8900A-CQ3	Cirrus Logic	CS8900A-CQ3
178	1	CMI-IC-00041	U41	R6764-63	Conexant	R6764-63
179	1	CMI-IC-00042	U43	EPM7032AELC44	Altera	EPM7032AELC44-7
180	1	CMI-IC-00043	U44	TPS3307-33DR	TI	TPS3307-33DR
181	1	CMI-IC-00044	U45	74LVC16244A	Philips Semiconductor	74LVC16244ADL
182	1	CMI-IC-00045	U46	AT93C46-10SC-2.7	ATMEL	AT93C46-10SC-2.7
183	2	CMI-IC-00046	U48 U49	74LVCH16373A	Philips Semiconductor	74LVC16373ADL
184	1	CMI-IC-00047	U50	DA28FXXXJ5-150	Intel	DA28F640J5-150
185	1	CMI-IC-00048	U53	74LVTH16374	TI	SN74LVTH16374DL
186	1	CMI-XTAL-00009	U54	48.00MHZ	FOX	JITO-2-DC3AE-48.00
187	1	CMI-IC-00050	U55	AT43301	Atmel	AT43301-55634D
189	1	CMI-IC-00006	U58	TSOP1238	Vishay	TSOP1238
190	1	CMI-IC-00052	U59	SN75LVDS84ADGG	Texas Instruments	SN75LVDS84ADGGR
191	1	CMI-IC-00053	U62	SN74LVC157AD	Philips Semiconductor	74LVC157AD
192	1	CMI-IC-00054	U63	DS1621S	Dallas Semiconductor	DS1621S/T&R
194	1	CMI-IC-00056	U69	DS1803E-010	Dallas Semiconductor	DS1803E-010

8.2 iCEBOX FlipScreen Controller Board - Rev. F (continued)

Item	Qty	iCEBOX P/N	Reference Designator(s)	Value	Mfg	Mfg P/N
195	1	CMI-IC-00057	U70	LT1761ES5-3.3	Linear Technology	LT1761ES5-3.3
196	1	CMI-IC-00058	U71	LT1763CS8	Linear Technology	LT1763CS8
197	1	CMI-IC-00059	U72	TCPN9082D A27CV	Samsung	TCPN9082D A27CV
198	1	CMI-SKT-00004	XU39	DS1994L-F5	Dallas Semi	DS1994L-F50
199	1	CMI-XTAL-00001	Y1	27.000 MHZ	QVS	QVS49U-27.000MHZ
200	1	CMI-XTAL-00002	Y2	16MHZ	CTS	MP160
201	1	CMI-XTAL-00003	Y4	24.576MHZ	SaRonix	SRX7005(N) 24.576
202	1	CMI-XTAL-00004	Y5	28.224MHZ	ILSI	ILCX-04-436-28.224
203	1	CMI-XTAL-00005	Y6	14.7456MHZ	Hooray	HH14745-20+AS
204	1	CMI-XTAL-00006	Y7	32.768 KHZ	Epson	C-001R-32.768K-A
205	1	CMI-XTAL-00007	Y8	20MHZ	Epson	CA-301 20.000MC 30 PPM 18PF Fundamental
206	1	CMI-IC-00061	U73	LMC660CM	National Semi	LMC660CM SO-14

8.3 iCEBOX FlipScreen LVDS Board, Rev. F

Item	Qty	iCEBOX PN	Ref Des(s)	Part/Value	Manufacturer	Mfg PN
2	8	CMI-CAP-00002	C2 C3 C6 C8 C10 C11 C17 C18	0.1UF	POLA	PCC0805R104 K050NR
3	4	CMI-CAP-00003	C4 C5 C7 C9	0.001UF	POLA	PCC0805R102 K050NR
4	4	CMI-CAP-00004	C13 C14 C15 C16	0.01UF	POLA	PCC0805R103 K050NR
5	1	CMI-FB-00001	FB1	BLM31A70 0S	TAI-TECH	FCB3216K-700T05
6	1	CMI-CON-00001	J1	CON41-HIROSE	Hirose	DF9-41S-1V(20)
7	2	CMI-CON-00002	J2 J3	CON10AP_RA HDR	Hirose	DF11-10DP-2DS(22)
8	2	CMI-IND-00001	L1 L2	EMI_FILTE R	Panasonic	EXC_CET-103U
11	4	CMI-RES-00002	R1 R2 R3 R4	100	ASJ	CR16-101-JF
13	4	CMI-RES-00003	R12 R13 R14 R15	33	ASJ	CR21-330-JF
15	1	CMI-IC-00001	U1	SN75LVDS 86A	Texas Instruments	SN75LVDS86A DGG
16	1	CMI-RES-00016	R10	0	ASJ	CR21-000-ZK
17	1	C010021-07-F		PCB	KCE	C010021-07-F

8.4 iCEBOX FlipScreen LVDS Filter Board, Rev. A

Item	Qty	CMI PN	Ref Des(s)	Part/Value	Manufacturer	Mfg PN
1	20	CMI-CAP-00035	C1-C20	"470pF, 50V"	Pola	PCC0805G471J050NR
2	20	CMI-CAP-00045	C21-C40 C41 C42	"47pF, 50V"	AVX	08055A470JAT2A
3	4	CMI-IND-00010	"L1, L2, L3, L4"	Common Mode Choke	Steward	CM3032V201R-00
4	4	CMI-IND-00011	"L5, L6, L7, L8"	Common Mode Choke	Steward	CM4732V201R-00
5	2	CMI-CON-00031	"J1, J6"	Header 8POS .100 Rt Angle	Molex	22-12-2081
6	4	CMI-CON-00002	"J2, J3, J4, J5"	Connector	Hirose	DF11-10DP-2DS(22)
7	1	C010021-12-A		LVDS Filter PCB	HOIHO	C010021-12-A

8.5 iCEBOX FlipScreen Modem Board, Rev. B

Item	Qty	CMI PN	Ref Des(s)	Part/Value	Manufacturer	Mfg PN
1	5	CMI-CAP-00001	C1 C7 C20 C28 C29	10UF_16V	Hitano	E5R100M16B
2	6	CMI-CAP-00002	C2 C23 C26 C27 C31 C34	0.1UF	Pola	PCC0805R104 K050NR
3	2	CMI-CAP-00005	C3 C18	.1UF 200V	TAE	MEF2E104J
4	6	CMI-CAP-00006	C4 C6 C9 C11 C14 C15	K935L	Krypton	K935L
5	2	CMI-CAP-00007	C5 C16	1000PF	Pola	PCC0805R102 K050NR
6	2	CMI-CAP-00037	C8 C10	2200PF	Pola	PCC0805R222 K050NR
7	2	CMI-CAP-00009	C12 C19	1UF	Hitano	E5R1R0M50B
8	2	CMI-CAP-00010	C13 C17	1000PF_1000VAC	Hitano	HB3A102K-S556R
9	1	CMI-CAP-00011	C21	6.8UF	Hitano	E5R6R8M25B
10	3	CMI-CAP-00012	C24 C25 C33	22UF_16V	Hitano	E5R220M16B
11	2	CMI-DIO-00001	D1 D2	CMDZ16L	Central Semiconductor	CMDZ16L
12	1	CMI-DIO-00002	D3	CMDZ7L5	Central Semiconductor	CMDZ7L5
13	2	CMI-DIO-00003	D4 D5	DUAL SWITCHING DIODE	Central Semiconductor	CMPD2004S
14	2	CMI-FUS-00001	F1 F2	PTC_FUSE	Raychem	TS600-200-RA-B-0.5-2
15	8	CMI-FB-00002	FB1 FB2 FB3 FB4 FB5 FB6 FB7 FB8	FERRITE BEAD	Tai-Tech	HCB3216K-900T30
16	2	CMI-CON-00003	J1 J4	GM-S-66	KYCON	GM-S-66
17	1	CMI-CON-00004	J2	HDR50_2MM	Molex	87333-5020
18	1	CMI-CON-00005	J3	87525-0001	Molex	87525-0001
19	1	CMI-IND-00002	L1	29F0418-1SR	Steward	29F0418-1SR
20	1	CMI-MTG-00001	M1	MOUNTING HOLE		
21	1	CMI-XSTR-00001	Q1	CMPTA92	Central Semi.	CMPTA92

8.5 iCEBOX FlipScreen Modem Board, Rev. B (continued)

Item	Qty	CMI PN	Ref Des(s)	Part/Value	Manufacturer	Mfg PN
22	2	CMI-XSTR-00002	Q2 Q5	FMMTA42	Zetex	FMMTA42
23	1	CMI-XSTR-00003	Q3	SXTA42	Zetex	SXTA42
24	1	CMI-XSTR-00004	Q4	N-MOSFET 60V 2W	Motorola	MTD3055VL
25	1	CMI-RES-00005	R1	10	ASJ	CR21-100-JF
26	4	CMI-RES-00006	R2 R4 R5 R22	10K	ASJ	CR21-103JF
27	1	CMI-RES-00007	R3	20K	ASJ	CR21-203-JF
28	1	CMI-RES-00008	R6	1K 1%	ASJ	CR21-1001-FF
29	1	CMI-RES-00009	R7	1.5K_ 1%	ASJ	CR21-1501-FF
30	1	CMI-RES-00010	R8	470	ASJ	CR21-471-JF
31	4	CMI-RES-00011	R9 R11 R12 R14	47K	ASJ	CR21-473-JF
32	1	CMI-RES-00012	R10	100K _ 1%	ASJ	CR21-1003-FF
33	1	CMI-RES-00013	R13	20 1/2W	Yageo	CFR-50JB 20R
34	1	CMI-RES-00014	R15	84.5_ 1%	ASJ	CR21-84R5-FF
35	1	CMI-RES-00015	R16	39_1W	Yageo	RSF100JT-39R
36	1	CMI-RES-00016	R17	0	ASJ	CR21-000-ZF
37	1	CMI-RES-00017	R18	59K_ 1%	ASJ	CR21-5902-FF
38	1	CMI-RES-00018	R19	10_0.25W_1%	YAGEO	MFR-25FBF10R0
39	1	CMI-RES-00019	R20	200K	ASJ	CR21-204-JF
40	1	CMI-RES-00020	R21	1K	ASJ	CR21-102-JF
41	1	CMI-RES-00021	R23	47	ASJ	CR21-470-JF
42	1	CMI-IC-00002	U1	K952C	Krypton	K952C

8.5 iCEBOX FlipScreen Modem Board, Rev. B (continued)

Item	Qty	CMI PN	Ref Des(s)	Part/Value	Manufacturer	Mfg PN
43	1	CMI-IC-00003	U2	K951C	Krypton	K951C
44	1	CMI-IC-00004	U3	PS2701-1	NEC	PS2701-1-F3
45	1	CMI-IC-00005	U4	TPS2042D	TI	TPS2042DR
46	1	CMI-IC-00006	U5	TSOP1238	Vishay	TSOP1238
47	3	CMI-VR-00001	V1 V2 V3	P2600	Power Innovations	TISP4350H3BJ

9. Block Diagrams

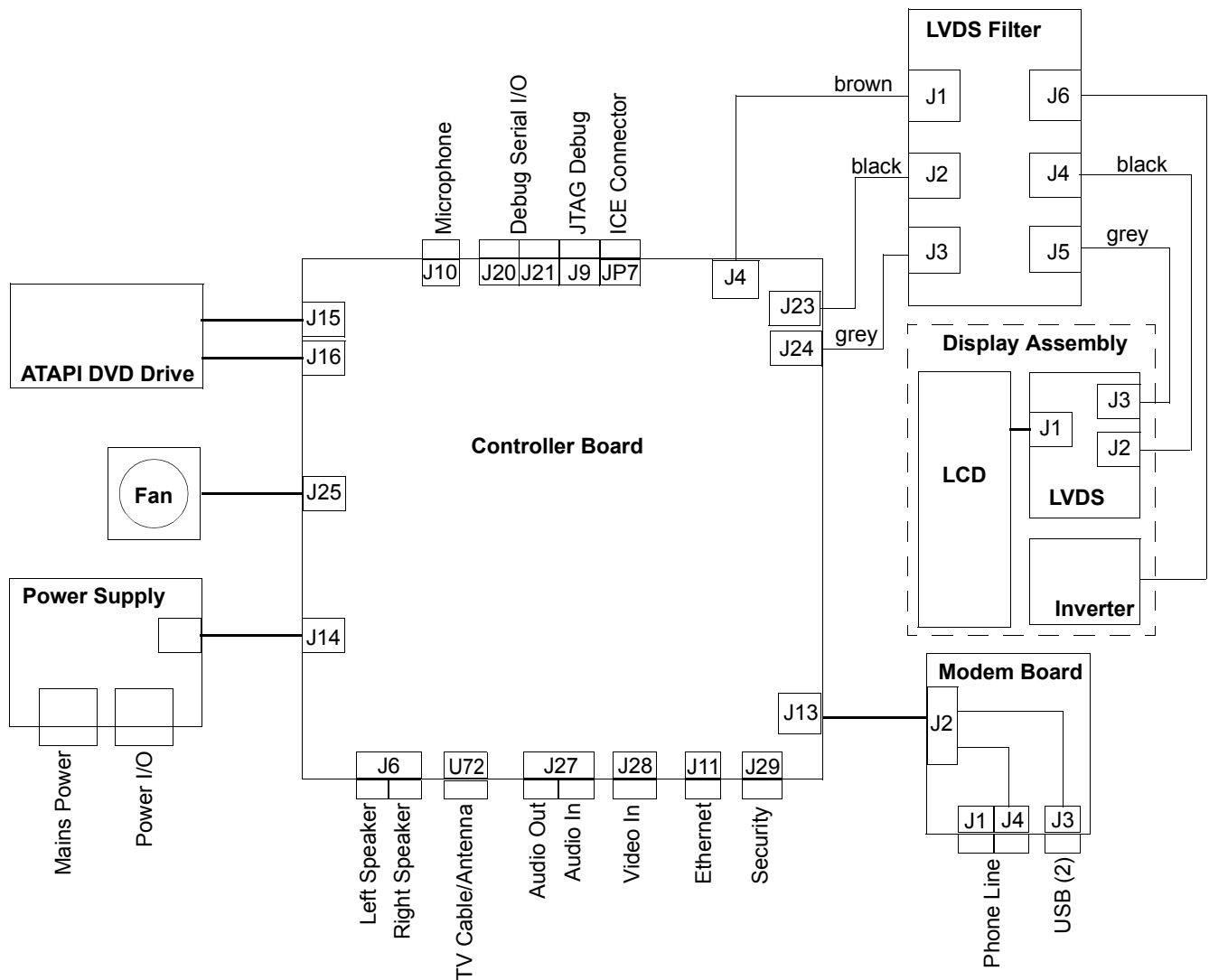
iCEBOX FlipScreen Interconnect Diagram 9-1

iCEBOX FlipScreen Block Diagram 9-2

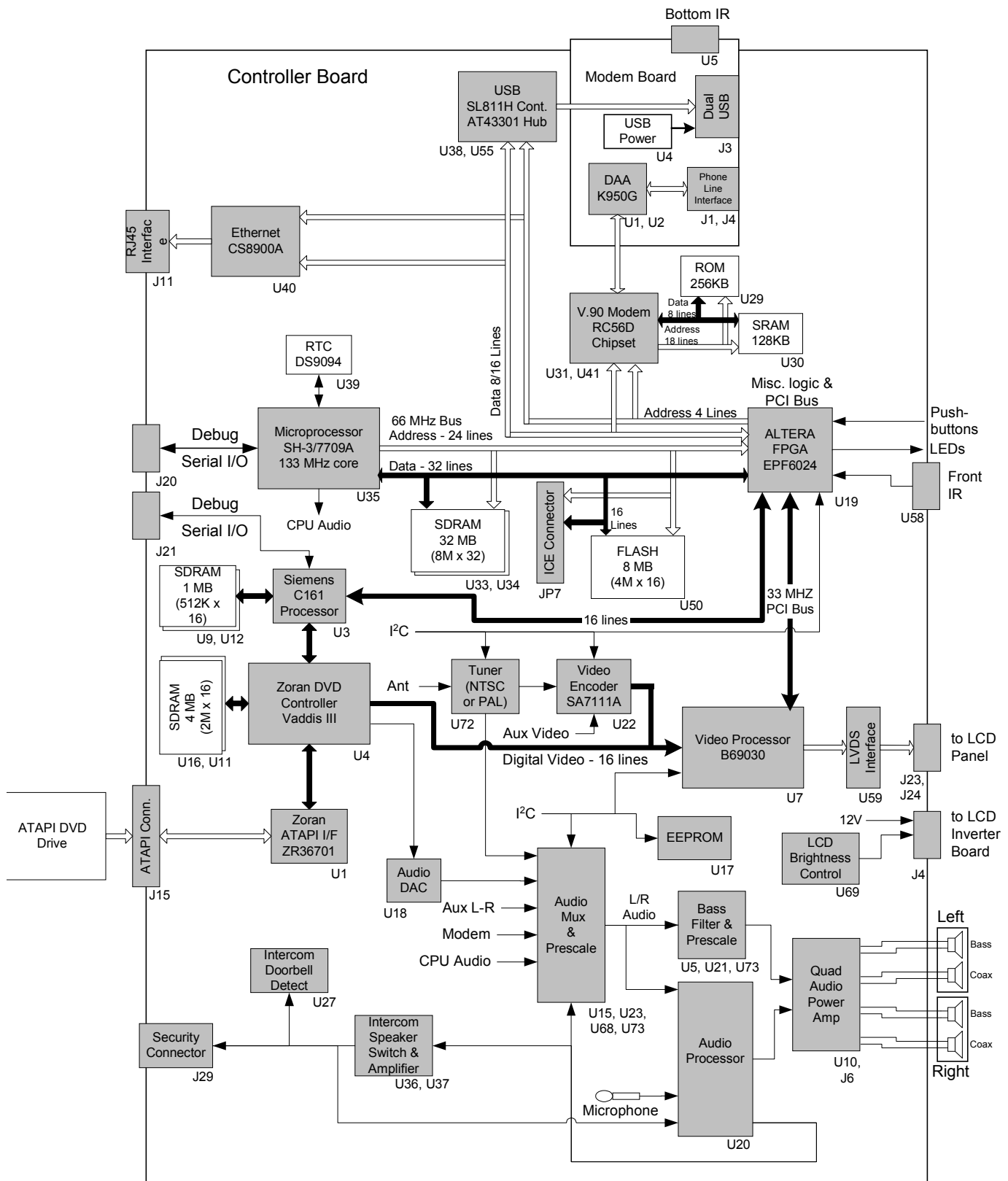
iCEBOX FlipScreen Display Block Diagram 9-3

9. Block Diagrams

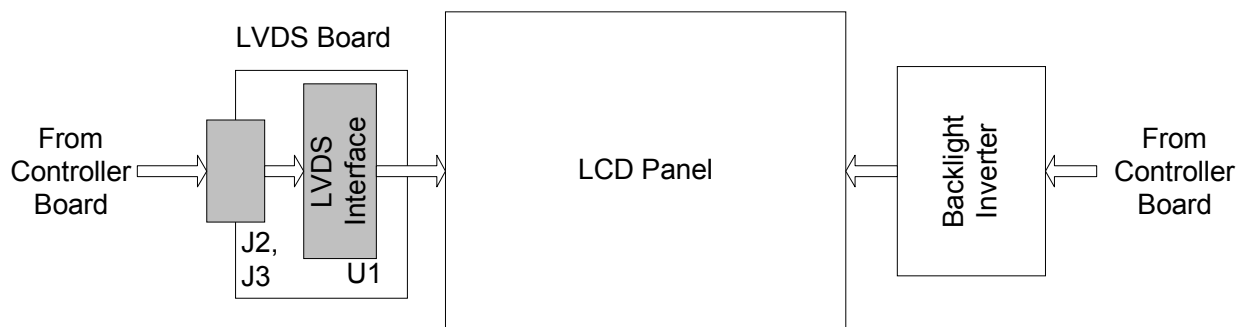
9.1 iCEBOX FlipScreen Interconnect Diagram



9-2

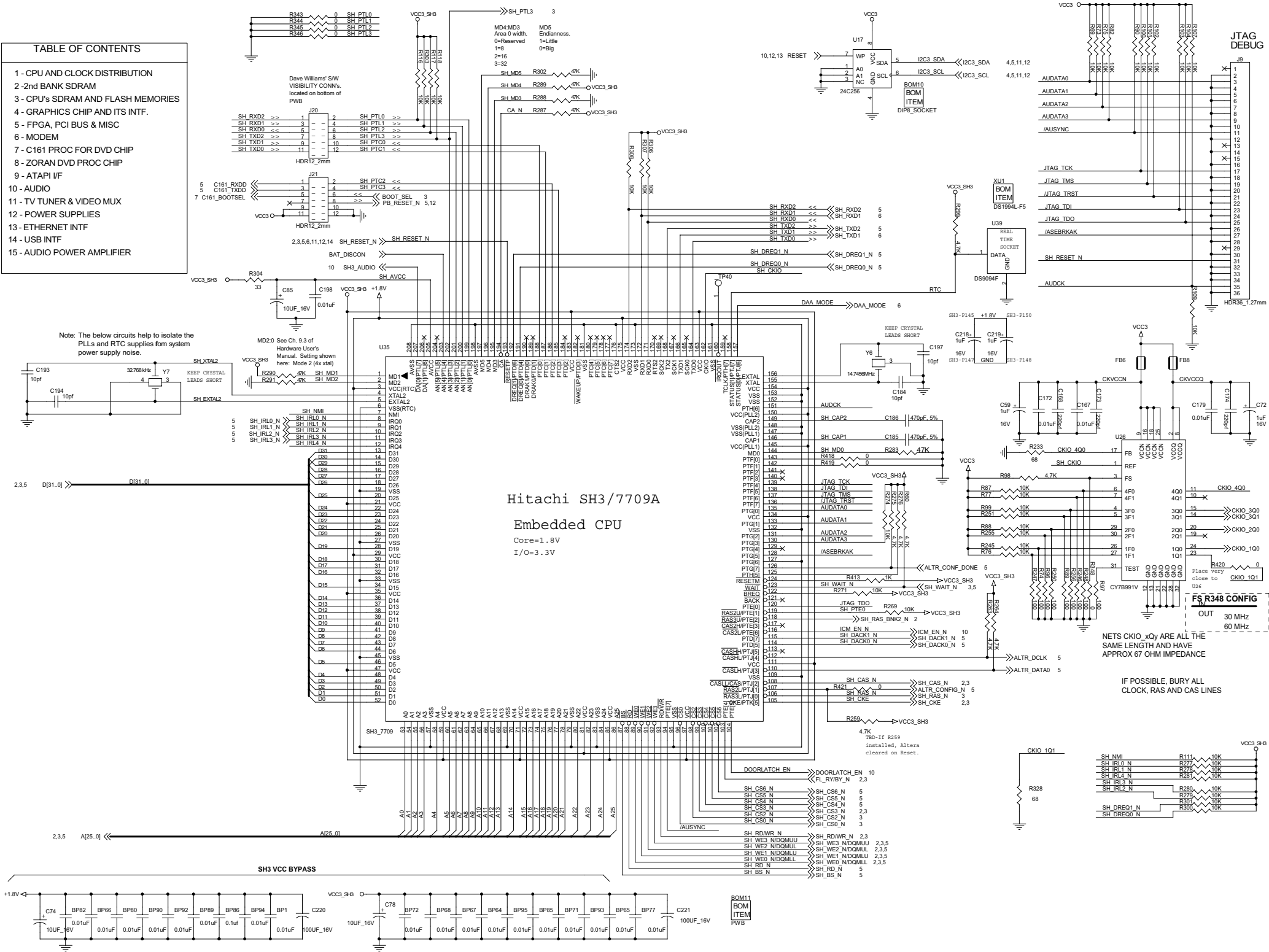


9.3 iCEBOX FlipScreen Display Block Diagram

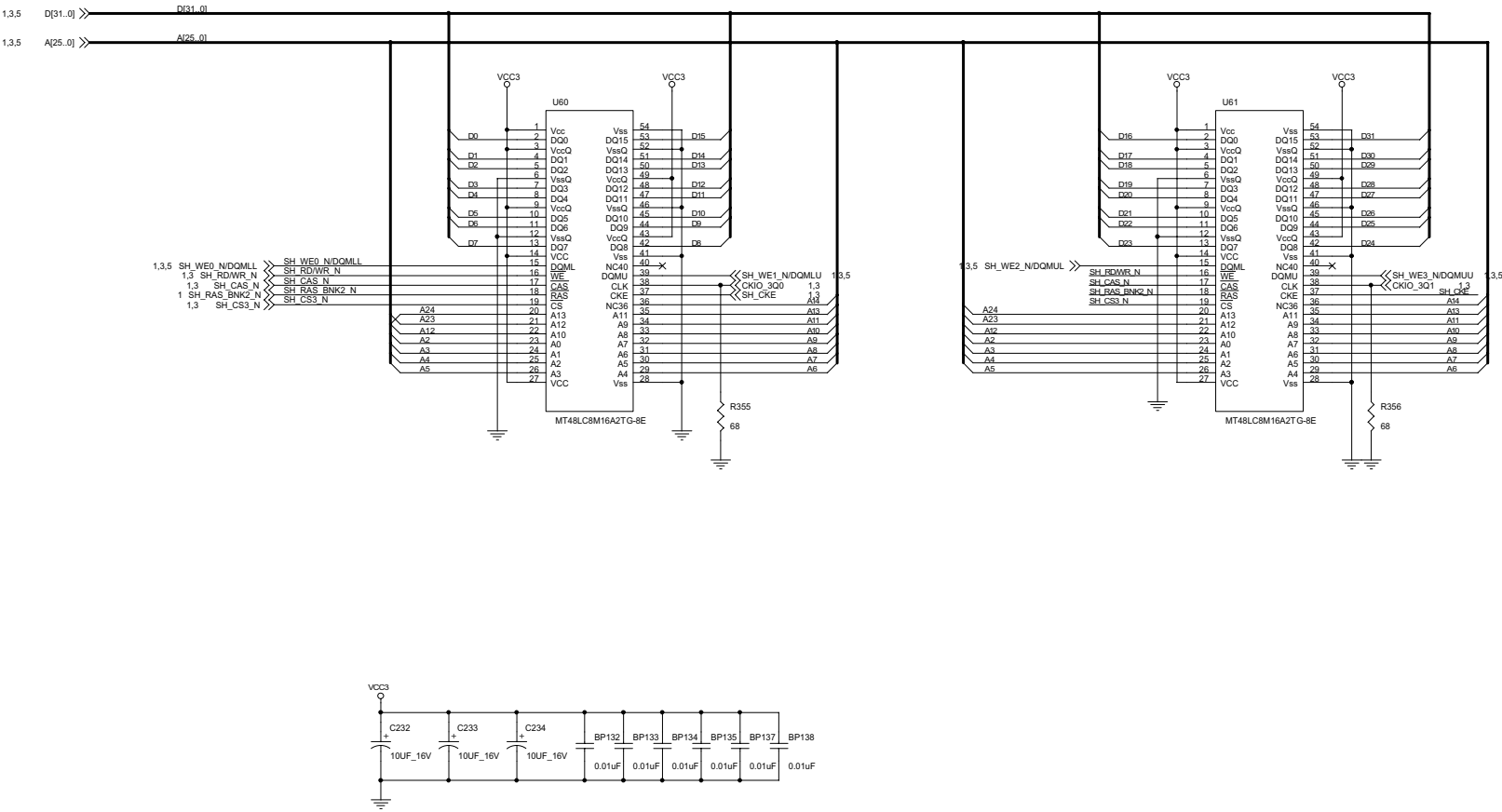


10. Schematics

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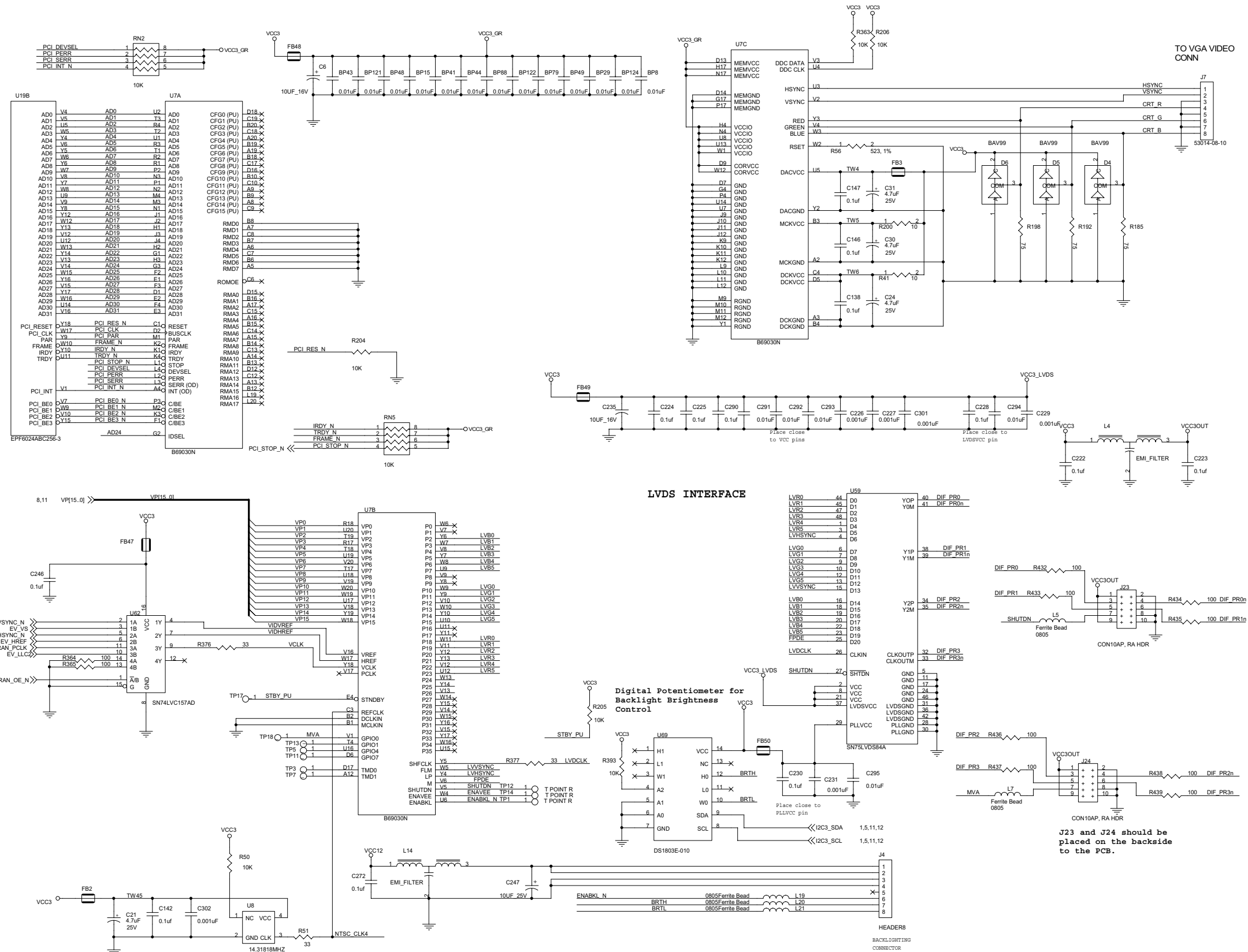


10.1 CPU and Clock Distribution

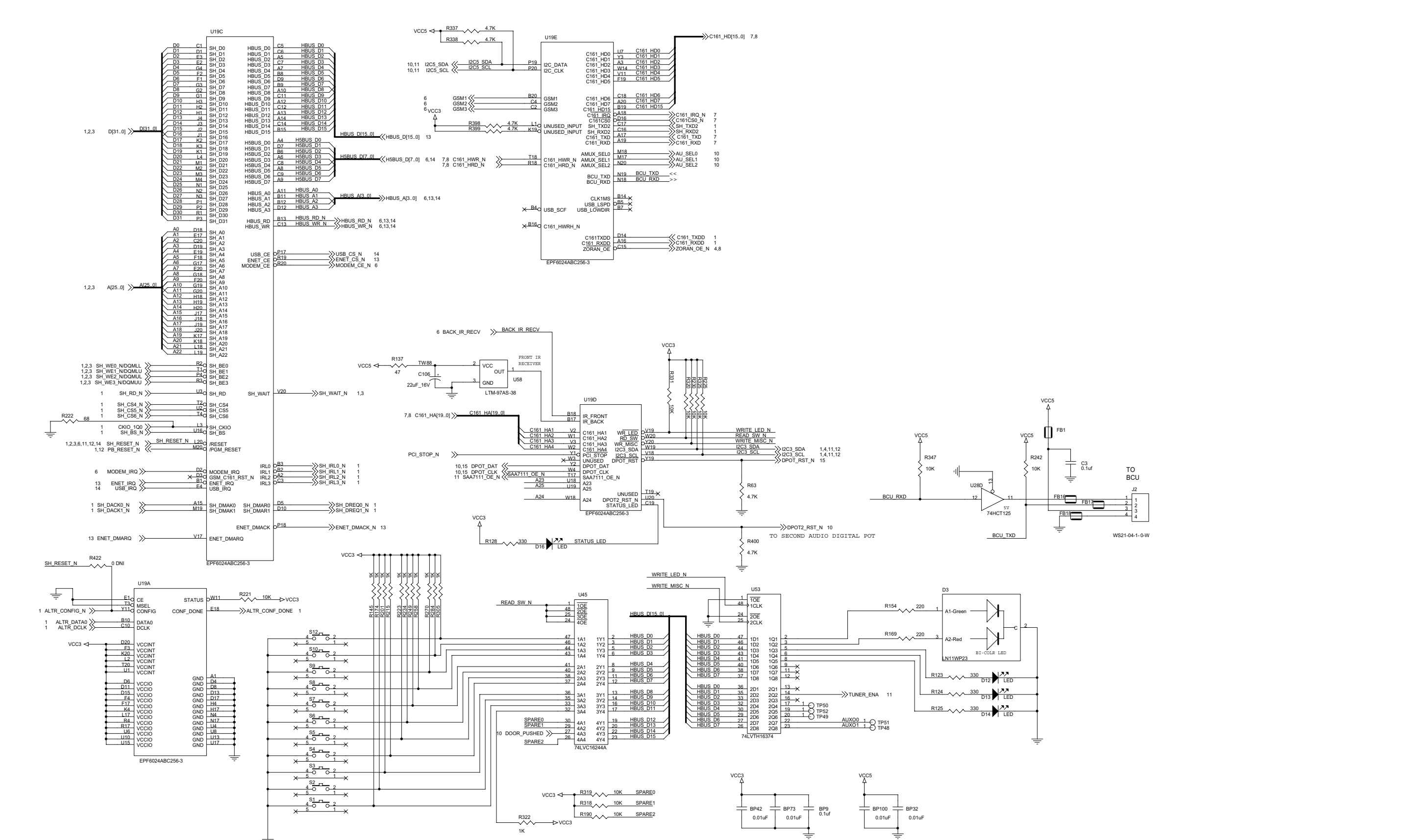


10.2 2nd Bank SDRAM



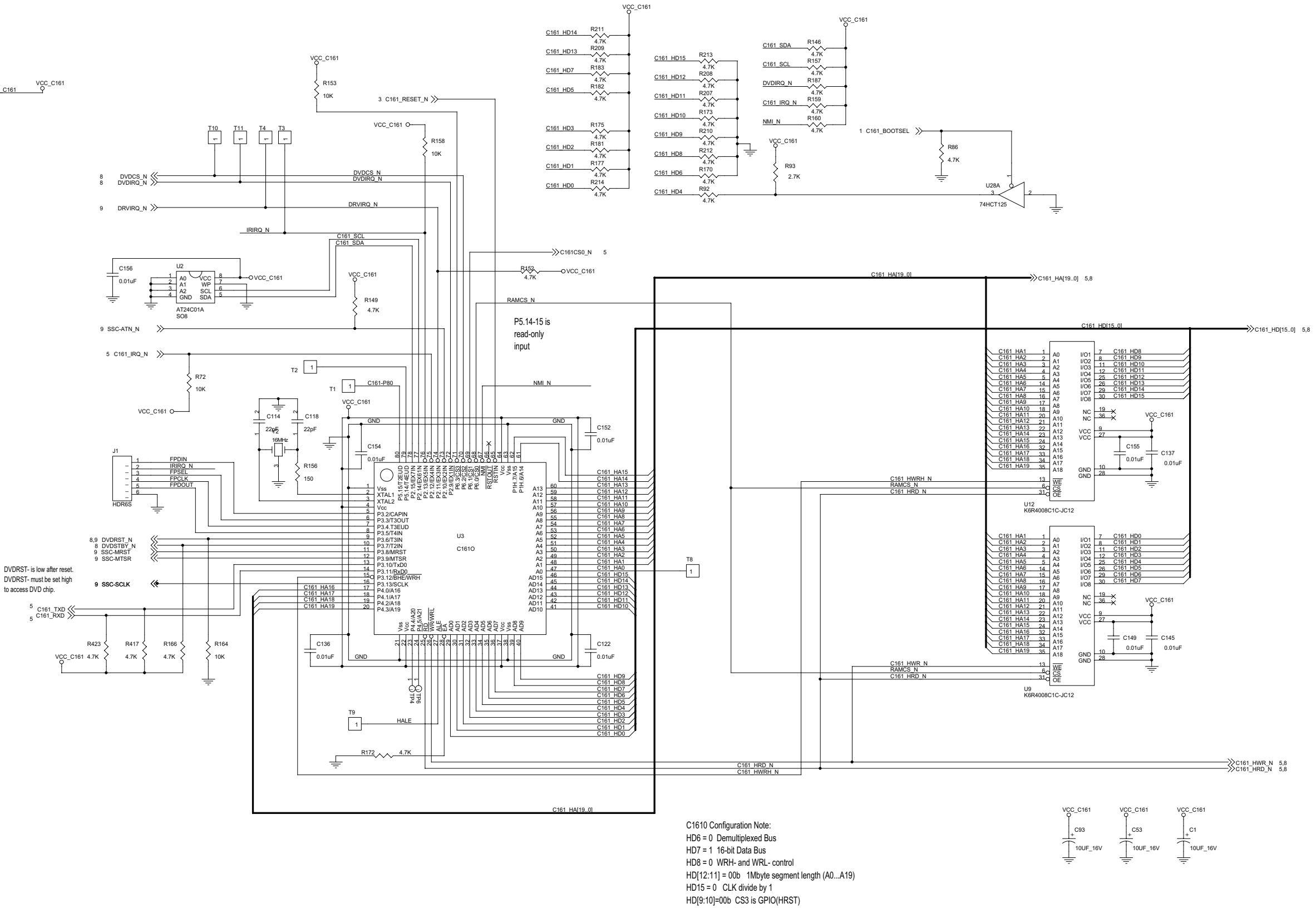


10.4 Graphics Chip and Interface

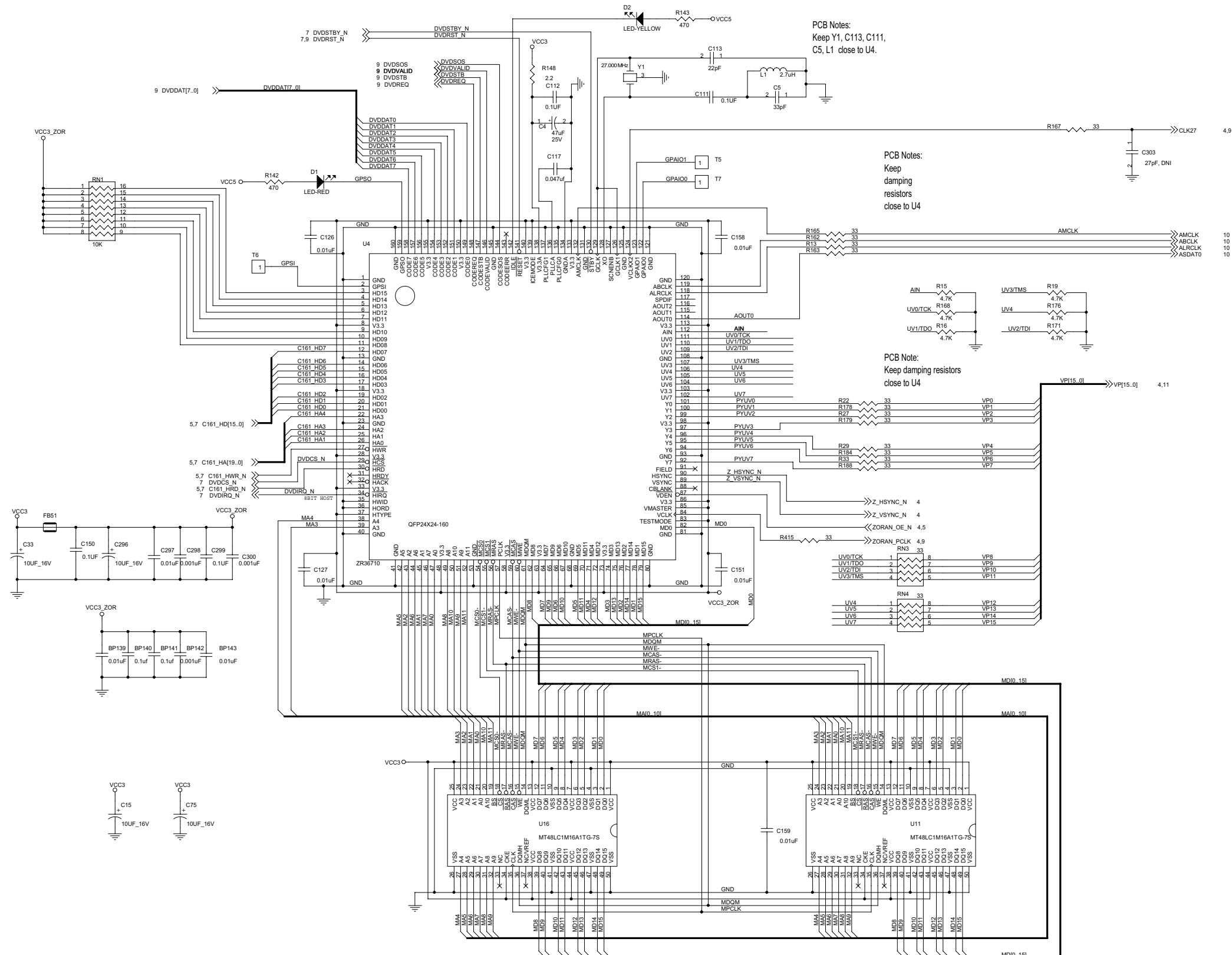


10.5 FPGA, PCI Bus and Misc.

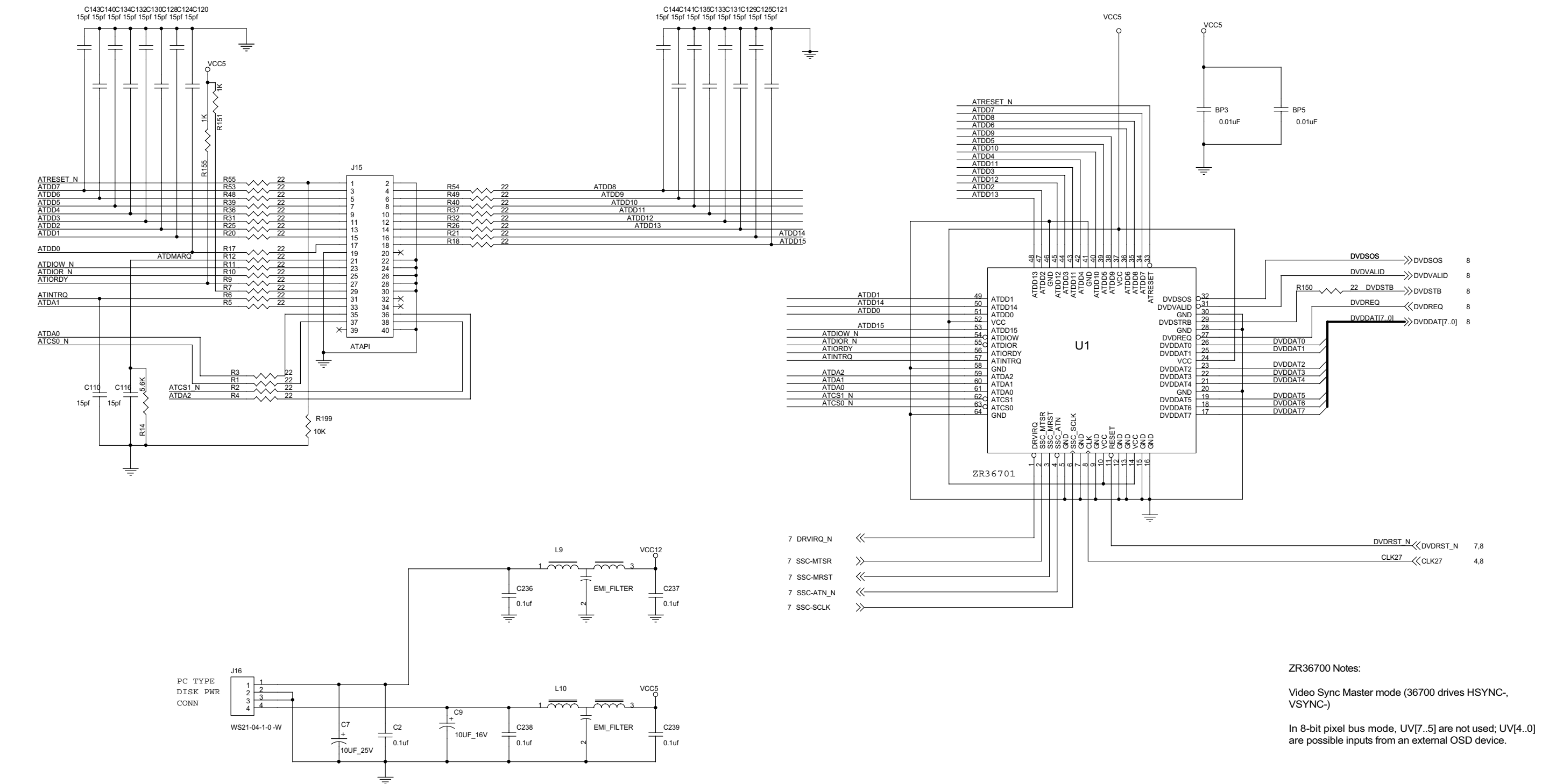




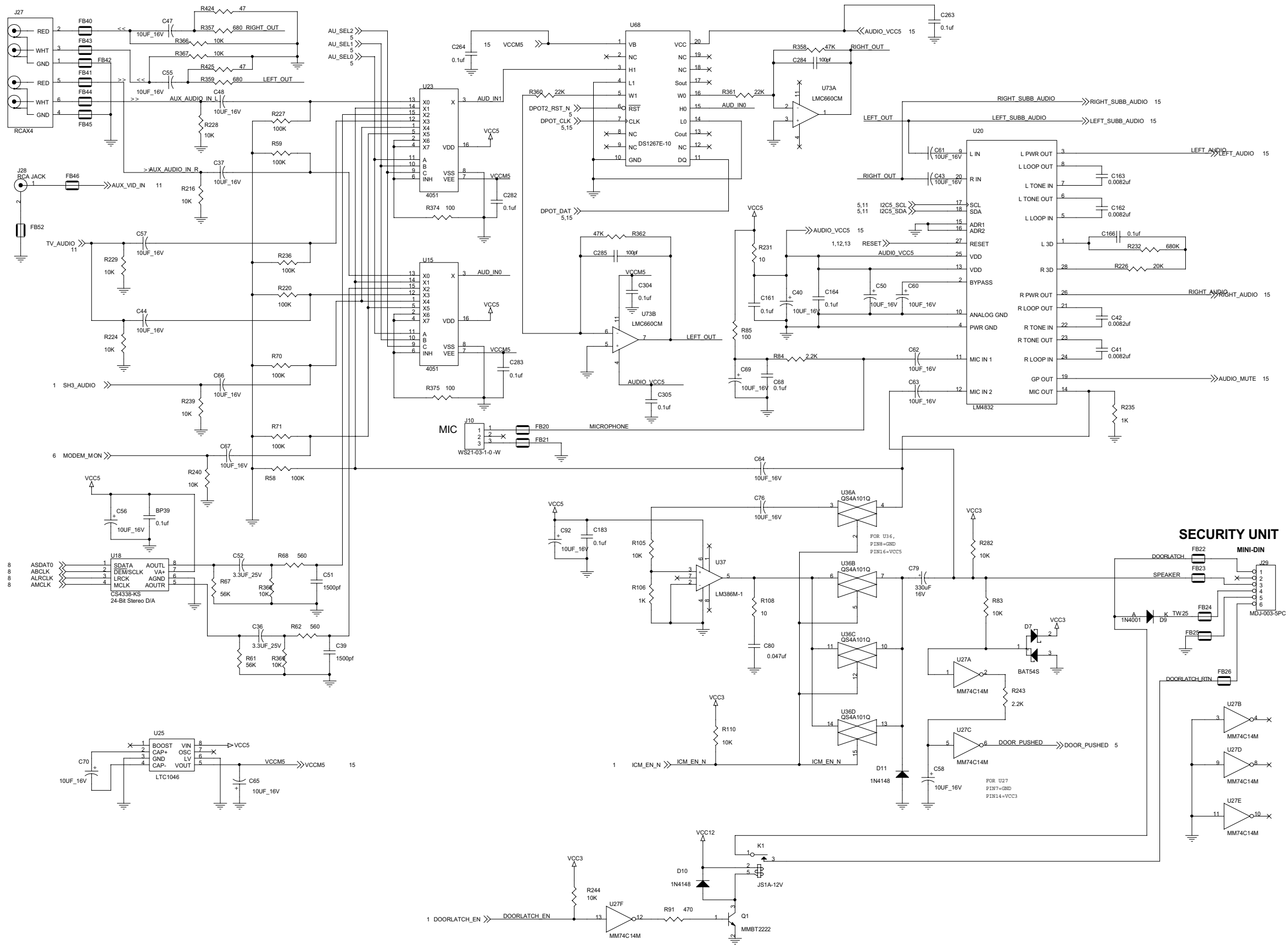
10.7 C161 Processor for DVD Chip



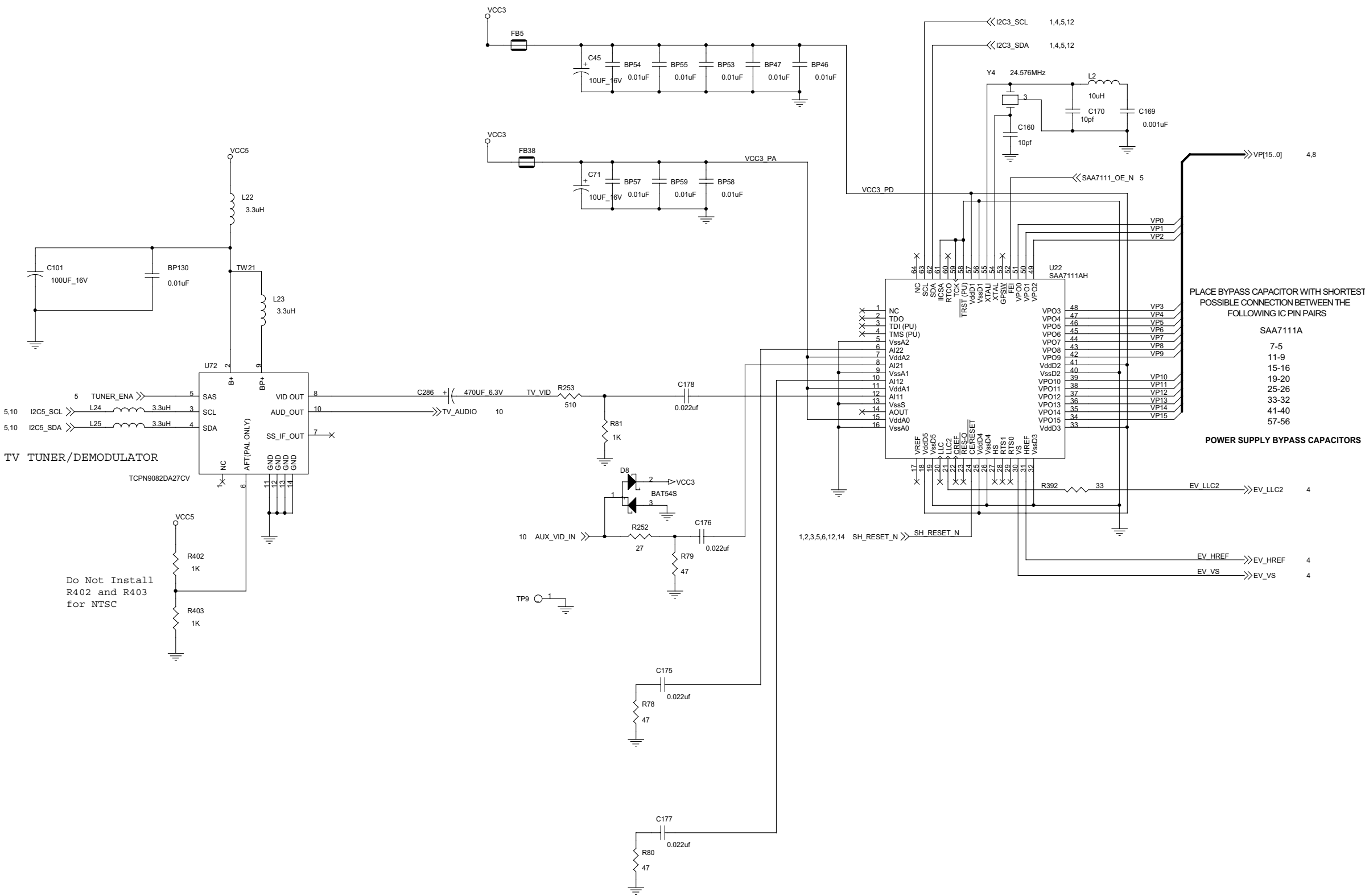
10.8 Zoran DVD Processor Chip



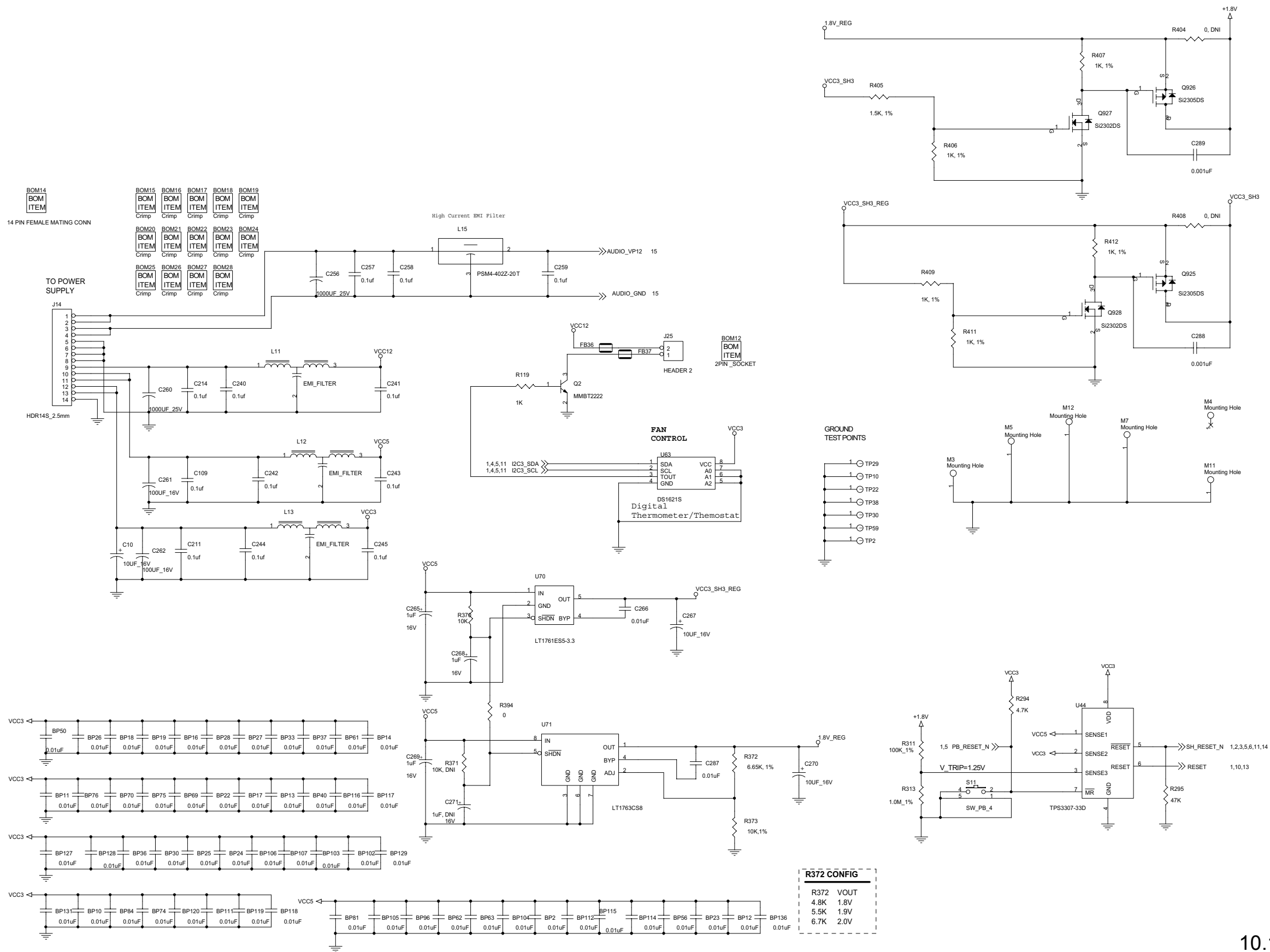
10.9 ATAPI I/F



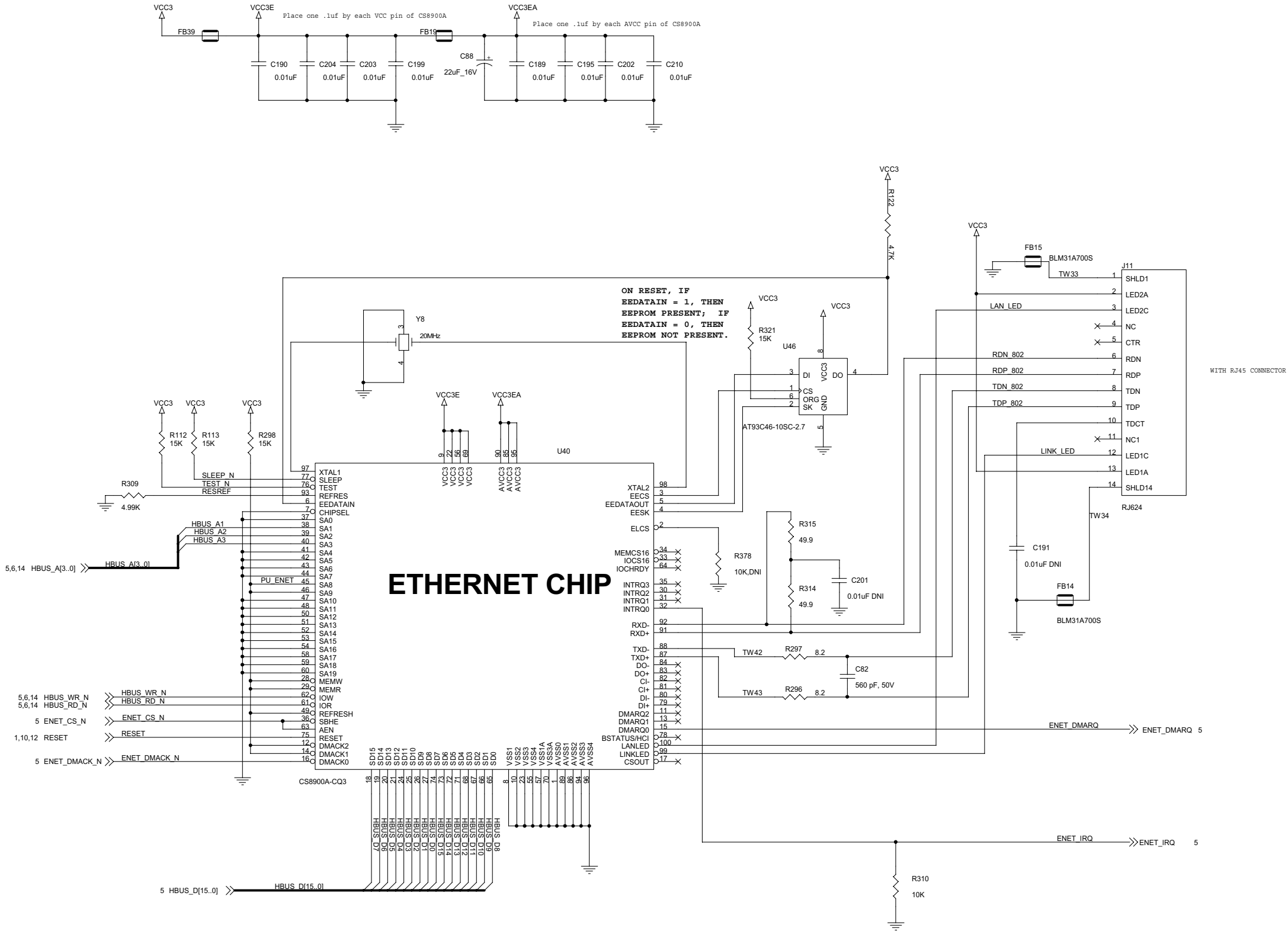
10.10 Audio



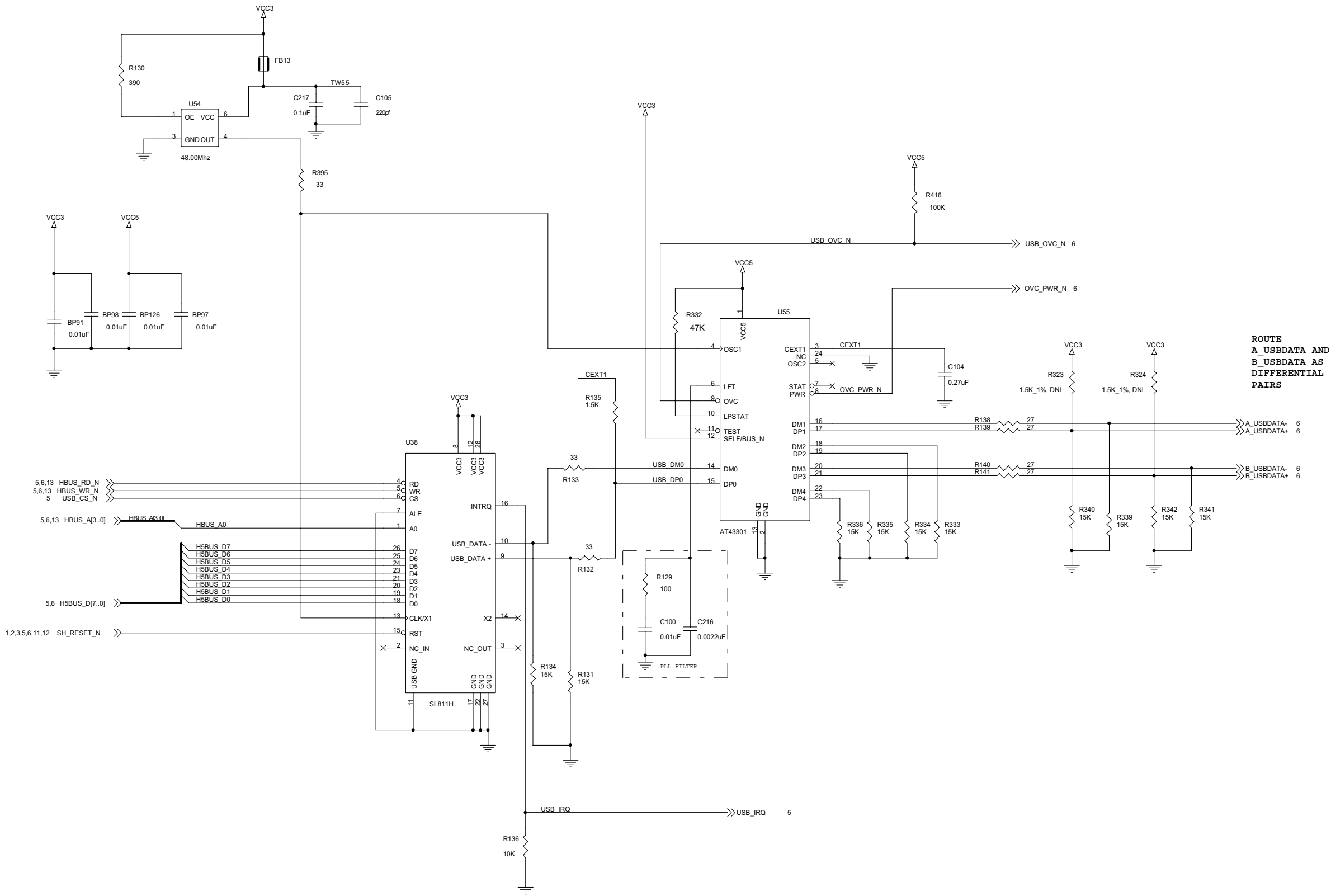
10.11 TV Tuner and Video Mux



10.12 Power Supplies

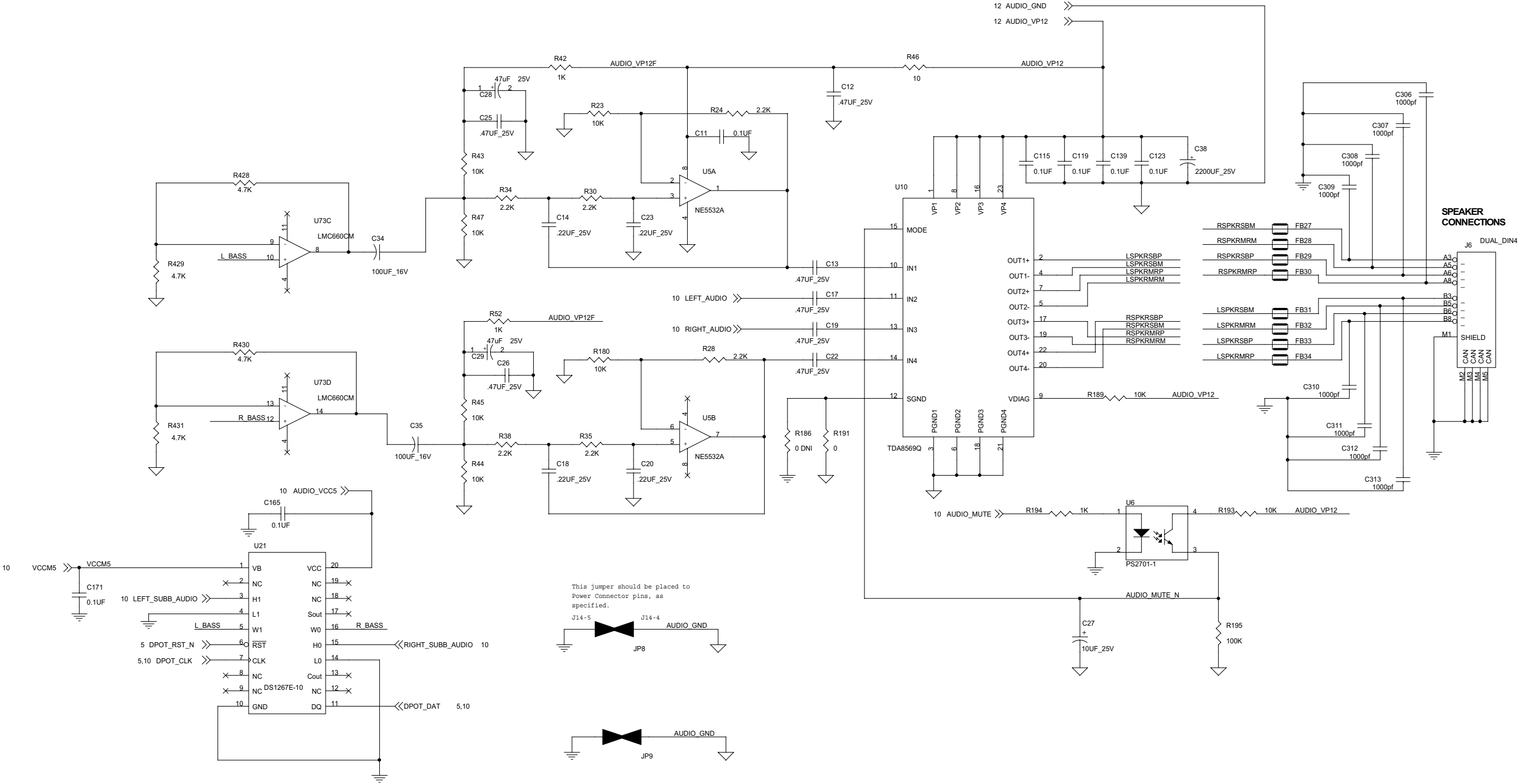


10.13 Ethernet Interface



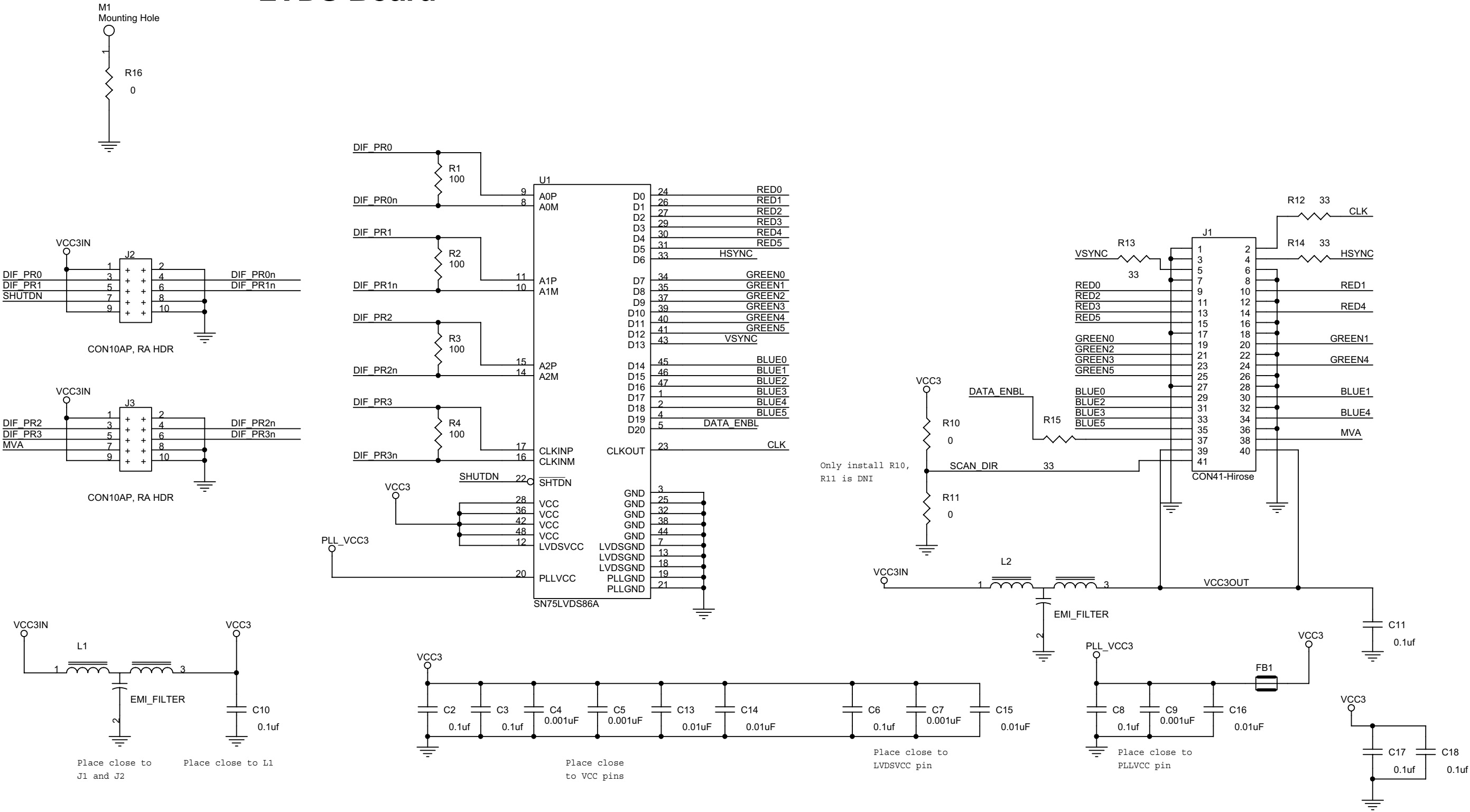
10.14 USB Interface

AUDIO POWER AMPLIFIER



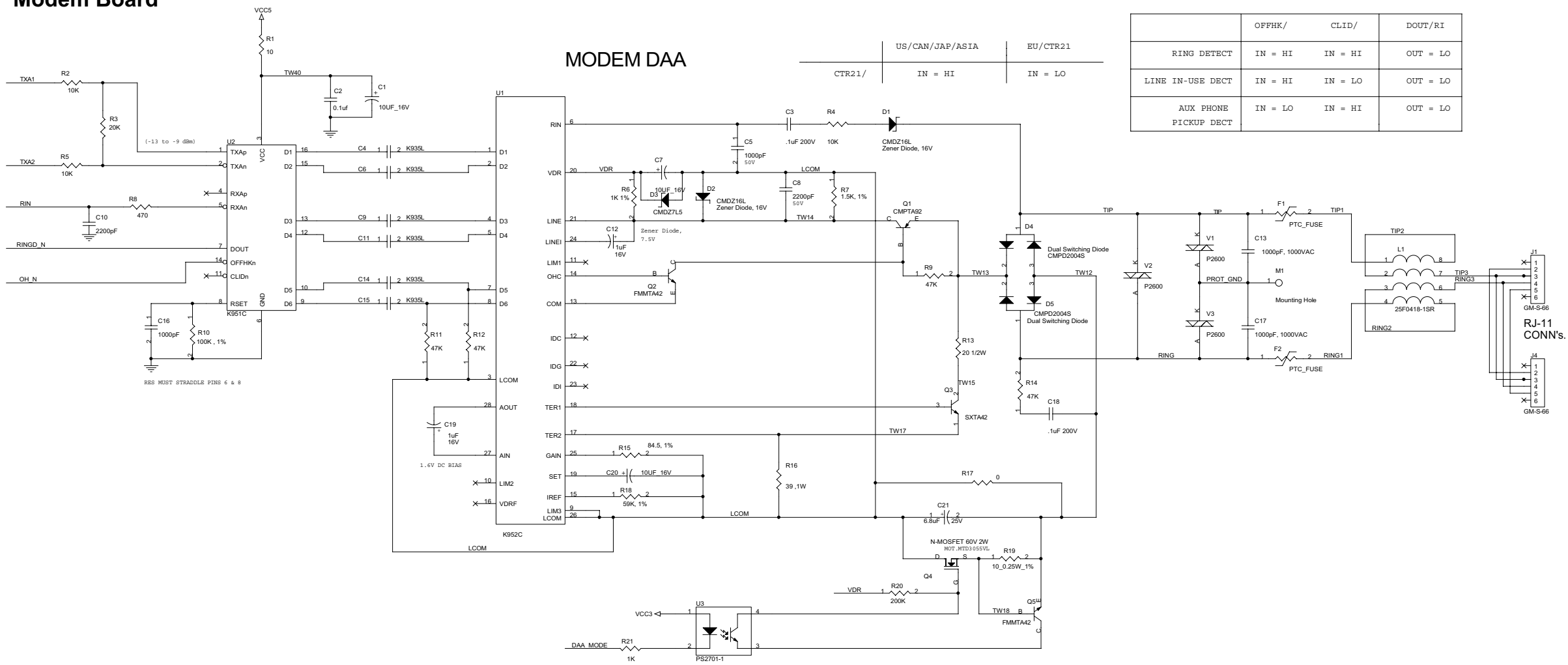
10.15 Audio Power Amplifier

LVDS Board

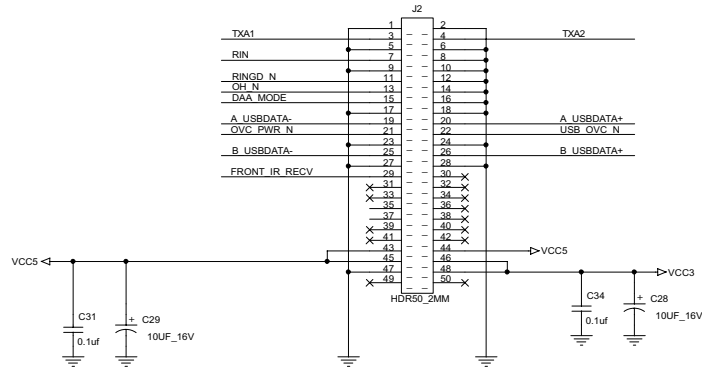


10.16 LVDS Board

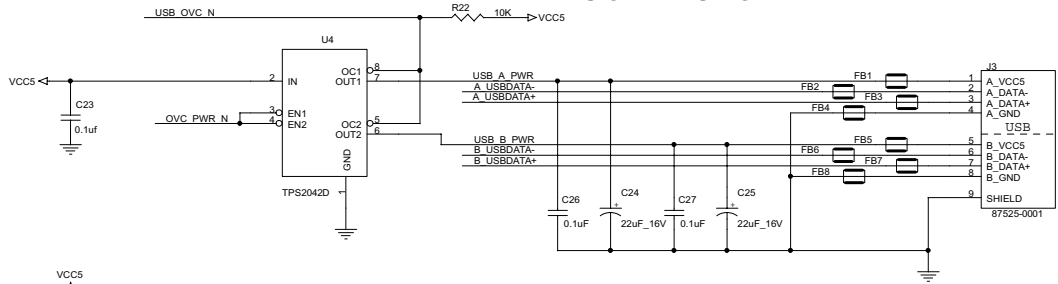
Modem Board



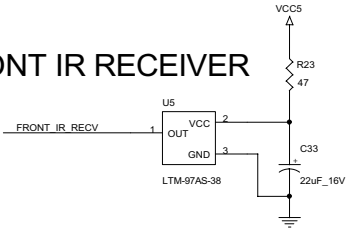
CONNECTOR TO MAIN BOARD



USB POWER CTRL & CONNECTOR

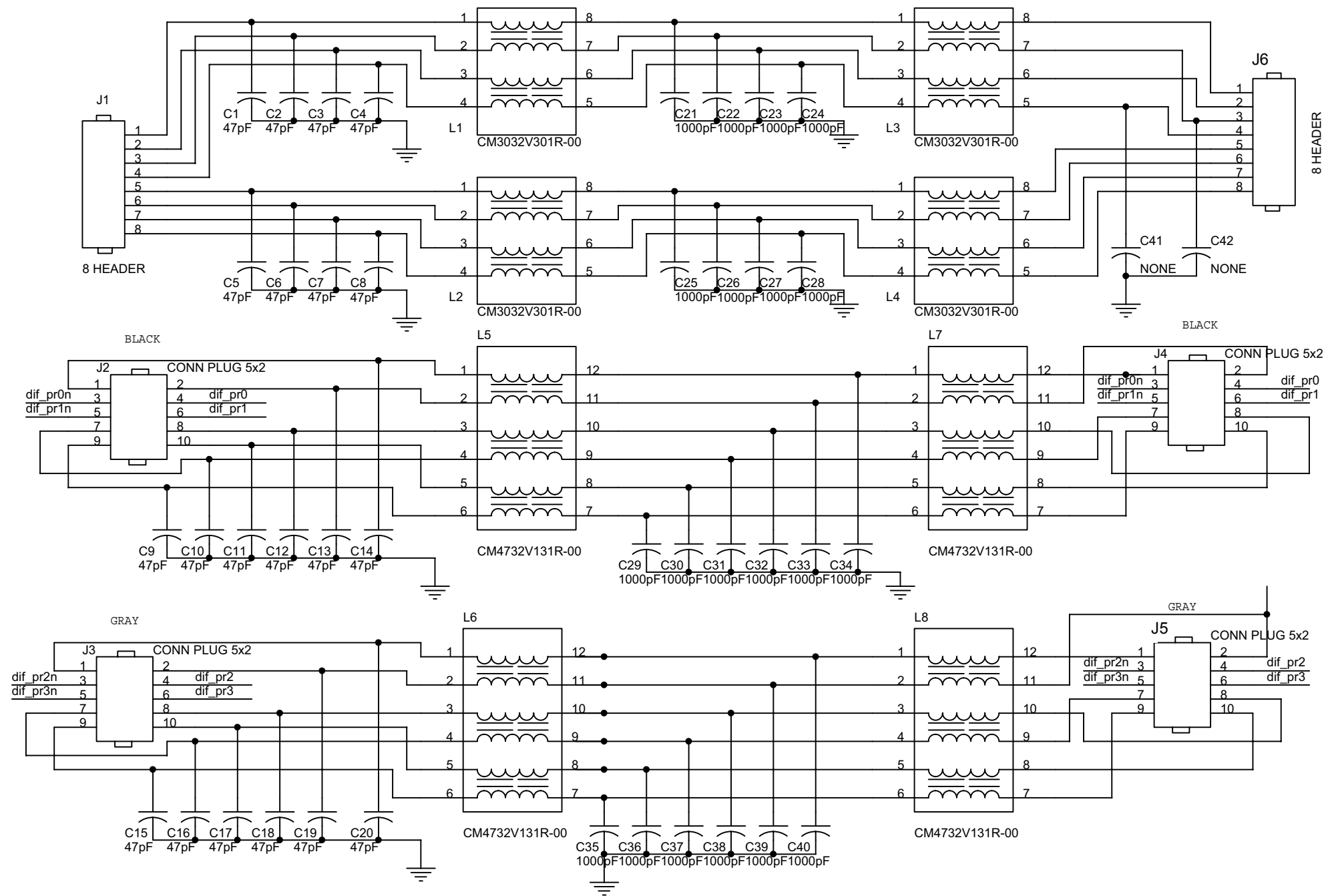


FRONT IR RECEIVER



10.17 Modem Board

LVDS Filter Board



All capacitors are 0805 size.
C41-C46 are 0805 size place-holders which are not loaded.

10.18 LVDS Filter Board



ICEBOX, LLC

1520 Bellevue Avenue
Seattle, WA 98122-2015

www.iceboxllc.com

tel: (800) 897-8554

tel: (206) 448-0354

fax: (206) 448-0359

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P/N ##### Rev. A

110501