

SP2XS

Service Manual



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The lightning flash with the arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY & INSTALLATION INSTRUCTIONS

INSTRUCTIONS PERTAINING TO THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS

WARNING: When using electric products, basic precautions should always be followed, including the following:

1. Read all of the Safety and Installation Instructions and Explanation of Graphic Symbols before using the product.
2. Do not use this product near water—for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
3. This product should be used only with a stand or cart that is recommended by the manufacturer.
4. This product, either alone or in combination with an amplifier and speakers or headphones, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
5. The product should be located so that its location or position does not interfere with its proper ventilation.
6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
7. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
8. This product may be equipped with a polarized line plug (one blade wider than the other). This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

9. The power supply cord of the product should be unplugged from the outlet when left unused for a long period of time. When unplugging the power supply cord, do not pull on the cord, but grasp it by the plug.
10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
11. The product should be serviced by qualified service personnel when:
 - A. The power supply cord or the plug has been damaged;
 - B. Objects have fallen onto, or liquid has been spilled into the product;
 - C. The product has been exposed to rain;
 - D. The product does not appear to be operating normally or exhibits a marked change in performance;
 - E. The product has been dropped, or the enclosure damaged.
12. Do not attempt to service the product beyond that described in the user maintenance instructions. All other servicing should be referred to qualified service personnel.
13. **WARNING:** Do not place objects on the product's power supply cord, or place the product in a position where anyone could trip over, walk on, or roll anything over cords of any type. Do not allow the product to rest on or be installed over cords of any type. Improper installations of this type create the possibility of a fire hazard and/or personal injury.

RADIO AND TELEVISION INTERFERENCE

WARNING: Changes or modifications to this instrument not expressly approved by Young Chang could void your authority to operate the instrument.

IMPORTANT: When connecting this product to accessories and/or other equipment use only high quality shielded cables.

NOTE: This instrument has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the instrument is used in a commercial environment. This instrument generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this instrument in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Changes and modifications not expressly approved by the manufacturer

or registrant of this instrument can void the user's authority to operate this instrument under Federal Communications Commission rules.

In order to maintain compliance with FCC regulations, shielded cables must be used with this instrument. Operation with unapproved equipment or unshielded cables is likely to result in harmful interference to radio and television reception.

NOTICE

This apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

AVIS

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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Chapter 1

Introduction

This chapter provides the service technician with a layout of the front and rear panel features, as well as a brief explanation of their functions. For in-depth descriptions of the many features the SP2XS instruments include, consult the Musician's Guide.

This chapter also includes a description the symbols used throughout this manual.



Note: If possible, all user programs and setups should be saved prior to opening the unit, entering the Boot Block to run diagnostics or to perform a hard reset. For instructions to save all user programs and setups, see *Saving User Data*.

Notes, Cautions, Warnings

Please pay special attention to all Notes, Cautions, and Warnings used throughout this manual. A brief description of these symbols follows:



Note: Provides additional information emphasizes specific instructions.



Caution: Instructs you to proceed cautiously so that damage does not occur to the unit or individual components.



Warning: Alerts you so that damage does not occur to yourself, others, or external devices.

Introduction to SP2XS

SP2XS Rear Panel

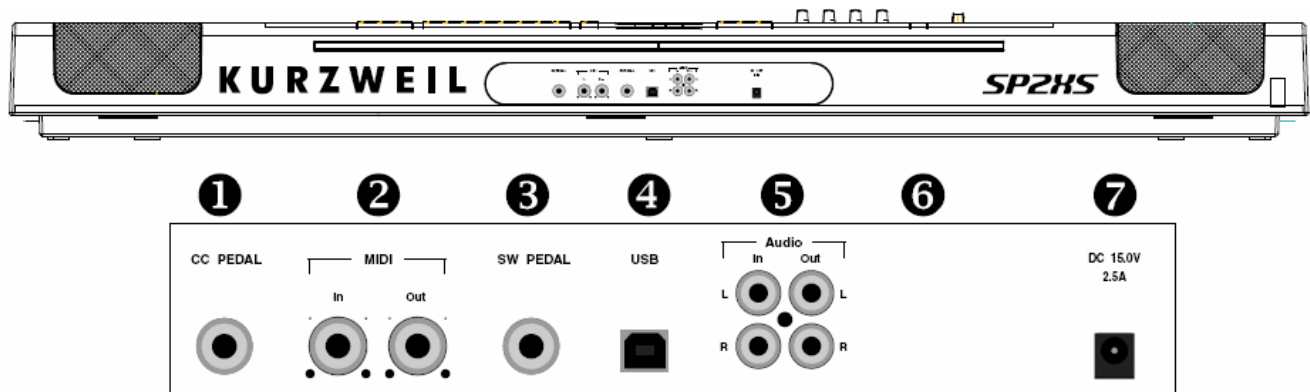


Figure 1-1 SP2XS rear panel features

Rear Panel Features

1. **Continuous Control Pedal(CC Pedal)** – One 1.4" jacks to connect pedals that can be assigned to control operations such as volume, expression, etc. (use 10K Ω linear taper potentiometer, 1/4" tip/ring/sleeve).
2. **MIDI Ports**—In and Out ports to connect the SP2XS to other MIDI devices to receive, send MIDI data.
3. **Switch Pedal(SW Pedal)** – One 1.4" jacks to connect switch pedals that can be assigned to control operations such as sustain, sostenuto, etc. (use 1/4" tip/sleeve)
4. **USB Port**—Transmit/receive MIDI messages over USB with host system(typically, PC)
5. **AUDIO IN OUT** – Balanced 1/4" left and right audio output jacks to connect to an amplifier, mixer or sound system.
7. **Power Connector**—DC jack to attach the Kurzweil 15VDC 2.5A power adapter.

Introduction

SP2X Front Panel

SP2XS Front Panel

Figure 1-2 is an illustration of the front panel for the SP2XS. Enlargements of sections of this illustration follow, as well as a brief description of the front panel features.

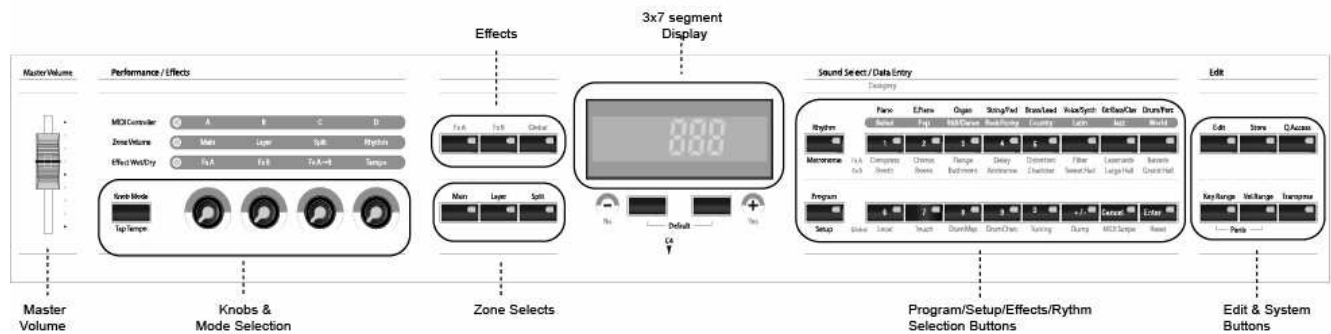


Figure 1-2 SP2XS Front Panel layout

Front Panel Features

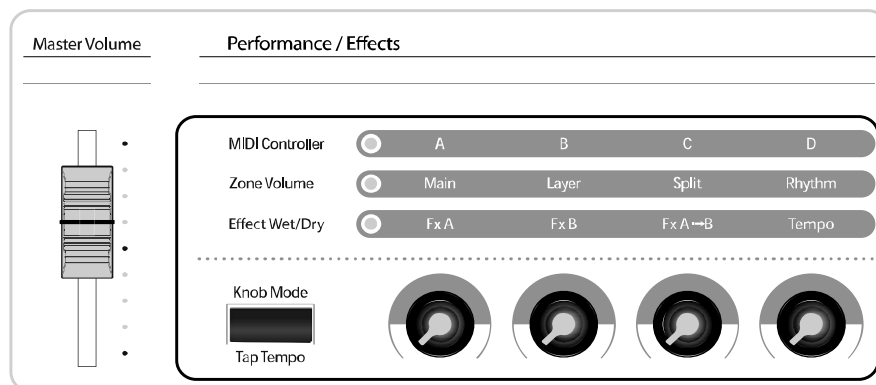


Figure 1-3 Master Volume, Performance, and Effects section

Master Volume – Slidepot to adjust the overall volume.

Performance and Effects – The operation of the buttons and knobs in this section depends on which of the three performance modes is active. Each LED located top of the Knob Mode selection button shows current one of performance modes. They are labeled as follows MIDI Controller mode, Zone Volume mode, Effects Wet/Dry mode.



Figure 1-4 SP2XS Front Panel center section

3X7 Segment – Three-character 7-segment display

+/-Buttons – This button can change Sounds in Program/Setup mode and also used as “Play” and “Stop” button while playing demo song or rhythm pattern in Global or Boot block menu can scroll items with this button.

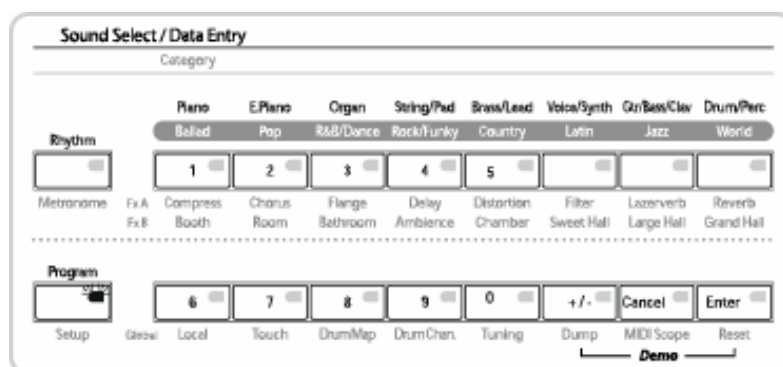


Figure 1-5 Sound Select/Data Entry sections

Group Select – Use the buttons to select a category of Programs or Setups.

Effects and Reverb – Use the buttons to select from two blocks of effects to apply effects and reverb to programs and setups.

Program/Setup Select - Use the button labeled 1-0, to select a specific program or setup. These buttons also used as keypad when you enter numbers. +/- button can change sign of the number typed in keypad mode. Enter/Cancel buttons used as enter or cancel the values you typed in keypad mode.

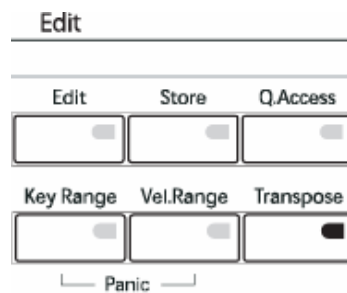


Figure 1-6 Edit sections

Edit/Store – Use this button to edit/store modified program or MIDI setup to user bank.

Q.Access – Use this button add your favorite Program/Setup in one place for easy and fast access.

Key/Vel. Range – Use this button change Key or Velocity rages

Transpose – Use this button to change tonality, using +/- button can be up/down up to 2 octaves.

Power Switch—Tact switch to turn the power on and off.
(It is in the right on the Keyboard)

Headphone - Standard 1/4" jack to connect headphones.
(It is in the left on the Keyboard)

Chapter 2

Diagnostics

Diagnostic Tests

The following lists the diagnostic tests available for the SP2XS.

- ROM
- RAM
- MARA
- Sound ROM
- DRAM
- Sine
- MIDI
- NVRAM



Warning: Some diagnostic tests erase user programs and setups. If possible, be sure to save all user programs and setups, before entering diagnostics. For instructions, refer to *Saving User Data*.

Entering Diagnostics

Apply power to the unit. Press Transpose button one time while three dots blinking in the 7-segment. After a while. Segment display the following message:



Figure 2-1 7-segment example, entering diagnostics



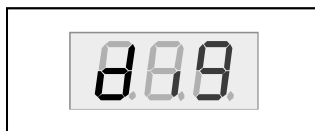
Press either the **Yes** or **No** button until  appears in the segment. Press the **Rhythm** button for enter into menu item. The segment displays the following:



Figure 2-2 7-segment example, diagnostic main menu

Press **Rhythm** to select the run one test mode. To select the run burn-in test mode, press either the **Yes** or **No** button then press the **Rhythm** button to begin the tests.

Diagnostic Test Modes

Run One Test

Run One Test allows you to select an individual test, or to step through and run each available test. To step through the different tests, the **Yes** or **No** button. Press the **Rhythm** button to select the test.



Figure 2-3 7-segment example, Run One Test

At the completion of a test, whether pass or fail, press the **Program** button to exit the test. Press either the **Yes** or **No** button to advance to the next test or another test in the sequence.

At the completion of a test, press the **Program** button to return to the test menu. To exit diagnostics, turn the power off and on to return to normal operation.

Run Burn-in



Burn-in mode, segment displays and following sequence of tests.

continuously runs the

- ROM
- RAM
- MARA
- Sound ROM
- DRAM
- MIDI

The segment displays the test results at the completion of each test. To stop the burn-in process and view the test results for each test run, press the **Program** button. Use the **Yes** or **No** button to scroll through the results of each test.

To exit Run Burn-in and return to the main menu, press the **Program** button. To exit diagnostics, turn the power off and on to return to normal operation.

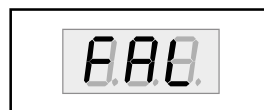
Test Results

At the completion of an individual test the segment displays the test results. An expected.

result is



mans passed



means failed.

Description of Tests

ROM



This test checks the software data (engine, boot, and setups) stored in FlashROM on the Engine Board.

A failure of this test may indicate a problem with the Flash ROM chip (U5 on the Engine Board), associated circuitry, or the Engine Board.

RAM



The RAM test writes to the microprocessor RAM space and verifies that the write was successful. A failure of this test may indicate a problem with the RAM or related circuitry on the Engine Board.

MARA



This test performs a read-write of the MARA registers and verifies that the data written can be read back successfully. A failure of this test may indicate a problem with a MA, related circuitry or the Engine Board. A failure of this test may indicate a problem

Sound ROM



This test confirms that the Sound ROMs can be read by the MARAs by performing a checksum of the Sound ROMs. The computed checksum is then compared to the stored checksum. A failure of this test may indicate a problem with a Sound ROM (U47), or the Engine Board.

Delay RAM



This test performs a quick read-write of the internal RAM and verifies that the data was successfully written and retained. A failure of this test may indicate a problem with the RAM or the Engine Board.

Diagnostics

Description of Tests

Sine Wave



This test generate sine wave from MARA, wave sample located in SoundRom. And plays through DAC and analog audio output. A failure of this test may indicate a problem with a MARA or Sound ROM (U47), or the analog audio section including DAC and OP-AMPs.



Caution: The output level of sinewave test is very loud!.

MIDI



The MIDI test performs a loop-back of the serial port by sending a 23-byte pattern over the external MIDI link. This test requires a MIDI loop (a MIDI cable that connects two MIDI jacks). The test will fail if a MIDI cable is not connected between two MIDI jacks. Be sure to run this test with MIDI cables connected as follows:

Note: Be sure to use a known working MIDI cable!



1. Connect a MIDI cable to the MIDI In and MIDI out jacks and run the test.

A failure of this test could be caused by failure of the serial port, other MIDI circuitry, or a problem on the Connector Board or the Engine Board.

NVRAM



The NVRAM(rM2) test performs part of the SRAM back up by built in lithium coin cell battery. Test starts with write test pattern to NVRAM area and after power cycle, read pattern again.

A failure of this test could be caused by low battery voltage or problem of battery-back related circuit.

Chapter 3

SP2XS Assembly

Introduction

This chapter contains all the procedures for the assembly of SP2XS—as well as instruments with factory-installed.

Notes, Cautions, Warnings

Please pay special attention to all Notes, Cautions, and Warnings as they not only point out specific instructions.

Cables, Connectors

Flat Ribbon Cables

All flat ribbon cables with connectors are keyed, and therefore cannot be reversed. Most flat ribbon cables have locking cable clips. Be sure to reapply the clips when connecting cables. When disconnecting and connecting these cables, you must look for the marking on the edge of the cable denoting Pin 1 and be sure that you match it correctly with Pin 1 on the board.

Cable Routing

In some cases, tape secures cable connections or fastens cables to the Top enclosure. Always peel back the tape from one side when disconnecting cables so that the tape remains properly positioned.

Required Tools and Materials

- No. 1 Phillips head screwdriver
- No. 2 Phillips head screwdriver
- Small flat screwdriver
- Dowel (3mm diameter)
- Needle-nose pliers
- Small blunt-end tool (Q-Tip, toothpick, etc.)
- Foam block

Assembly the SP2XS

SP2XS Bottom assembly

Refer to Figure 3-1. Arrows indicate the locations of the enclosure support wall, bottom panel screws.

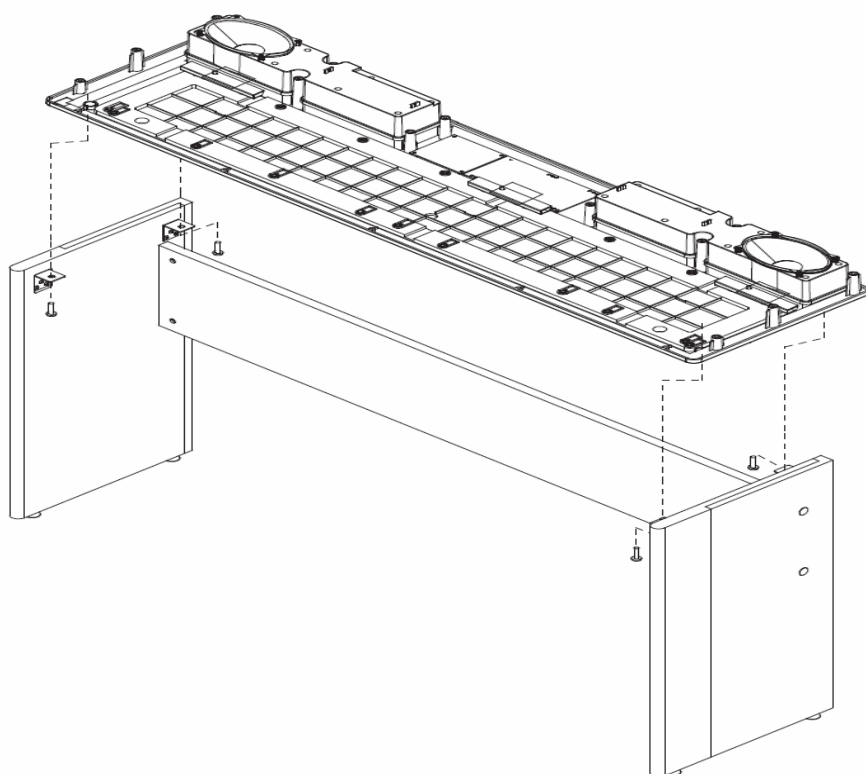


Figure 3-1 SP2XS bottom assembly

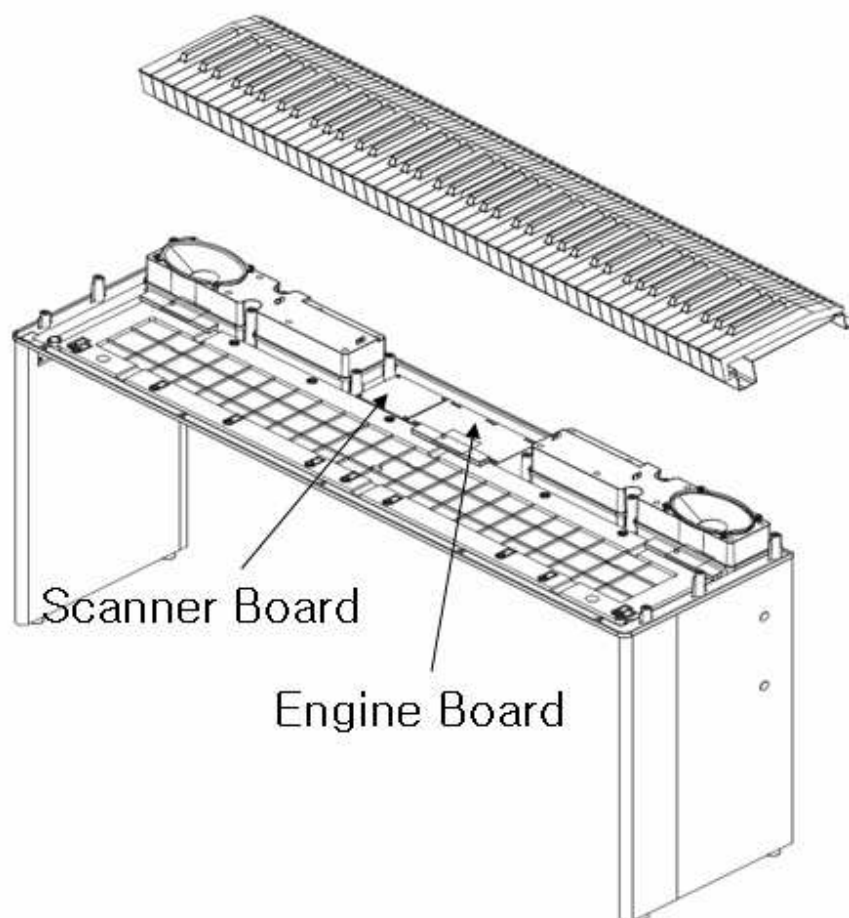


Figure 3-2 SP2XS Keyboard assembly

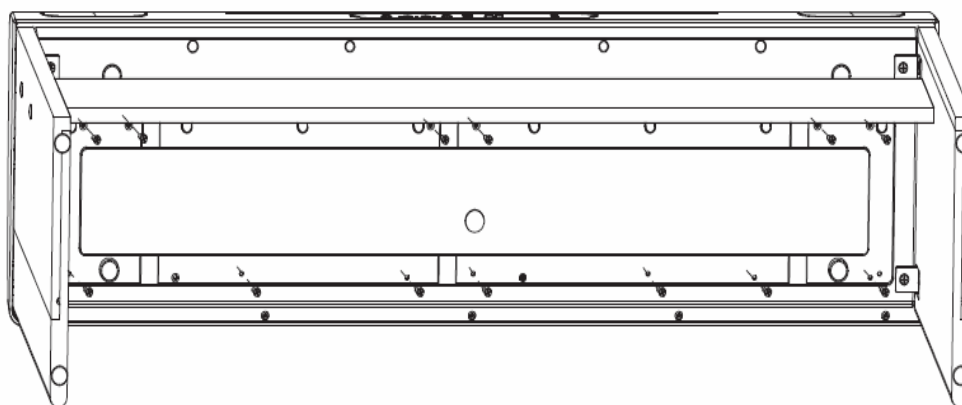


Figure 3-3 SP2XS keyslip screws assembly

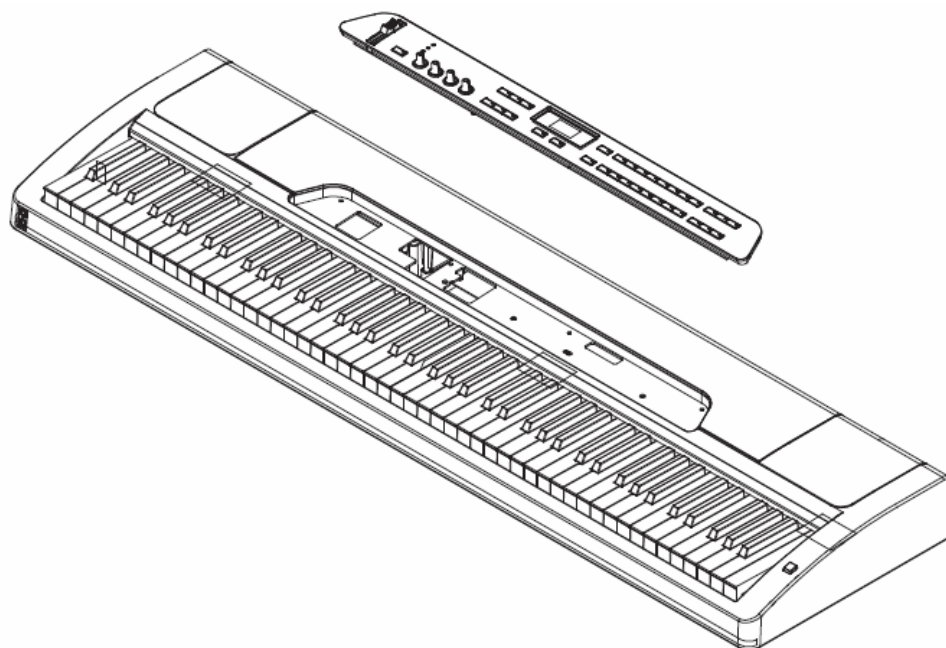


Figure 3-4 SP2XS Front panel Assembly

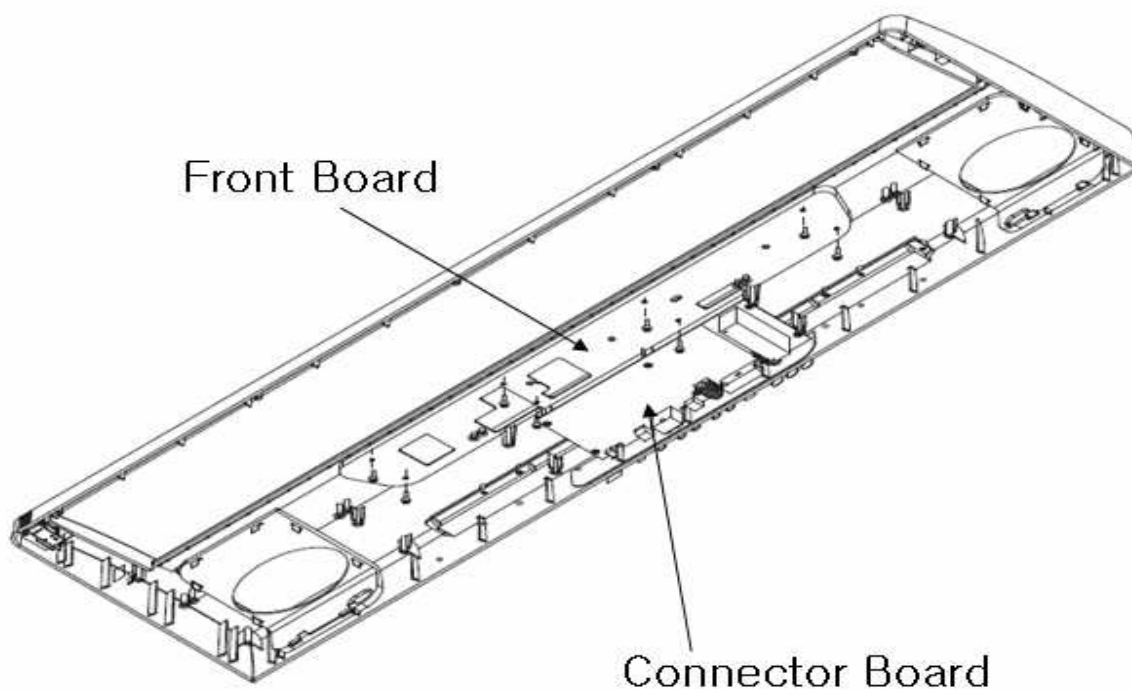


Figure 3-5 SP2XS front keyslip screws assembly

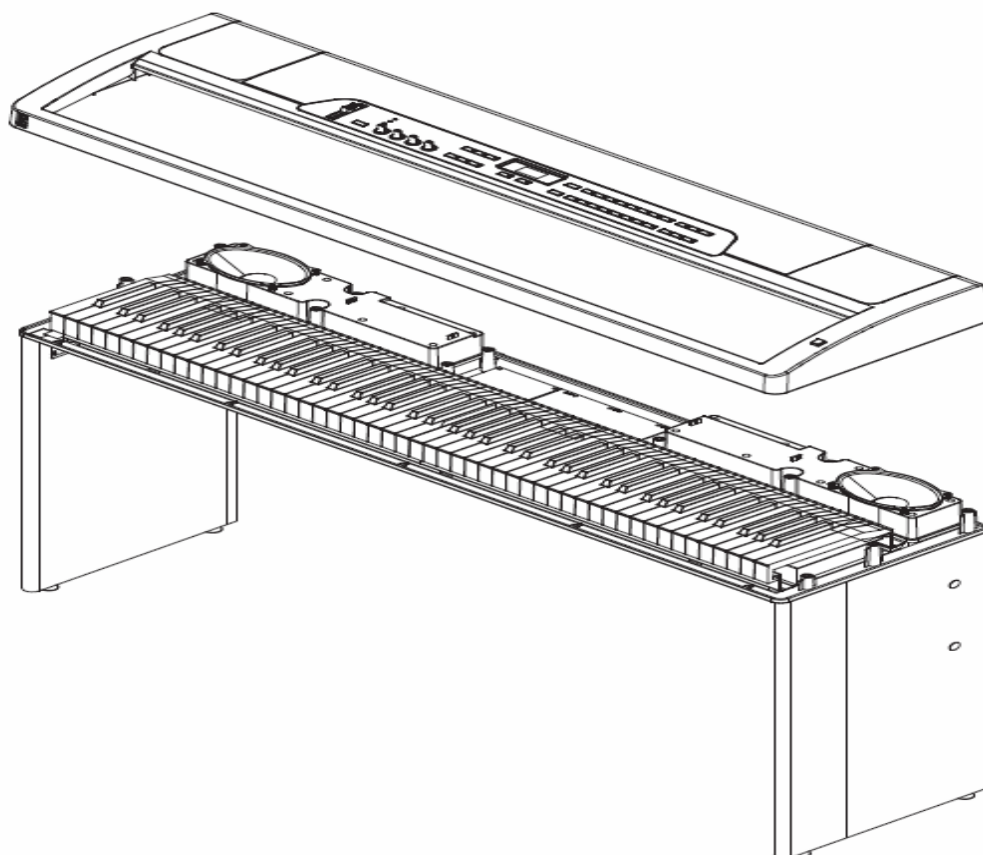


Figure 3-6 SP2XS top cover assembly

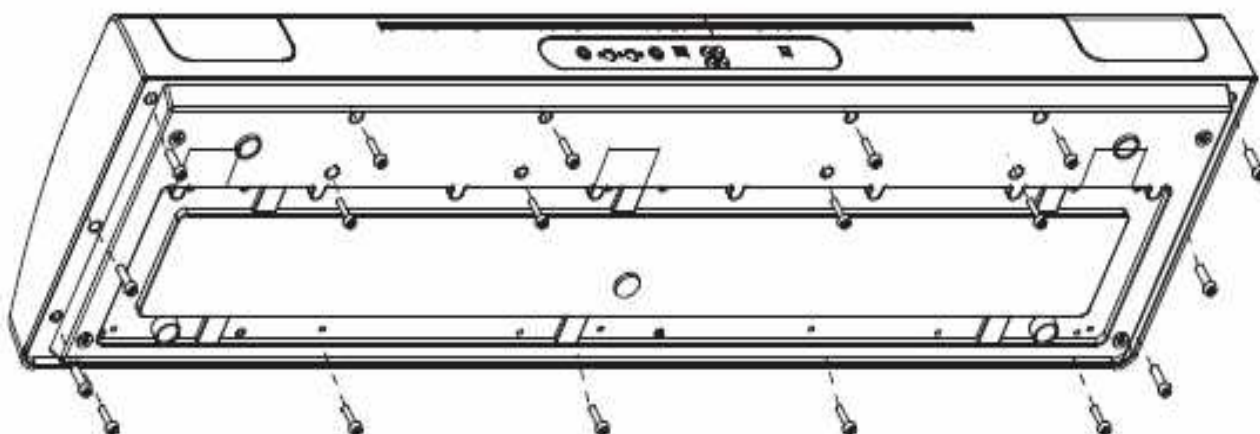


Figure4-5 SP2XS top cover keyslip screws assembly

The AUDIO Board assembly

1. Follow the procedure described on page 16 to remove the top panel assy.
2. Refer to Figure 3-5. (board position)
3. Following Steps 3–5, connect the cables listed in Table 4-1

Ref.	Name	Cable Type	Destination
J11	SP2XS Power	standard wire	Engine Board
J2	POWER SW	standard wire	POWER SW
J12	RESET	standard wire	SCANNER Board
J52	AUDIO	standard wire	Engine Board
J51	HEADPHONE	standard wire	HEADPHONE
CON1	L WOOFER LEFT	standard wire	SPEAKER
CON3	R WOOFER LEFT	standard wire	SPEAKER
J1	POWER	standard wire	ADAPTER
J20	USB	standard wire	Engine Board
J8	PEDAL PORT	standard wire	SCANNER Board

Table 4-1 AUDIO Board cables

4. Install the three screws that secure the MIDI jacks and Line In Out to the rear panel.
5. Install the five screws that secure the Audio Board to the top enclosure. See Figure 3-5 for the locations of the screws and spacers.
6. Connect the hook-up wire cable on the Audio Board.

The Front Panel Board assembly

1. Follow the procedure described on page 16 to connect the Front Board.
2. Refer to figure3-5 and the cables listed in Table 4-2.

Ref.	Name	Cable Type	Destination
J4	FP Bridge	flat ribbon	Front Board
J5	FP Bridge	flat ribbon	Front Board

Table 4-2 Front Panel Board cables

3. Place the Front Board in position on the Bottom enclosure.
4. Connect the cable locking clip and the flat ribbon cable at J4, J5 on the Front Panel Board.
4. Install the screws.
5. Install slider volume handle and 4 control knob handles also



Caution: Each switch button cap uses a set of small pegs to mount the cap to the Front Panel Board. The button caps are mounted individually or in clusters. If a cap becomes separated from the board, be careful that a peg is not inadvertently broken.

The Engine Board assembly

1. Connect the cables listed in Table 4-3.
2. Refer to figure3-2 (board position)

Ref.	Name	Cable Type	Destination
J6	SP2X PWR	stranded wire	AUDIO Board
J4	SCANNER	Standard wire	SCANNER Board
J9	SP2X AUDIO OUT	stranded wire	AUDIO Board
J10	SP2X USB	standard wire	AUDIO Board

Table 4-3 Engine Board cables

3. Place the Engine Board in position on the Bottom enclosure.
4. Align the center screw and install the screw that secures the front panel edge.
5. Connect the stranded wire cable from the Connector Board to on the Engine Board.



Caution: Be sure to look for the marking on the edge of the cable denoting Pin 1 and that you match it correctly with Pin 1 on the board. Make certain that the wires are straight prior to inserting them into the connector and that each cable is correctly inserted into its respective position.

The Scanner Board assembly

1. Connect the cables listed in Table 4-4.
2. Refer to figure3-2 (board position)

Ref.	Name	Cable Type	Destination
J2	KEYBOARD TREBLE	flat ribbon	KEYBOARD
J3	KEYBOARD BASS	flat ribbon	KEYBOARD
J4	CONTROL	flat ribbon	Front Left board
J6	SCANNER	standard wire	Engine Board
J7	EXT_PEDAL	standard wire	AUDIO Board
J12	RESET	standard wire	AUDIO Board
J8	SLIDER	standard wire	Front Left board

Table 4-4 SCANNER Board cables

3. Place the SCANNER Board in position on the BOTTOM enclosure.
4. Align the center screw and install the screw that secures the front panel edge.
5. Connect the stranded wire cable from the SCANNER Board



Caution: Be sure to look for the marking on the edge of the cable denoting Pin 1 and that you match it correctly with Pin 1 on the board. Make certain that the wires are straight prior to inserting them into the connector and that each cable is correctly inserted into its respective position.

Chapter 4

Troubleshooting

Introduction

Cables, Connectors

Cable Routing

In some cases, tape secures cable connections or fastens cables to the bottom enclosure. Always peel back the tape from one side when disconnecting cables so that the tape remains properly positioned.

Surface-Mount Devices

The removal and replacement of surface-mount devices requires training and the proper equipment. If you do not have the training or equipment to remove or replace surface-mount devices, contact the service department to order a board replacement. International service technicians should contact their appropriate Young Chang Distributor.

Saving User Data

1. Set up a MIDI recording device.
2. Connect the a MIDI cable to the MIDI Out port of the SP2XS to the MIDI In port on the external device.
3. Press the **Global** button on the SP2XS. Press the +/- cursor button until the segment

displays



4. Begin recording on the MIDI recording device.

5. Press Rythm on the SP2XS. The segment shows



. When all objects

are saved, will



appear in the display.


6. To reload the saved objects, connect a MIDI cable from the MIDI Out port of the recording device to the SP2XS's MIDI In port.
7. From the external device, begin the playback of the file.

Boot Block

Use the SP2XS's Boot Loader to enter Diagnostics or perform a Hard Reset to the unit. You can also install operating system updates and ROM objects into Flash ROM.

Entering the Boot Block



Apply power to the unit. When the  message appears in the display, quickly press and release the **Transpose** button. The segment displays the main menu of the Boot Loader and the first available option. Use the + or - button to advance to the next option. The menu options are as follows:



Install Engine

— Installs new operating system software upgrades.



Update Boot block

— Installs boot block updates.



Run Diagnostics

— Enters the diagnostic test menu. For a complete list of tests and the procedure to execute the diagnostic tests, refer to Chapter 2, *Diagnostics*.



Run Engine

— Exits the boot block and returns the unit to normal operation.



Hard RESET

— Clears the memory to factory default settings.

Resets

Hard Reset

There are two ways to perform a Hard Reset to the SP2X.

1. Press the Global button and press the Reset button segment displays following screen

and press + button



segment displays

an message. Press the + button again segment finally displays
continue or the **Yes** or **No** button.



to

Software Updates

A computer with a MIDI interface and sequencer is necessary to transfer software to your SP2X units MIDI Sysex.

File Formats

Software upgrades are stored as standard MIDI files. Filenames are in the format SP2XVV.MID, where X is the software block and VVV is the version number (V.VV). The following lists the possible values for X. Never install files with names that don't conform to this format; it won't work.

bk—boot block for keyboard models

k—operating system software for keyboard models.

Installing the Operating System or Setups



Warning: This procedure requires performing a hard reset. All user programs and setups will be erased. Before continuing, be sure to save all user programs and setups.

1. Connect a MIDI cable from the MIDI Out port of the computer interface or sequencer to the MIDI In port on the PC2.
2. Open the first .MID file using the sequencer program.
3. Turn on the SP2X and follow the procedure to enter the Boot Block.
4. Press the **Enter** button to select "**uOS**"
5. The segment shows "**uOS**". Start playing the MIDI file from the sequencer. While a file is loading, the bottom line of the display shows the progress. If the display continues to show after starting the sequencer, stop and restart the sequence.
6. After the file is loaded, the display will show "**oK**".
7. If you have additional files to load, open the file from the sequencer and begin playing it.
8. Press the **Cancel** button twice to return to the main menu. Scroll to Hard Reset and select.

Installing a New Boot Block



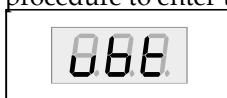
Warning: This procedure performs a hard reset. All user programs and setups will be erased. Before continuing, be sure to save all user programs and setups.

1. Connect a MIDI cable from the MIDI Out port of the computer interface or sequencer to the MIDI In port on the SP2XS.

2. Using the sequencer program, open the first **.MID** file.

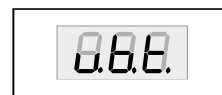
3. Turn on the SP2XS and follow the procedure to enter the Boot Block.

4. Press the Enter button to select .



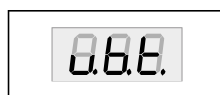
6. The segment shows the MIDI file from the sequencer.

While a file is loading, the bottom line of the display shows the progress. If the display



Start playing

continues to show



after starting the sequencer, stop and restart the sequence.

7. After the file is loaded, the unit will reset.

Replacing the Battery

The SP2XS uses a flat three volt Lithium coin cell battery. When the battery voltage runs low, the unit boots up with a low battery message.



Note: The battery voltage can be checked at anytime using the Scanner Diagnostics. See page 30 for more information.

Accessing the Battery

1. Place the SP2X upside down on a flat protected surface.
2. Remove top assembly and set it safely aside.

Removing the Battery

The battery (CR2032) in the SP2X is mounted into a holder on the Engine Board and is accessible when the access panel is removed.

1. Insert a flat plastic tool (plastic knife, pen cap, etc.) into one of the openings between the battery and the holder to lift the battery.

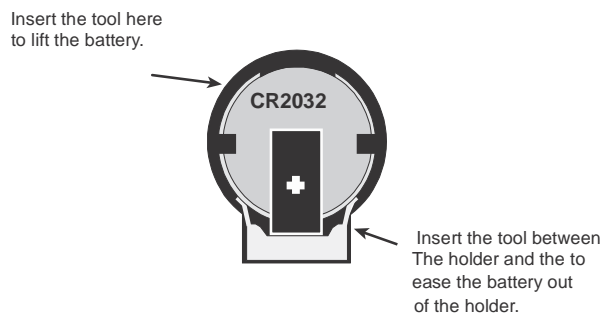


Figure 5-1 Battery and holder

2. Ease the battery out of the holder. If necessary, insert the plastic tool at the bottom of the holder (closest to the Engine Board) to remove the battery.

Installing the Battery

1. Position the battery over the holder so that the positive terminal is pointing to the Engine Board.
2. Slide the battery into the holder and apply slight pressure until it snaps into place.
4. Install the seven screws to secure the top assembly

SP2XS Scanner Test

The Scanner Tests for the SP2XS include separate tests for the front panel buttons and LEDs, front panel knobs including the Master Volume slider, the Mod and Pitch wheels, the keyboard, and the pedals.

To enter the Scanner Tests, first turn on the SP2XS. Once the SP2XS is on and ready to play, simultaneously hold down the **Main**, **Layer** and **Split** buttons. All front panel LEDs will flash and the segment will display the following:



Figure 5-3 Segment example, SP2XS scanner tests

"SP2", "SCn", then "vX.Y" are displayed briefly in sequence vX.Y means version of the scanner installed the unit.

"bAt" means "Battery" and the voltage is X.Y volts. Normal battery voltage is around 3.0 volts where 3.2v is typical for a new battery and less than 2.8 means the battery is nearing the end of its life and has only a few months left. At 2.2 volts, warning will begin. A completely dead or missing battery may not read exactly 0.0v but will certainly read less than 1.0v.

Next "PCH" then "XXX" is displayed in sequence. "PCH" means the Pitch(left) Wheel and XXX is its center reading at power-on. Ideally this is 128 but anything between 120 and 136 is acceptable. New units should be adjusted to be between 126 and 130 to allow for drift over the life of the unit.

Last is a display of which option diodes have been installed. First "jPr" is displayed briefly then 4 vertical lines will show briefly. Each line represents an option diode from Opt1(leftmost) to Opt4(rightmost) A long line(2 segments long) means the corresponding diode is installed while a short line(1 segment) is not installed. Option settings normally tell the scanner software the keyboard length and weight and should match the actual unit.

Front Panel Buttons

When a button is pressed, its LED(if any) turns on and its matrix address is shown in the display. Each press of Knob Mode will right the next Knob Mode LED in a top down sequences. Rhythm and Program button has two color led, each button press, RED and GREEN LEDs turns on alternatively.

Front Panel Knobs

When a knob or the volume slider is moved, its name is shown briefly then its changing value is displayed. The names are

"vol" – volume slider,
"KnA" – Knob A,
"KnB" – Knob B,
"KnC" – Knob C,
"KnD" – Knob D.

The name should be correct and the value numbers should run smoothly from 0(or 1) up to 255(254) as slider moved upward or the knob clockwise. When turned very slowly, the number display will typically change in steps of two(1,3,5,,or 2,4,6,,,,) and may even switch from even to

Trouble Shooting

Keyboard Problems

odd and back which is normal. Big jumps of more than 3 counts which turning slowly may indicate a problem

however, When the control is released, its last reading should remain without changing by more than 2 counts.

Keyboard

When a keyboard key is pressed, the key's musical pitch should be shown in the display. The first character should be the note name. The second character should be blank for white keys or a "high o(sharp sign) for black keys. The third character should be the octave number from 0 to 8. Thus Middle C will be shown as "C 4"

Besides the key name, the 3 decimal points in the display reveal important information about the rubber switches under the key being pressed. When the key is pressed partially, the left decimal point will indicate that the first rubber switch and made contact. When the key is pressed further, the middle decimal point indicates that the key is pressed further, the middle decimal points indicates that the second rubber switch has also made contact. Thus when a key is pressed slowly, the following sequence should be observed exactly 0.

Blank Display -> Correct Key name and left decimal point -> Correctly Key name and left and center decimal points

If the correct key name and only the center decimal point lights, then there is a defect associated with the first switch. If all 3 decimal points light, then either more than one key is processing at once or there is a short circuit in the connecting or on the connector.

Switch Pedals

If a single switch pedal is plugged into the SW jack, operating it should cause a response in the display. For Kurzweil pedals, pressing the pedal should cause "S1C" to be displayed while releasing it should cause "S1o" to be displayed. Other vender's pedals may cause the opposite response. If a dual pedal is plugged in, then the Sustain (right) pedal should display as described above. The Soft pedal(left) should cause "S2C" and "S2o" to display. As with the buttons, the display should respond immediately and without flickering if pedal working properly.

Continuous Pedals

If control pedal is plugged into the CC jack, operating it should cause the display to show "CP1" briefly then its changing values. As with the volume slide r and knobs, the value display should smoothly increase from 0 to 1 up to 254 or 255 as the pedal is pressed. This is the ideal range of a perfectly calibrated Kurzweil pedal. Many pedals may only reach 248-250 which acceptable. All should go down to 0 or 1 however

Power Problems

Dead

1. Before opening the unit, verify the following:
 - The AC outlet is supplying power.
 - The AC adapter is properly connected to the unit.
2. Check the power switch, power jack and AC adapter.
3. Refer to the Interconnect Diagram. Check all related connections.
4. Refer to the Audio Board schematics and check all supply voltages.

Audio Problems

No Audio



1. Run the Scanner Diagnostics to check the volume slider operation.
2. Refer to the Interconnect Diagram.
3. Check the standard wire from J9 on the Engine Board to J52 on the Audio Board.
4. Check the solder connections at the connectors.
5. Refer to the Engine Board schematics and check the signal activity on the DAC, U28.
6. Trace the signal path.

Front Panel Problems

Buttons, Knobs or Controllers not working

1. Run the Scanner Tests.
2. Refer to the Interconnect Diagram.
3. Check all related cables.
4. Disconnect and reseal the cables.
5. Check the solder connections at the connectors.
6. Check front panel ribbon cable(s).
7. Refer to the Connector Board schematics and check U12, IC Scanner 38869, for signal activity.

Keyboard Problems

Dead Keyboard

1. Check the flat ribbon cables connecting the keyboard Bass and Treble Contact Boards to the Scanner Board, locations J2 and J3. Be certain that the cables are not loose or damaged.
2. Disconnect and reseal the cables.

Trouble Shooting

Keyboard Problems

3. Refer to the Connector Board schematics.
4. Check U12, IC Scanner 38869 on the Scanner Board for keyboard signals.
5. Trace signal path.
- . Find and replace bad component(s) or order a board replacement. Dead Note(s)

One or More in a Section

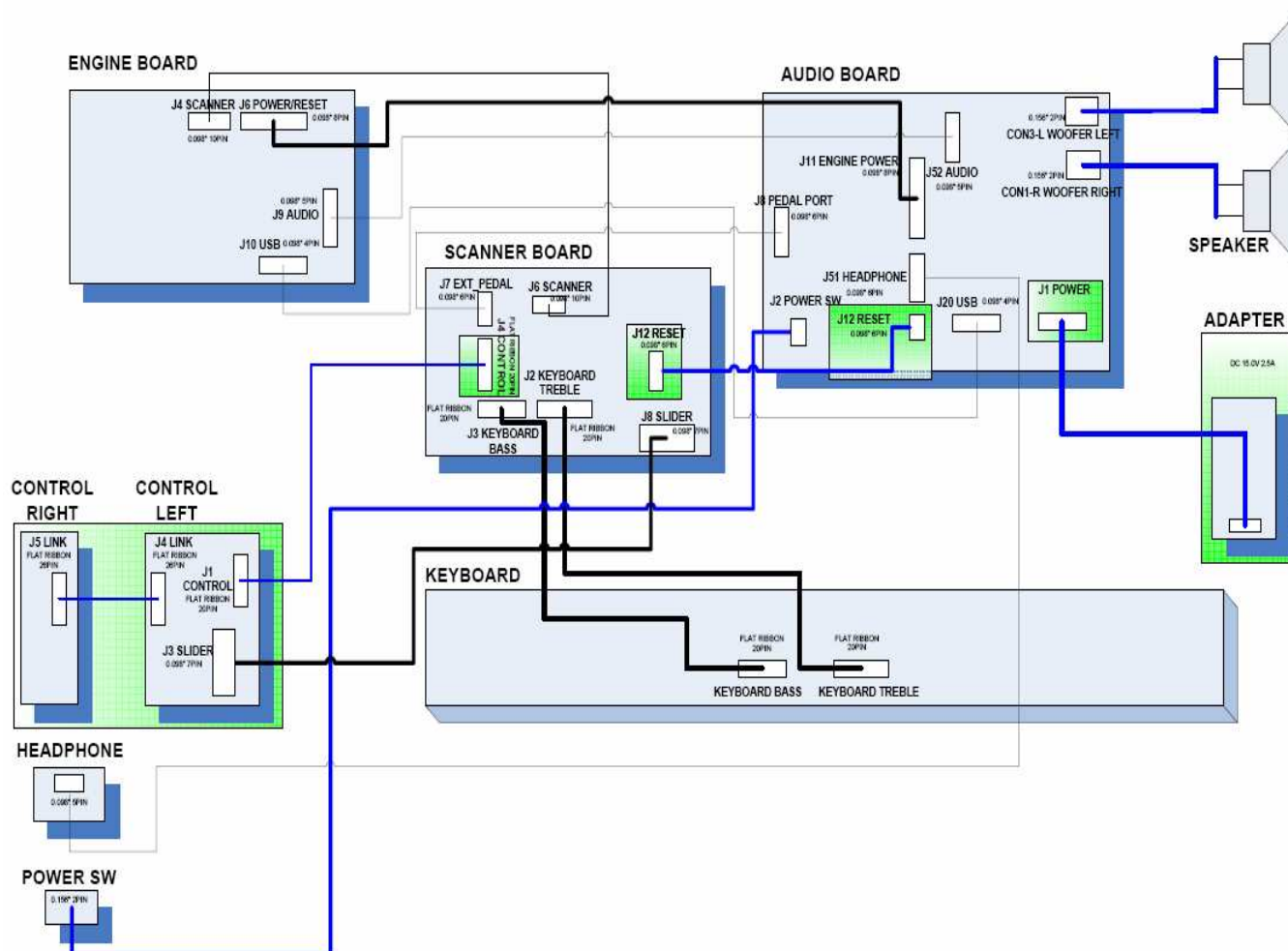
1. Remove related contact board.
2. Check contact strip for dirt, damage or wearing. Clean dirty contacts with denatured alcohol. Replace damaged or worn contact strip.
3. Install contact strip.
4. If section is still dead, remove strip and check contact board for shorts, cold solder joints, etc.
5. Find and replace bad component(s) or order replacement board.

Mechanical Noise

1. Check keyboard for broken key weights, support brackets, or ripped contacts.

SP2XS Interconnect Diagram

29-April-2008, BH KANG



Chapter 5

Parts Lists

Introduction

The parts lists included in this chapter cover all models of the SP2XS. Some printed circuit boards and assemblies are used in more than one model. Therefore, the parts lists on the following pages are listed under these headings:

The following two tables list the printed circuit boards and assemblies by model.

Part List

Front Panel Board

Final Assembly

	Code#	Material Description	Spec.	Units	Waste%	Qty.	Remark
1-----	102020095	Packing part,	SP2XSExport,	set	0.0000	1	
-2-----	639000450	Manual, SP2XS	English	pcs	0.0000	1	
-2-----	901990031	Drier	50g/Bag	Bag	0.0000	2	
-2-----	901020011	Transparent, Special made,	60mm*50Y Add thickness	Roll	0.0000	0.2	
-2-----	644000297	Right Foam, SP2XS	Middle density, 470*245*200mm RD070607	pcs	0.0000	1	
-2-----	644000299	Foam, SP2XS	Middle density, 470*200*101mm RD070609	pcs	0.0000	1	
-2-----	644000298	LeftFoam, SP2XS	Middle density, 470*245*200mm RD070606	pcs	0.0000	1	
-2-----	644000300	Foam, SP2XS	Middle density, 470*200*182.81mm RD070608	pcs	0.0000	1	
-2-----	643010087	Bag for unit, SP2X	PE material 1600*550*0.06mm K=K Dimension	pcs	0.0000	1	
-2-----	649000532	Carton, SP2XS	1530*502*276mm Outside dimension, 1536*508*289mm English	pcs	0.0000	1	
-2-----	643010088	Bag for manual, SP2X	PE material (Bag) 0.5*300*400mm	pcs	0.0000	1	
-2-----	634000017	Pearl-cotton,	1230*150*1.0mm	pcs	0.0000	1	
-2-----	901020027	Pack tie	PET 16*0.8mm 20KG/Roll About 1200M/Roll Green	Roll	0.0000	0.0016	
-2-----	901020001	Fibre Band with (00453-40312)	3MSticky-single side, W=10	m	0.0000	0.2	
-2-----	650000280	Paperboard SP2XS	A3A 1697*1520mm L=1500mm Korea Style	pcs	0.0000	1	
-2-----	628090036	Power wire, Korea Style	Power wire, cricinal Jack With EK Attestation IN:100-220V 50-60Hz	pcs	0.0000	1	
-2-----	6380100240	Switching power supply,	OUT:+15V 2.5A AttestationDSA-0421S-14 2 38	pcs	0.0000	1	
-2-----	499010020	Wood CardBoard SP2XS	Material:Plywood,	pcs	0.0000	0.1429	

Part List

Front Panel Board

			1540*1016*108mm			
-2-----	002990013	Pedal,	P90	set	0.0000	1
--3-----	102020081	Packing part,	P90Export,	set	0.0000	1
			P0material			
---4----	643020006	Bag P50	350(+35)*135*0.02mm Two	pcs	0.0000	1
			languages &			
			environmental,			
---4----	641100046	label P90	Thickness :0.5mm	pcs	0.0000	1
			Silkscreen KURZWEIL			
---4----	648000036	Carton P90	A9A 235*80*92mm	pcs	0.0000	1
--3-----	102010156	Unpacking pedal,	P90	set	0.0000	1
		PCB of display, single				
---4----	501030065	side-paper board,	Key, Board V03 Making	pcs	0.0000	1
		1.6mm	carbon & blue glue,			
---4----	629010028	Conductive rubber,	Original color, Travel	pcs	0.0000	1
		Hardness SA35	length 1.0 Making			
			carbon, 22.6*19*9mm			
---4----	631030086	Roundness Velvet	Dia.13*(T)5.0mm With	pcs	0.0000	1
			glue in one side, Black			
---4----	631030087	Velvet,	34*8*3.5mm With glue in	pcs	0.0000	1
			one side, Black			
---4----	630010060	FOOT Cushion,	Black Sticky-single	pcs	0.0000	2
			side,			
---4----	311070016	Pedal board, P90	Plate rolling, Plating,	pcs	0.0000	1
			Silver, No 190*40*8mm			
			MET-0120			
----5---	311010019	Pedal board, P90	Plate rolling, No	pcs	0.0000	1
			machining on surface,			
			190*40*8mm MET-0120			
----6---	398020006	Plate rolling,	2.0mm	kg	0.0000	0.1815
---4----	316010032	Metal bottom housing	Electrolyte board, MET-	pcs	0.0000	1
		P90 RD070292	0214			
----5---	398010006	Electrolyte board,	2.0mm	kg	0.0000	0.233
---4----	309010008	Spring, P80 RD060192	Black Dia.19.4*30.7mm	pcs	0.0000	1
			Steel Rotate right			
			Interior diameter 6mm			
---4----	303060010	Cushion, P80	External diameter 20mm	pcs	0.0000	1
			thickness 1mm Look like			
			black, Iron,			
---4----	302010007	Screw cap,	Interior diameter 6mm	pcs	0.0000	1
			Thickness 20mm Soft			

Part List

Front Panel Board

			steel, Nickel plating, Silver,				
---4----	299010028	Connector, DL-1278	POMmaterial White No machining on surface,	pcs	0.0000	1	
---4----	201010060	Up housing, P90 DL- 1409	HIPS Injection moulding in black, No machining on surface, RD070290	pcs	0.0000	1	
---5---	298020001	Plastic,	HIPS	kg	3.0000	0.0968	
---4----	301110025	Screw, BB	3*8BB Black Zinc Type '+', Flat cauda & selftapping,	pcs	0.0000	11	3 PCS FIX KNOB, 4 PCS FOR PCB, 4 PCS FOR METAL PLATE
---4----	301130031	Screw, BM	6*30BM Black Type '+',	pcs	0.0000	1	
---4----	901030014	Lubricant,	EM-50L	g	0.0000	1	
---4----	628100005	Line of pedal,	L=3.5mm CORD DIA DC=6.3 MOMO PLUG END-OUT	pcs	0.0000	1	
---4----	299010041	Pedal P90 DL-1410	PP Injection moulding,Original color, No machining on surface, RD070291	pcs	0.0000	1	
1-----	102110008	Score rack part,	SP2XS	set	0.0000	1	
-2-----	313030003	Score rack,Stand, SP2XS MET-0287	Aluminum alloy, RD080195	pcs	0.0000	1	
-2-----	217010009	Score rack board, SP2XS	PMMA No machining on surface, RD070550	pcs	0.0000	1	
-2-----	643020015	Bag for score rack, SP2XS	POMaterial 800*250*0.025mm	pcs	0.0000	1	
-2-----	643020014	Score rack,Stand, Bag SP2XS	POMaterial 900*150*0.025mm	pcs	0.0000	1	
-2-----	301290011	Score rack board,Fix	M2 A3Steel Surface Plating chromium, RD080285	pcs	0.0000	2	
1-----	1020101790	Unpacking unit,	SP2XS	set	0.0000	1	
-2-----	1020400610	Top Cabinet board part,	SP2XS	set	0.0000	1	
---3----	201030218	Top Cabinet, SP2XS DL- 1441	HIPS Injection moulding in black, Painting in black, 433C Silkscreen Cool gray, 4C SP2XS RD070452	pcs	0.0000	1	
---4----	201010065	Top Cabinet, SP2XS DL- 1441	HIPS Injection moulding in black, No machining	pcs	0.0000	1	

Part List
Front Panel Board

			on surface, RD070452				
---5---	298020001	Plastic,	HIPS	kg	3.0000	2.3014	
---	4---	652020007	Hard plastic-against alcohol-spray-Gray oil,	G1-433C 4L/Barrel	1	0.0000	0.0096
---	4---	901030029	Hard plastic/against alcohol/spray/thinner,	S-902 18L/Barrel	1	0.0000	0.0211
--3----	310050040	LeftSpeaker cover, SP2XS RD070511	Plate rolling, Surface Baking varnish, Black MET-0254	pcs	0.0000	1	
---	4---	310010008	LeftSpeaker cover, SP2XS RD070511	Plate rolling, No machining on surface, MET-0254	pcs	0.0000	1
--3----	310050039	Right Speaker cover, SP2XS RD070512	Plate rolling, Surface Baking varnish, Black MET-0255	pcs	0.0000	1	
---	4---	310010007	Right Speaker cover, SP2XS RD070512	Plate rolling, No machining on surface, MET-0255	pcs	0.0000	1
--3----	203030225	Function panel, SP2XS DL-1444	ABS Surface Painting, 411C Silkscreen Cool gray, 1C RD070455	pcs	0.0000	1	
---	4---	203010056	Function panel, SP2XS DL-1444	ABS:ABS Origin No machining on surface, RD070455	pcs	0.0000	1
---	5---	298010001	Plastic,	ABS	kg	3.0000	0.1875
---	4---	652020076	Hard plastic-against alcohol-spray-Gray oil,	G1-16-411C 4L/Barrel	1	0.0000	0.0072
---	4---	901030029	Hard plastic/against alcohol/spray/thinner,	S-902 18L/Barrel	1	0.0000	0.0158
--3----	211010082	Score rack, SP2XS DL-1443	HIPS Injection moulding in black, No machining on surface, RD070454	pcs	0.0000	1	
---	4---	298020001	Plastic,	HIPS	kg	3.0000	0.0721
--3----	211010084	Score rack, SP2XS DL-1443	HIPS Injection moulding in black, No machining on surface, RD070548	pcs	0.0000	1	
---	4---	298020001	Plastic,	HIPS	kg	3.0000	0.0721
--3----	206020015	Power switch, SP2XS DL-1443	HIPS Injection moulding in black, 433C RD070534	pcs	0.0000	1	

Part List

Front Panel Board

---4----	206010122	Power switch, SP2XS DL-1443	HIPS Injection moulding in black, No machining on surface, RD070534	pcs	0.0000	1	
---5---	298020001	Plastic,	HIPS	kg	3.0000	0.0011	
---4----	652020007	Hard plastic-against alcohol-spray-Gray oil,	G1-433C 4L/Barrel	1	0.0000	0.0015	
---4----	901030029	Hard plastic/against alcohol/spray/thinner,	S-902 18L/Barrel	1	0.0000	0.0033	
--3-----	218040004	LED Translucent lens, SP2XS	PMMA Black RD070552	pcs	0.0000	1	
--3-----	642990038	PVC SP2XS	Black Printing word, RD070551	pcs	0.0000	1	
--3-----	317010023	Spacing Pole	内 Screw thread, M3*12 外 Screw thread, ST2.9*6 Height 26mm	pcs	0.0000	3	
--3-----	631010027	Dustproof cloth,	60*16*0.3mm Not sticky, Black	pcs	0.0000	1	
--3-----	207010017	Slider,	ABS+TPE Black Red Two colors Customer supply KS-06604	pcs	0.0000	1	
---4----	298010001	Plastic,	ABS	kg	0.0000	0.006	
--3-----	208010027	Two colors Knob, DL- 1395/6	ABS+TPE No machining on surface,	pcs	0.0000	4	
--3-----	206010091	Big Button	ABS No Silkscreen 不 with LED Customer supply KS-06603	pcs	0.0000	0.75	SW1, SW5, SW6
---4----	298010001	Plastic,	ABS	kg	3.0000	0.0046	
--3-----	206010115	Big Button SP2X DL- 1402	ABS(qimei 757) Black 4 join with LED No machining on surface, Customer supply KS-06602	pcs	0.0000	4	SW2~SW4, SW7~SW9
--3-----	206040013	"1" Big Button SP2X	ABS+PMMA Silkscreen 1 2 3 4 Customer supply KS- 06602 with LED	pcs	0.0000	1	SW18, 22, 26, 30
---4----	206010115	Big Button SP2X DL- 1402	ABS Black 4 join with LED No machining on surface, Customer supply KS-06602	pcs	0.0000	1	
--3-----	206040012	"0" Big Button SP2X	ABS+PMMA Silkscreen 0 +/- CANCEL ENTER	pcs	0.0000	1	SW17, 21, 24, 29

Part List

Front Panel Board

			Customer supply KS-06602 with LED				
---4----	206010115	Big Button SP2X DL-1402	ABS Black 4 join with LED No machining on surface, Customer supply KS-06602	pcs	0.0000	1	
--3-----	206040015	"6" Big Button SP2X	ABS+PMMA Silkscreen 6 7 8 9 Customer supply KS- 06602 with LED	pcs	0.0000	1	SW16, 20, 28, 32
---4----	206010115	Big Button SP2X DL-1402	ABS Black 4 join with LED No machining on surface, Customer supply KS-06602	pcs	0.0000	1	
--3-----	206040014	"5" Big Button SP2X	ABS+PMMA Silkscreen 5 Customer supply KS-06602 with LED	pcs	0.0000	1	SW19, 23, 27, 31
---4----	206010115	Big Button SP2X DL-1402	ABS Black 4 join with LED No machining on surface, Customer supply KS-06602	pcs	0.0000	1	
--3-----	631030101	Velvet	1250*10*3mm Black High density Not sticky,	pcs	0.0000	1	
--3-----	631050039	Gray sponge,	250*60*3mm Sticky,	pcs	0.0000	2	Function panel, 2PCS
--3-----	631050006	Gray sponge,	380*70*3mm Sticky,	pcs	0.0000	2	Keyboard 线
--3-----	631050026	Gray sponge,	670*25*3mm Sticky,	pcs	0.0000	2	Speaker, 线
--3-----	631050044	Gray sponge,	580*30*3mm Sticky,	pcs	0.0000	2	Power wire, 2PCS
--3-----	631020017	Black velvet paper,	66*30*0.3mm Sticky,	pcs	0.0000	6	
--3-----	301110010	Screw, BB	2.6*6BB Type '+', Double teeth, Flat cauda & selftapping,	pcs	0.0000	19	Function board,
--3-----	301110029	Screw, BB	4*12BB (00683-54012) Black Type '+', Flat cauda & selftapping,	pcs	0.0000	14	
--3-----	301110025	Screw, BB	3*8BB Type '+', Flat cauda & selftapping,	pcs	0.0000	10	
--3-----	301130008	Screw, BM	3*8BM Black Type '+', Machine-made, Metric small-single tooth,	pcs	0.0000	6	3PCS Earphone, Board , 3PCS IOBoard
--3-----	301070011	Screw, PWB	3*12PWB Black Type '+', Flat cauda & selftapping,	pcs	0.0000	8	Function panel,

Part List**Front Panel Board**

--3----	1010200810	Preceding AMP. board part,	SP2XS	set	0.0000	1	
---	4----	506040064	Double side fibre PCB, 1.6mm	SP2XSAMP. board, PCB V00 Silkscreen Green oil, tin,	pcs	0.0000	1
---	4----	603010005	SMD ceramic capacitance,	100pf/50V +5% -5% 0805 (NP0) SMD	pcs	0.0000	2 C49 C53
---	4----	603010011	SMD ceramic capacitance,	0.001uf(1000pf) 50V +10% -10% 0805 SMD	pcs	0.0000	11 C75, C73, C65, C66, C14, C15, C74, C71, C68, C69, C70
---	4----	603010020	SMD ceramic capacitance,	0.1uf/50V +10% -10% 0805	pcs	0.0000	3 C63, C72, C67
---	4----	603010081	SMD ceramic capacitance,	470pf/50V +10% -10% 0805 SMD	pcs	0.0000	2 C60 C61
---	4----	603080004	DIP electrolyte capacitance,	10uf/16V +20% -20% 5*11mm DIP	pcs	0.0000	2 C57 C62
---	4----	603080012	DIP electrolyte capacitance,	100uf/16V +20% -20% 6.3*11mm	pcs	0.0000	4 C5, C29, C87, C84
---	4----	603080028	DIP electrolyte capacitance,	2.2uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	5 C12, C13, C16, C17, C28
---	4----	603080034	DIP electrolyte capacitance,	220uf/16V +20% -20% 6.3*11mm DIP	pcs	0.0000	1 C50
---	4----	603080045	DIP electrolyte capacitance,	33uf/16V +20% -20% 5*11mm	pcs	0.0000	1 C6
---	4----	603080067	DIP electrolyte capacitance,	470uf/16V +20% -20% 8*12mm DIP	pcs	0.0000	1 C25
---	4----	603080077	capacitance	0.1uf/50V +20-20% 5*11mm DIP	pcs	0.0000	2 C1, C34,
---	4----	603080080	capacitance	1uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	2 C32, C39
---	4----	603080078	capacitance	0.47uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	4 C3, C33, C58, C59
---	4----	603080079	capacitance	4.7uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	9 C11, C27, C30, C31, C35, C36, C40, C51, C52
---	4----	603110059	DIP polymer capacitance,	1000pf/100V +5%-5% 2A102J P=3.5mm DIP	pcs	0.0000	2 C41, C48
---	4----	603110064	DIP polymer capacitance,	10nf/100V +5%-5% 2A103J P=4mm DIP	pcs	0.0000	4 C37, C38, C44, C46
---	4----	603110063	DIP polymer capacitance,	4700pf/100V +5%-5% 2A472J P=4mm DIP	pcs	0.0000	3 C43, C47, C86
---	4----	603110070	DIP polymer capacitance,	47nf/100V +5%-5% 2A473J P=5mm DIP	pcs	0.0000	8 C2, C4, C7-C10, C42, C45

Part List**Front Panel Board**

---4---	609020013	DIP transistor,	9014C DIP High frequency & little power, DIP	pcs	0.0000	2	Q1-Q2
---4---	601020004	DIP IC,	REGULATOR 7808 DIP TYPE	pcs	0.0000	1	U10
---4---	6010200240	DIP IC,	LA4708 DIP TYPE SANYO	pcs	0.0000	1	U7
---4---	6010100170	SMD IC,	BA3823LS ZIP TYPE ROHM	pcs	0.0000	1	U4
---4---	6010101130	SMD IC,	NJM4580 DUAL LOW NOISE SOP TYPE	pcs	0.0000	2	U5, U6
---4---	602010011	SMD resistance,	100 ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R41
---4---	602010019	SMD resistance,	10K ohm(1/8w)+5%-5% 0805	pcs	0.0000	9	R16, R17, R27, R40, R42, R43, R38, R96, R97
---4---	602010022	SMD resistance,	100K ohm(1/8w)+5%-5% 0805	pcs	0.0000	6	R5, R6, R25, R39, R102, R103,
---4---	602010026	SMD resistance,	1M ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R72
---4---	602010285	SMD resistance,	110 ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R15, R32, R61, R48
---4---	602010033	SMD resistance,	1.2K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R53, R54
---4---	602010035	SMD resistance,	12K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R18-R19
---4---	602010064	SMD resistance,	18K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R55, R68
---4---	602010077	SMD resistance,	220 ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R51
---4---	602010081	SMD resistance,	2.2K ohm(1/8w)+5%-5% 0805	pcs	0.0000	5	R10, R14, R44, R52, R47
---4---	602010083	SMD resistance,	22K ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R30, R31, R57, R66
---4---	602010298	SMD resistance,	2.2 ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R1-R4
---4---	602010090	SMD resistance,	24K ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R45, R59, R64, R70
---4---	602010094	SMD resistance,	270 ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R34
---4---	602010099	SMD resistance,	27K ohm(1/8w)+5%-5% 0805	pcs	0.0000	6	R46, R56, R58, R63, R65, R69
---4---	602010157	SMD resistance,	4.7 ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R33
---4---	602010117	SMD resistance,	33K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R49, R67
---4---	602010146	SMD resistance,	4.7K ohm(1/8w)+5%-5% 0805	pcs	0.0000	10	R7, R8, R12, R13, R22, R23, R26, R28, R100, R101
---4---	602010299	SMD resistance,	510 ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R24, R29, R62, R73
---4---	602010241	SMD resistance,	56 ohm(1/10w)+5%-5% 0805	pcs	0.0000	4	R36, R35, R37, R60
---4---	308010007	Radiator, MC850	85*25*26mm HLC-1128	pcs	0.0000	1	FOR LA4708
---4---	301110024	Screw, BB	3*8BB Zinc with color, Type '+', Flat cauda & selftapping,	pcs	0.0000	4	2PCS FOR HEAT 2PCS FOR IC
---4---	6281100080	INSULOK CALBLE TIES	100mm	pcs	0.0000	1	
---4---	603070007	DIP ceramic capacitance,	0.01uf/250V+20%-20% CQC Attestation DIP	pcs	0.0000	2	C19, C20

Part List**Front Panel Board**

---4----	620010006	Power jack,	3Pin DS-210 DIP	pcs	0.0000	1	J1
---4----	6060100070	SMD Ferrite bead,	2.5-TURN SMT(2744555577)	pcs	0.0000	2	L1, L2
---4----	603080075	DIP electrolyte capacitance,	4700uf/50V +80% -20% 22*40mm DIP	pcs	0.0000	1	C64
---4----	628010007	Header of connector,	2Pins/3.96mm Single row, Straight foot, Straight housing DIP	pcs	0.0000	3	J2 R-CON3 L-CON1
---4----	6010200540	DIP IC,	LM78L05 DIP T0-92 TYPE ON-SEMI	pcs	0.0000	1	VR1
---4----	603010022	SMD ceramic capacitance,	100Nf/100V +10% -10% 1206 X7R	pcs	0.0000	4	C88, C81, C85, C83
---4----	602010282	SMD resistance,	390K ohm (1/8w) +5% -5% 1206	pcs	0.0000	2	R76, R78
---4----	603110053	DIP polymer capacitance,	10nf/100V +5% -5% CL21- 100V-103J P=5mm DIP	pcs	0.0000	2	C82, C80
---4----	6010200110	DIP IC,	6N138 DIP TYPE FAIRCHILD	pcs	0.0000	1	U1
---4----	6010100450	SMD IC,	LM358 SOP TYPE ST	pcs	0.0000	1	U9
---4----	602010281	SMD resistance,	150K ohm (1/8w) +5% -5% 1206	pcs	0.0000	2	R77, R85
---4----	6090100180	SMD audion,	MMBT2222 SOT-23	pcs	0.0000	3	Q6, Q7, Q12
---4----	6090100190	SMD audion,	MMBT2907L SOT-23	pcs	0.0000	5	Q3, Q4, Q5, Q13, Q14
---4----	603080048	DIP electrolyte capacitance,	3300uf/25V +20% -20% Dia. 16*25mm	pcs	0.0000	2	C79, C78
---4----	608030003	diode,	5817(SS12) SMT 1A 20V	pcs	0.0000	2	D5, D7
---4----	6010200780	DIP IC,	LM79L05 IC LINEAR+5V 100MA 5% T0-92	pcs	0.0000	1	VR3
---4----	6280101040	Header of connector,	4Pins/2.5mm Single row, Straight foot, A2503WV-4P WAFER	pcs	0.0000	1	J20
---4----	620050001	USBjack,	6PIN 67068-1000 DIP	pcs	0.0000	1	J19
---4----	602010204	SMD resistance,	5.6K ohm (1/8w) +5% -5% 0603	pcs	0.0000	2	R80, R81
---4----	602010052	SMD resistance,	1.5K ohm (1/10w) +5% -5% 0603	pcs	0.0000	1	R75
---4----	602010142	SMD resistance,	470 ohm (1/10w) +5% -5% 0603	pcs	0.0000	2	R79, R71
---4----	602010024	SMD resistance,	1M ohm (1/16w) +1% -1% 0603	pcs	0.0000	1	R74
---4----	602010230	SMD resistance,	10K ohm (1/8w) +5% -5% 1206	pcs	0.0000	2	R82, R84
---4----	602010275	SMD resistance,	1.8K ohm (1/8w) +5% -5% 1206	pcs	0.0000	1	R83

Part List**Front Panel Board**

---4---	603080002	DIP electrolyte capacitance,	1uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	2	C26, C77
---4---	608010004	SMD switching diode,	IN4148 SOP TYPE SMD	pcs	0.0000	6	D9, D1, D2, D3, D4, D6
---4---	608030002	diode,	IN4001 6.00*3.00mm	pcs	0.0000	1	D18
---4---	603080017	DIP electrolyte capacitance,	1000uf/16V +20% -20% 10*16mm	pcs	0.0000	1	C76
---4---	6010100950	SMD IC,	74HCU04 SOP14 TYPE PHI PHI	pcs	0.0000	2	U2, U16
---4---	6280101120	Header of connector,	8Pin/2.54 Single row, Straight foot, A2503WV-8P WAFER	pcs	0.0000	1	J11
---4---	6280101070	Header of connector,	6Pins/2.5mm Single row, Straight foot, A2503WV-6P WAFER	pcs	0.0000	3	J12, J8, J51
---4---	6280101060	Header of connector,	5Pins/2.5mm Single row, Straight foot, A2503WV-5P WAFER	pcs	0.0000	2	J49 J52
---4---	620020011	Stereo jack,	CK-6.35-35B 6PIN	pcs	0.0000	2	J7, J10
---4---	6209900230	RCA jack,	Two Group Stereo IN/OUT	pcs	0.0000	1	J3
---4---	6200300060	MIDI jack,	DIP YKF51-5051V	pcs	0.0000	1	J5
---4---	603080032	DIP electrolyte capacitance,	22uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	1	C89
---4---	604020007	DIP inductance,	470UH +/-10% 1.3A 0.28 Ohm DIP	pcs	0.0000	1	L3
---4---	603080036	DIP electrolyte capacitance,	220uf/50V +20% -20% 10*16mm DIP	pcs	0.0000	2	C90 C92
---4---	603010021	SMD ceramic capacitance,	0.1uf/50V +10% -10% 0805 X7R	pcs	0.0000	2	C91 C93
---4---	6010101780	SMD IC,	PQ1CZ41H2ZP SOP TYPE	pcs	0.0000	1	U8
---4---	608040002	SMD2diode,	SS24 2A 40V	pcs	0.0000	1	D8
---4---	604010003	SMD inductance,	100UH +/-10% 1.1A 0.22 OHM SMD	pcs	0.0000	1	L4
---4---	602010304	SMD resistance,	3K ohm(1/8w)+1%-1% 0805	pcs	0.0000	1	R86
---4---	602010273	SMD resistance,	1K ohm(1/10w)+1%-1% 0805	pcs	0.0000	1	R87
---4---	603110009	DIP polymer capacitance,	0.1uf/50V +10% -10% DIP	pcs	0.0000	1	C54
---4---	602010109	SMD resistance,	330 ohm(1/8w)+5%-5% 0805	pcs	0.0000	1	R50
---4---	602010014	SMD resistance,	1K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R98 R99
---4---	602010096	SMD resistance,	2.7K ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R20 R21 R94 R95

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Front Panel Board

---4----	602010152	SMD resistance,	47K ohm(1/8w)+5%-5% 0805	pcs	0.0000	4	R9, R11, R92, R93
---4----	6010102320	SMD IC,	TDA1308T/N1 SOP TYPE PHI	pcs	0.0000	1	U11
---4----	603080006	DIP electrolyte capacitance,	10uf/25V +20% -20% 5*11mm DIP	pcs	0.0000	2	C96, C97
---4----	603080083	DIP capacitance,	2.2uf/50V +20% -20% 5*11mm DIP	pcs	0.0000	4	C21-C24
---4----	603010077	SMD ceramic capacitance,	47pf/50V +5%-5% 0805 (NP0) SMD	pcs	0.0000	2	C55 C56
---4----	628040121	Single line wire,	L=230mm U/L 1007#18 Black	pcs	0.0000	1	
---4----	603080058	DIP electrolyte capacitance,	47uf/25V +20% -20% 5*11mm	pcs	0.0000	3	C18 C94 C95
--3-----	1010301020	Right function board part,	SP2XS	set	0.0000	1	
---4----	506040067	Double side fibre PCB, 1.6mm	SP2XSRight function board, PCB VER1 Silkscreen Green oil, tin,	pcs	0.0000	1	
---4----	6210100290	Touch switch,	(ALPS) TACT. SWITCH SKHMPWE010	pcs	0.0000	24	SW10-SW33
---4----	6190100170	Shine diode,	Red KINGBRIGHT AP3216SURCK SMD	pcs	0.0000	22	D10-D13, D15-D32
---4----	6190100220	Two colors Shine diode,	Red /Green KA- 2735SRSGC SMT	pcs	0.0000	2	D14, D33
---4----	628010088	Header of connector,	13Pin*2 Straight foot, DUAL ROW WITH BOX HEADER	pcs	0.0000	1	J5
---4----	608010004	SMD switching diode,	IN4148 SOP TYPE SMD	pcs	0.0000	2	D88 D89
--3-----	1010301030	Left function board part,	SP2XS	set	0.0000	1	
---4----	506040068	Double side fibre PCB, 1.6mm	SP2XSLeft function board, PCB VER1 Silkscreen Green oil, tin,	pcs	0.0000	1	
---4----	6110100470	Potentiometer,	RV09ACF-40-20F-B10K ALPHA	pcs	0.0000	4	R27-R30
---4----	6110100460	Potentiometer,	RA4543F-20-10C1-B10K ALPHA	pcs	0.0000	1	R31
---4----	603080063	DIP electrolyte capacitance,	470uf/10V ±20% 6.3x11mm DIP	pcs	0.0000	2	C1, C2
---4----	619010008	Shine diode,	Red WEJ3148D LED 3mm	pcs	0.0000	3	D1, D2, D3
---4----	628010084	Header of connector,	10PIN*2 Straight foot,	pcs	0.0000	1	J1

Part List

Front Panel Board

			DUAL ROW WITH BOX HEADER				
---4----	628010088	Header of connector,	13Pin*2 Straight foot, DUAL ROW WITH BOX HEADER	pcs	0.0000	1	J4
---4----	6280101080	Header of connector,	7Pins/2.5mm Single row, Straight foot, A2503WV- 7P WAFER	pcs	0.0000	1	J3
---4----	6210100290	Touch switch,	(ALPS) TACT. SWITCH SKHMPWE010	pcs	0.0000	9	SW1-SW9
---4----	602010108	SMD resistance,	33 ohm(1/16w)+5%-5% 0603	pcs	0.0000	8	R1, R4, R8, R11, R15, R17, R18, R32
---4----	602040152	DIP resistance,	4.7 ohm(1/8w)+5%-5%	pcs	0.0000	1	R16
---4----	602010017	SMD resistance,	10K ohm(1/16w)+1%-1% 0603	pcs	0.0000	1	R2, R3, R5-R7, R9, R10, R12-R14, R19-R26
---4----	603010021	SMD ceramic capacitance,	0.1uf/50V +10% -10% 0805 X7R	pcs	0.0000	3	C3-C5
---4----	6190100170	Shine diode,	Red KINGBRIGHT AP3216SURCK SMD	pcs	0.0000	6	D4-D9
---4----	619030018	3 bit LED	Red WEJ30562-LOOW	pcs	0.0000	1	DS1
---4----	6090100180	SMD audion,	MMBT2222 SOT-23	pcs	0.0000	8	Q11-Q18
---4----	6090100190	SMD audion,	MMBT2907L SOT-23	pcs	0.0000	10	Q1-Q10
---4----	6010100910	SMD IC,	74HC373 SOP TYPE PHI	pcs	0.0000	1	U2
---4----	6010100930	SMD IC,	74HC541 SOP20 TYPE PHI	pcs	0.0000	1	U3
---4----	6010103740	SMD IC,	74LS145 SOP 16	pcs	0.0000	1	U1
---4----	2180100080	LED Fix Bracket	HIPS White No machining on surface, H=6.4mm LED3-065 (White)	pcs	0.0000	3	D1-D3
--3-----	1011000810	Earphone, Jack board part	SP2XS	set	0.0000	1	
---4----	506040065	Double side fibre PCB, 1.6mm	SP2XSEarphone, Board 1PCB V00 Silkscreen Green oil, tin,	pcs	0.0000	1	
---4----	506040066	Double side fibre PCB, 1.6mm	SP2XSEarphone, Board 2PCB V00 Silkscreen Green oil, tin,	pcs	0.0000	1	
---4----	620020005	Stereo jack,	7Pin MJ-631 DIP	pcs	0.0000	2	J1, J2
---4----	602010146	SMD resistance,	4.7K ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R90 R91
---4----	628060101	Cable,	6pin L=40mm 24# White /Blue	pcs	0.0000	1	
---4----	6280101070	Header of connector,	6Pins/2.5mm Single row, Straight foot, A2503WV-	pcs	0.0000	1	

Part List

Front Panel Board

			6P WAFER					
---4----	901010006	Tin line	Sn-0.5Ag-0.7Cu Dia.1.0mm	kg	0.0000	0.0014		
---4----	603080058	DIP electrolyte capacitance,	47uf/25V +20% -20% 5*11mm	pcs	0.0000	2	C1, C2	
---4----	602010136	SMD resistance,	47 ohm(1/8w)+5%-5% 0805	pcs	0.0000	2	R88, R89	
--3-----	626000068	Speaker,	4 OHM 25W 4"X 6"Full frequency, Speaker, Dia. 70 Steel BS100X160B7AG	pcs	0.0000	2		
--3-----	6281100080	INSULOK CALBLE TIES	100mm	pcs	0.0000	1		
--3-----	628070557	Colors cable with jack,	4pin L=200mm 24# with CKM2503H-4PHSGJack P=2.5mm	pcs	0.0000	1	ENGINE TO AMP (USB)	
--3-----	628070558	Colors cable with jack,	7pin L=250mm 24# with CKM2503H-7PHSGJack P=2.5mm 2PCS	pcs	0.0000	1	FRONTPANEL TO SCANNER	
--3-----	628070559	Colors cable with jack,	5pin L=250mm 24# with CKM2503H-5PHSGJack P=2.5mm	pcs	0.0000	1	ENGINE TO AMP	
--3-----	628070560	Colors cable with jack,	8pin L=150mm 24# with CKM2503H-8PHSG Jack P=2.5mm	pcs	0.0000	1	ENGINE TO AMP	
--3-----	628070566	Terminal withjack, Cable,	20pin L=250mm with 10*2PIN/2.54jack, with Magnetic loop,	pcs	0.0000	1	FRONTPANEL TO SCANNER	
--3-----	628070561	Colors cable with jack,	10pin L=250mm 24# with CKM2503H-10PHSGJack P=2.5mm with Magnetic loop,	pcs	0.0000	1	ENGINE TO SCANNER	
--3-----	628070567	Terminal withjack, Cable,	26pin L=300mm with 13*2PIN/2.54jack,	pcs	0.0000	1	(FRO-TO-FRO)	
--3-----	628070562	Colors cable with jack,	6pin L=250mm with Magnetic loop, 24# P=2.5mm J07-0394-00	pcs	0.0000	2	ENGINE TO AMP (PEDAL)	
--3-----	628070568	Colors cable with jack,	6pin L=900mm with Magnetic loop, 24# P=2.5mm J07-0394-00	pcs	0.0000	1	AMP TO PONEJACK	
--3-----	628070563	Colors cable with jack,	2pin L=600mm 18# with 2PIN/3.96mm Other terminalwith 2PCS J07- 0391-00	pcs	0.0000	2		

Part List

Front Panel Board

--3-----	631050122	sponge	160*150*4mm Black Not sticky,	pcs	0.0000	2	
--3-----	627030001	Battery,	CR2032 3V Can't charge,	pcs	0.0000	1	
--3-----	101060059	Power switch, Part,	SP2XS	set	0.0000	1	
---4----	621010002	Switch,	Key, BZJS026 2FEET	pcs	0.0000	1	
---4----	628070604	Colors cable with jack,	2pin L=1000mm 18# with 2PINjack, /3.96mm Other terminal	pcs	0.0000	1	
--3-----	301010015	Screw, PA	4*12PA Black Type '+', Acuate cauda & selftapping, No quenching,	pcs	0.0000	3	Fix MIDI jack,
--3-----	301110017	Screw, BB	3*12BB Type '+', Flat cauda & selftapping, External diameter 9	pcs	0.0000	1	Fix 莲花 jack,
--3-----	628110021	Meson PA50	Interior diameter Dia. 4.0 T=0.5mm Length 55+/-5mm	pcs	0.0000	8	
--3-----	302010019	Hexagon-nut,	Interior diameter 6.43mm Thickness 9.2mm Plating, Stereo jack, CK-6.35-35B 6PIN	pcs	0.0000	2	
--3-----	303010012	Cushion,	Interior diameter 9mm External diameter 15mm thickness 0.5 Iron	pcs	0.0000	2	
--3-----	317010026	M3Copper pole,	Copper M3*17 Small teeth,	pcs	0.0000	3	
--3-----	901030019	Silica gel WK2000ST	Diameter 3 Black	g	0.0000	2	
-2-----	1020500590	Bottom housing part,	SP2XS	set	0.0000	1	
--3-----	202020023	Bottom housing, SP2XS DL-1442	HIPS Injection moulding in black, Painting, 433C RD070456	pcs	0.0000	1	
---4----	202010050	Bottom housing, SP2XS DL-1442	HIPS Injection moulding in black, No machining on surface, RD070456	pcs	0.0000	1	
---5----	298020001	Plastic,	HIPS	kg	3.0000	2.9139	
---4----	652020007	Hard plastic-against alcohol-spray-Gray oil,	G1-433C 4L/Barrel	1	0.0000	0.012	
---4----	901030029	Hard plastic/against alcohol/spray/thinner,	S-902 18L/Barrel	1	0.0000	0.0264	

Part List

Front Panel Board

--3-----	216010037	Left speaker box Cover SP2XS DL-1445	HIPS Injection moulding in black, No machining on surface, RD070456	pcs	0.0000	1	
---4----	298020001	Plastic,	HIPS	kg	3.0000	0.317	
--3-----	216010038	Right speaker box Cover SP2XS DL-1445	HIPS Injection moulding in black, No machining on surface, RD070457	pcs	0.0000	1	
---4----	298020001	Plastic,	HIPS	kg	3.0000	0.317	
--3-----	211010083	Guide Canister SP2XS DL-1452	ABS Injection moulding in black, No machining on surface, RD070510	pcs	0.0000	2	
---4----	298010001	Plastic,	ABS	kg	3.0000	0.0241	
--3-----	630010059	Plastic cushion,	φ22.5*3mm Black Single side 3M glue,	pcs	0.0000	5	
--3-----	631040085	EVA	1250*10*1mm Single side with glue, Black	pcs	0.0000	5	SPEAKER BOX 2PCS Bottom housing, 3PCS
--3-----	631060011	Cotton,	485*120*35mm Not sticky, White	pcs	0.0000	2	
--3-----	631040131	EVA	48*36*1.0mm Sticky- single side, Black RD070605	pcs	0.0000	2	
--3-----	301110025	Screw, BB	3*8BB Type '+', Flat cauda & selftapping, 3*8PWB (D=10mm) Black	pcs	0.0000	10	Main board,
--3-----	301070026	Screw, PWB	Type '+', Flat cauda & selftapping,	pcs	0.0000	16	
--3-----	301110017	Screw, BB	3*12BB Type '+', Flat cauda & selftapping,	pcs	0.0000	16	
--3-----	301020001	Screw, PB	4*20PB Nickel plating, Type '+',	pcs	0.0000	19	Up housing,
--3-----	301110029	Screw, BB	4*12BB(00683-54012) Black Type '+', Flat cauda & selftapping,	pcs	0.0000	6	
--3-----	1010101390	Main board part,	SP2XS	set	0.0000	1	
---4----	628020001	Female Connector,	with Plastic,	pcs	0.0000	2	J2 J11
---4----	6280101090	Header of connector,	2Pins/2.54mm Single row, Straight foot,	pcs	0.0000	1	J11
---4----	628010110	Header of connector,	3Pins/2.54mm Single row, DIP	pcs	0.0000	2	J2 J4
---4----	6280101110	Header of connector,	2*25/2.54mm Two rows, Straight foot,	pcs	0.0000	1	J1

Part List**Front Panel Board**

---4----	6280101040	Header of connector,	4Pins/2.5mm Single row, Straight foot, A2503WV- 4P WAFER	pcs	0.0000	1	J10
---4----	6280101060	Header of connector,	5Pins/2.5mm Single row, Straight foot, A2503WV- 5P WAFER	pcs	0.0000	1	J9
---4----	6280101020	Header of connector,	10Pins/2.5mm Single row, Straight foot, A2503WV- 10P WAFER	pcs	0.0000	1	J4
---4----	6140000060	Filter	MURATA DSS6NC51H470	pcs	0.0000	1	T2
---4----	6150000060	Relay,	Bestar BP-5 coil 5V DC	pcs	0.0000	2	RY1, RY2
---4----	602010135	SMD resistance,	47 ohm(1/8w)+5%-5% 0603	pcs	0.0000	1	R68
---4----	602010010	SMD resistance,	100 ohm(1/8w)+5%-5% 0603	pcs	0.0000	2	R19, R32
---4----	602010079	SMD resistance,	220 ohm(1/10w)+5%-5% 0603	pcs	0.0000	1	R22
---4----	602010111	SMD resistance,	330 ohm(1/10w)+5%-5% 0603	pcs	0.0000	2	R24, R91
---4----	602010219	SMD resistance,	620 ohm(1/16w)+5%-5% 0603	pcs	0.0000	1	R110
---4----	602010188	SMD resistance,	820 ohm(1/16w)+5%-5% 0603	pcs	0.0000	1	R29
---4----	602010016	SMD resistance,	1K ohm(1/10w)+5%-5% 0603	pcs	0.0000	3	R3, R30, R54
---4----	602010210	SMD resistance,	1.3K ohm(1/16w)+5%-5% 0603	pcs	0.0000	1	R1
---4----	602010052	SMD resistance,	1.5K ohm(1/10w)+5%-5% 0603	pcs	0.0000	1	R4
---4----	602010082	SMD resistance,	2.2K ohm(1/10w)+5%-5% 0603	pcs	0.0000	2	R2, R7
---4----	602010148	SMD resistance,	4.7K ohm(1/10w)+5%-5% 0603	pcs	0.0000	3	R5, R80, R85
---4----	602010020	SMD resistance,	10K ohm(1/10w)+5%-5% 0603	pcs	0.0000	19	R9, R12-R14, R18, R55, R69, R70, R72-R75, R78, R104-R109,
---4----	602010024	SMD resistance,	1M ohm(1/16w)+1%-1% 0603	pcs	0.0000	4	R27, R83, R84, R86
---4----	602010212	SMD resistance,	18 ohm(1/16w)+1%-1% 0603	pcs	0.0000	2	R81, R82
---4----	602010143	SMD resistance,	4.75K ohm(1/16w)+1%-1% 0603	pcs	0.0000	17	R36-R39, R42-R45, R48-R52, R57-R60
---4----	602010207	SMD resistance,	10.7K ohm(1/16w)+1%-1% 0603	pcs	0.0000	8	R35, R40, R41, R46, R47, R53, R56, R61
---4----	602030005	SMD resistance net,	10K ohm(1/16w)+5%-5% CRN164	pcs	0.0000	4	RN1-RN4

Part List

Front Panel Board

---4---	6209900130	Battery box	3Pin BV-32N PC-88 TOSHIBA	pcs	0.0000	1	J13
---4---	603010033	SMD ceramic capacitance,	15pf/50V +5% -5% 0603	pcs	0.0000	1	C32
---4---	603010062	SMD ceramic capacitance,	33pf/25V +5% -5% 0603 NP0	pcs	0.0000	2	C33, C34
---4---	603010004	SMD ceramic capacitance,	100pf/50V +5% -5% 0603 (NP0) SMD	pcs	0.0000	1	C6
---4---	603010107	SMD capacitance,	270pf/50V +5%-5% 0603	pcs	0.0000	8	C58, C61, C63, C66, C69, C72, C74, C76
---4---	603010009	SMD ceramic capacitance,	0.001uf(1000pf) 50V +10% -10% 0603 SMD	pcs	0.0000	5	C59, C64, C70, C75, C128
---4---	603010014	SMD ceramic capacitance,	0.01uf/50V +10% -10% 0603 SMD	pcs	0.0000	1	C207
---4---	603010019	SMD ceramic capacitance,	0.1uf/50V +10% -10% 0603 X7R	pcs	0.0000	102	C2-C4, C8-C14, C19- C21, C51, C54, C56, C60, C62, C65, C67, C68, C71, C73, C129-C154, C156-C163, C166-C168, C170, C172-C173 C175-C186, C188-C199, C206, C210-C212, C215-C225
---4---	603020002	SMD ceramic capacitance,	10uf/16V+/-20% 4.5x3mmTAPE&REEL RV2-16V	pcs	0.0000	4	C1, C200, C202, C208
---4---	603020003	SMD ceramic capacitance,	100uf/16V +/-20% 6.3x5.3mm	pcs	0.0000	2	C201, C204
---4---	603020011	SMD ceramic capacitance,	220uf/16V +/-20% 6.3*5mm	pcs	0.0000	1	C17
---4---	608030002	diode,	IN4001 6.00*3.00mm	pcs	0.0000	1	D7
---4---	608010004	SMD switching diode,	IN4148 SOP TYPE SMD	pcs	0.0000	2	D6, D8
---4---	6090100200	SMD audion,	MMBT3904 SOT-23	pcs	0.0000	1	Q1
---4---	6090100180	SMD audion,	MMBT2222 SOT-23	pcs	0.0000	1	Q3
---4---	6090100190	SMD audion,	MMBT2907L SOT-23	pcs	0.0000	1	Q2
---4---	6060100070	SMD Ferrite bead,	2.5-TURN SMT (2744555577)	pcs	0.0000	1	L3
---4---	606010005	SMD Ferrite bead,	2012D102B 0805 SMD	pcs	0.0000	4	L14, L16-L18
---4---	6100300100	crystal,	24.576M HZ +50 -50PPM HC-49SMD	pcs	0.0000	1	X2
---4---	610030001	SMD 49S crystal,	6MHz (HC-49S-SMD)	pcs	0.0000	1	X4
---4---	6010103430	SMD IC,	NC7SU04 SOP23-5	pcs	0.0000	2	U22, U24
---4---	6010103770	SMD IC,	74LVC139PW TSSOP16	pcs	0.0000	1	U9
---4---	6010103510	SMD IC,	74LCXR162245MEX SSOP48 FSC	pcs	0.0000	2	U12, U13
---4---	6010103520	SMD IC,	74LCX2245 SO IC 20-300	pcs	0.0000	1	U15
---4---	6010103530	SMD IC,	74VHC14 SOP14-150	pcs	0.0000	1	U38

Part List**Front Panel Board**

---4----	6010103000	SMD IC,	74AC08SC SOP TYPE FSC NOT MOT	pcs	0.0000	1	U39
---4----	6010103490	SMD IC,	ST16C550 PLCC 44P	pcs	0.0000	1	U23
---4----	6010103410	SMD IC,	DAC AK4382VF VSOP 16	pcs	0.0000	1	U28
---4----	6010103780	SMD IC,	GAL 16V8D PLCC20	pcs	0.0000	1	U26
---4----	6010104330	SMD IC,	LY6225616ML-551L IA68944 3E254C	pcs	0.0000	1	U3
---4----	6010103460	SMD IC,	MT46V8M16P-75:DTR.	pcs	0.0000	1	U11
---4----	6010100700	SMD IC,	LM1117DTX LOW DROP ADJ 0.8A T0252 SMD ST	pcs	0.0000	2	U55, U56
---4----	6010103440	SMD IC,	LP2992IM5-2.5	pcs	0.0000	1	U57
---4----	6010101130	SMD IC,	NJM4580 DUAL LOW NOISE SOP TYPE	pcs	0.0000	2	U27, U30
---4----	6010104170	SMD IC,	MR27T12800L-01STN03A 7285BA7J 48PIN	pcs	0.0000	1	U47
---4----	6080100090	SMD switching diode,	BAS40 SOT-23	pcs	0.0000	2	D2, D11
---4----	6010103550	SMD IC,	MCU68331 CPV 25 MOTOROLA	pcs	0.0000	1	U1
---4----	6010103540	SMD IC,	AM29F160DB-75EF	pcs	0.0000	1	U4
---4----	6010103470	SMD IC,	PBGA388L PITCH 35*35mm 1.27mm	pcs	0.0000	1	U46
---4----	6010103480	SMD IC,	PDIUSB12 TSSOP28	pcs	0.0000	1	U48
---4----	507040011	Four layer fibre PCB, 1.6mm	Main board, V02 Green oil, Silkscreen tin, 8Pin/2.54 Single row,	pcs	0.0000	1	
---4----	6280101120	Header of connector,	Straight foot, A2503WV- 8P WAFER	pcs	0.0000	1	J6
---4----	602010222	SMD resistance,	121 ohm(1/16W)+1%-1% 0603	pcs	0.0000	2	R111, R112
---4----	602010213	SMD resistance,	196 ohm(1/16w)+1%-1% 0603	pcs	0.0000	1	R113
---4----	602010223	SMD resistance,	60.4 ohm(1/16w)+1%-1% 0603	pcs	0.0000	1	R114
---4----	603010110	SMD Capacitance	22pf /50V +5%-5% 0603	pcs	0.0000	2	C169, C171
---4----	603010111	SMD Capacitance	10UF/10V +10%-10% 0805 (X5R)	pcs	0.0000	6	C213, C214, C226, C227, C228, C229
---4----	602040012	DIP resistance,	1K ohm(1/8w)+5%-5%	pcs	0.0000	1	
--3-----	1019900340	Scan Board Part,	SP2XS	set	0.0000	1	
---4----	603010009	SMD ceramic capacitance,	0.001uf(1000pf) 50V +10% -10% 0603 SMD	pcs	0.0000	4	C24-C26, C8
---4----	603010019	SMD ceramic	0.1uf/50V +10% -10% 0603	pcs	0.0000	9	C4, C7, C9, C10, C11, C20, C12, C14, C16

Part List

Front Panel Board

		capacitance,	X7R					
---4---	603010062	SMD ceramic capacitance,	33pf/25V +5% -5% 0603	pcs	0.0000	2	C5, C6	
---4---	603080063	DIP electrolyte capacitance,	470uf/10V ±20% 6.3x11mm	pcs	0.0000	1	C15	
---4---	608010004	SMD switching diode,	IN4148 SOP TYPE SMD	pcs	0.0000	1	D5	
---4---	628010084	Header of connector,	10PIN*2 Straight foot, DUAL ROW WITH BOX HEADER	pcs	0.0000	3	J2, J3, J4	
---4---	6280101020	Header of connector,	10Pins/2.5mm Single row, Straight foot, A2503WV-10P WAFER	pcs	0.0000	1	J6	
---4---	6060100070	SMD Ferrite bead,	2.5-TURN SMT (2744555577)	pcs	0.0000	1	L1	
---4---	6090100190	SMD audion,	MMBT2907L SOT-23	pcs	0.0000	1	Q1	
---4---	6090100180	SMD audion,	MMBT2222 SOT-23	pcs	0.0000	6	Q13, Q14, Q15, Q16, Q17, Q18	
---4---	602030005	SMD resistance net,	10K ohm(1/16w)+5%-5% CRN164	pcs	0.0000	6	RN1, RN2, RN4, RN9, RN10, RN14	
---4---	602030003	SMD resistance net,	100 ohm(1/16w)+5%-5% CRN164	pcs	0.0000	8	RN3, RN5, RN6, RN7, RN8, RN11, RN12, RN13	
---4---	602010024	SMD resistance,	1M ohm(1/16w)+1%-1% 0603	pcs	0.0000	3	R1, R10, R99	
---4---	602010020	SMD resistance,	10K ohm(1/10w)+5%-5% 0603	pcs	0.0000	24	R2, R3, R4, R5, R6, R7, R11, R12, R13, R17, R20, R21, R24, R26, R28, R30, R43, R22, R52, R53, R27, R29, R48, R49	
---4---	602010052	SMD resistance,	1.5K ohm(1/10w)+5%-5% 0603	pcs	0.0000	1	R9	
---4---	602010271	SMD resistance,	110 ohm(1/8w)+5%-5% 0603	pcs	0.0000	2	R14, R15	
---4---	602010108	SMD resistance,	33 ohm(1/16w)+5%-5% 0603	pcs	0.0000	6	R16, R19, R37, R39, R41, R44	
---4---	602010201	SMD resistance,	4.7 ohm(1/8w)+5%-5% 0603	pcs	0.0000	1	R23	
---4---	602010148	SMD resistance,	4.7K ohm(1/10w)+5%-5% 0603	pcs	0.0000	1	R35	
---4---	602010272	SMD resistance,	4.7M ohm(1/16w)+5%-5% 0603	pcs	0.0000	1	R36	
---4---	6010103740	SMD IC,	74LS145 SOP 16	pcs	0.0000	1	U1	
---4---	6010100930	SMD IC,	74HC541 SOP20 TYPE PHI	pcs	0.0000	2	U2 U4	
---4---	6010100910	SMD IC,	74HC373 SOP TYPE PHI	pcs	0.0000	1	U3	
---4---	6010104770	SMD IC,	M38869M8A-216GP Masking,	pcs	0.0000	1	U12	
---4---	610030011	Crystal	6.144MHZ HC-49 SMD	pcs	0.0000	1	Y1	
---4---	506040053	Double side fibre PCB, 1.6mm	PCB REVA VER2 Green oil, Silkscreen tin,	pcs	0.0000	1		
---4---	6280101070	Header of connector,	6Pins/2.5mm Single row,	pcs	0.0000	2	J7, J12	

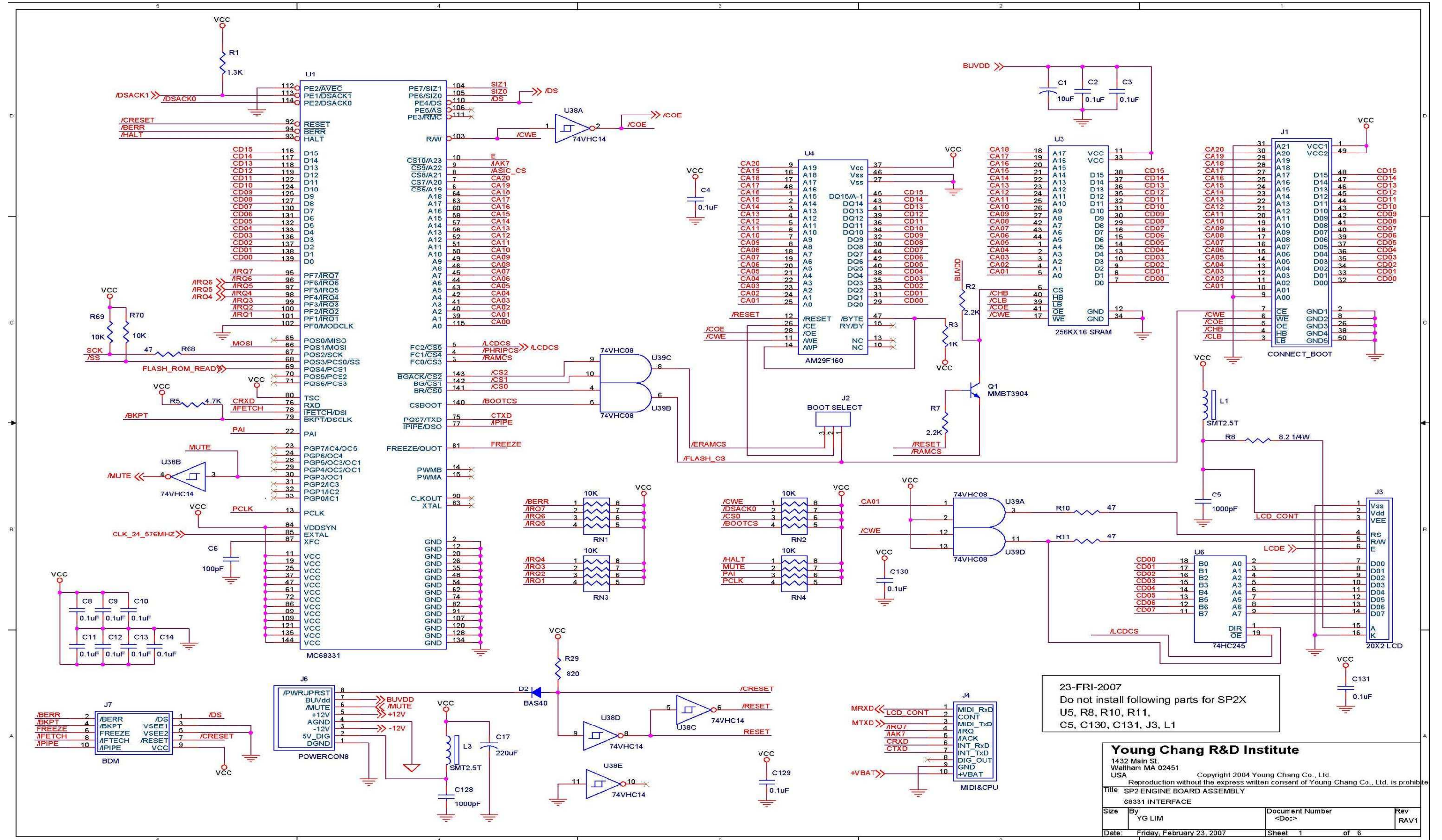
Part List**Front Panel Board**

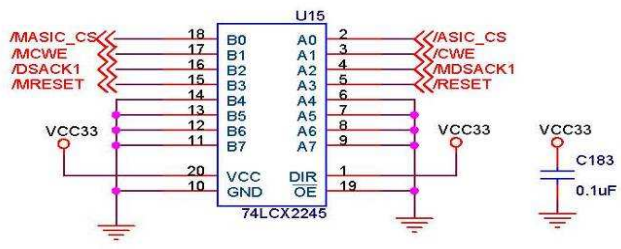
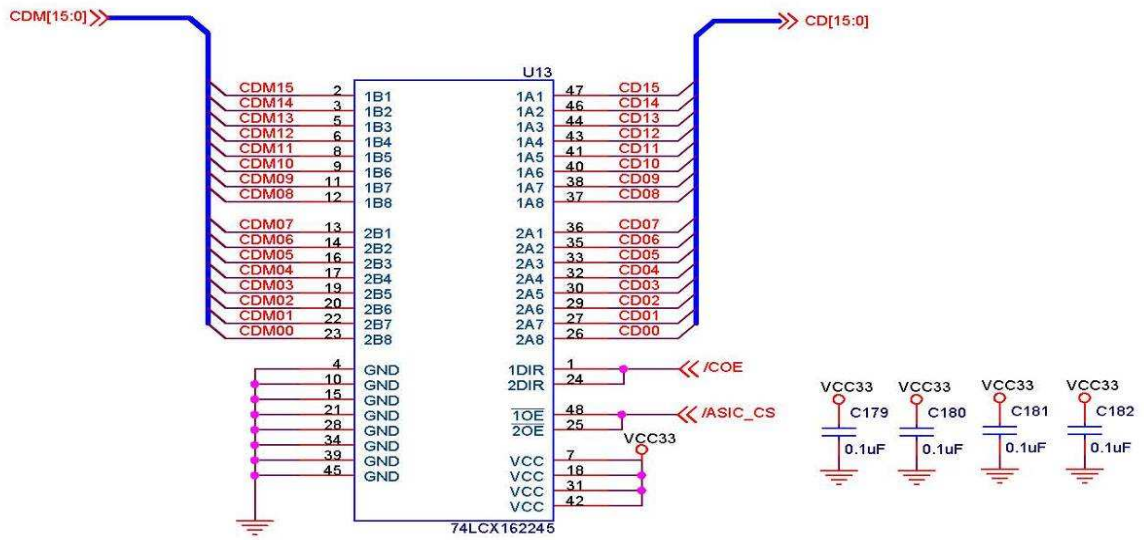
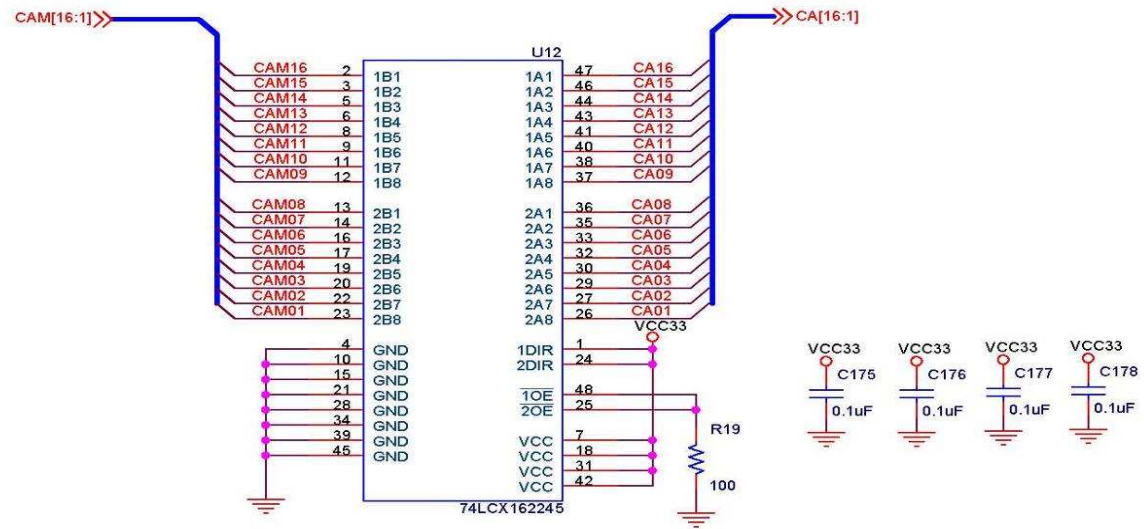
			Straight foot, A2503WV- 6P WAFER				
---4----	6010100630	SMD IC,	CD4051 SOP TYPE	pcs	0.0000	1	U6
---4----	602010017	SMD resistance,	10K ohm(1/16w)+1%-1% 0603	pcs	0.0000	1	R32
---4----	6280101080	Header of connector,	7Pins/2.5mm Single row, Straight foot, A2503WV- 7P WAFER	pcs	0.0000	1	J8
--3-----	1020600510	Keyboard part, (SP2X)	88TP40L	set	0.0000	1	
--3----	6280705860	Terminal withjack, Keyboard Cable,	20pin L=360mm 28# One terminal with, 10*2PIN/2.54jack, Other terminalwith 10*2PIN/1.27AMPjack, with Magnetic loop,	pcs	0.0000	2	
--3-----	211010085	Keyboard Support Board SP2XS DL-1445	HIPS No machining on surface, Black RD070623	pcs	0.0000	3	
---4----	298020001	Plastic,	HIPS	kg	3.0000	0.0179	
--3-----	299010040	Nut, Cover DL-1371	HIPS Black No machining on surface, RD070038	pcs	0.0000	4	
---4----	298010001	Plastic,	ABS	kg	3.0000	0.0007	
--3-----	302010018	Nut,	C Grand GB/T41-2000 Black M6 Thickness 4.8mm P=9.85mm	pcs	0.0000	4	
--3-----	301080009	Screw, PWM	5*12PWM Black Type '+', Machine-made, Small- single tooth,	pcs	0.0000	9	
--3-----	631040133	Glue,	380*8*2.5mm With glue in one side, Black	pcs	0.0000	2	
--3-----	301070025	Screw, PWB	2.6*8PWB Black Type '+', Flat cauda & selftapping, External diameter 9	pcs	0.0000	8	
--3-----	628110021	Meson PA50	Interior diameter Dia. 4.0 T=0.5mm Length 55+/-5mm	pcs	0.0000	2	

Chapter 6

Schematics

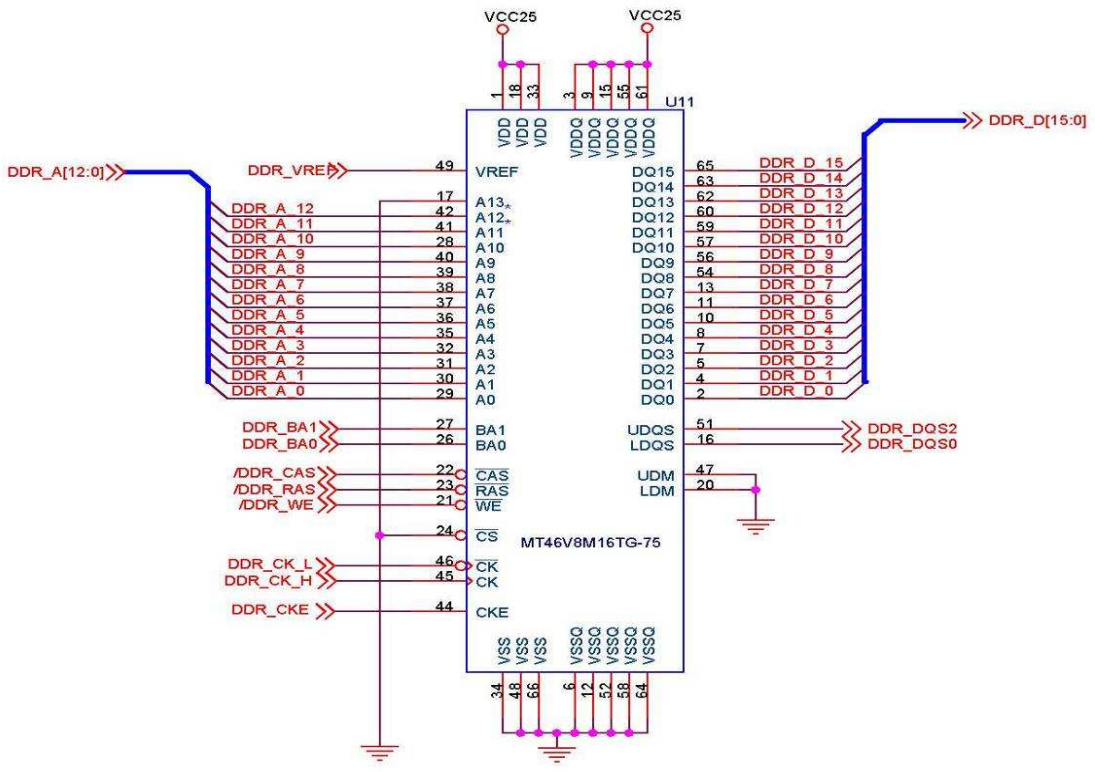
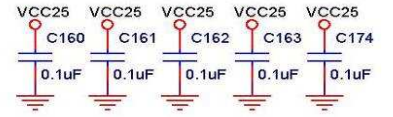
ENGINE BOARD





IMPORTANT!

Signals DDR_D_[15:8] and DDR_DQS_2 should all have equal length copper traces. Signals DDR_D_[7:0] and DDR_DQS_0 should all have equal length copper traces.



SP2.BOM.Engine.REV3.VER3

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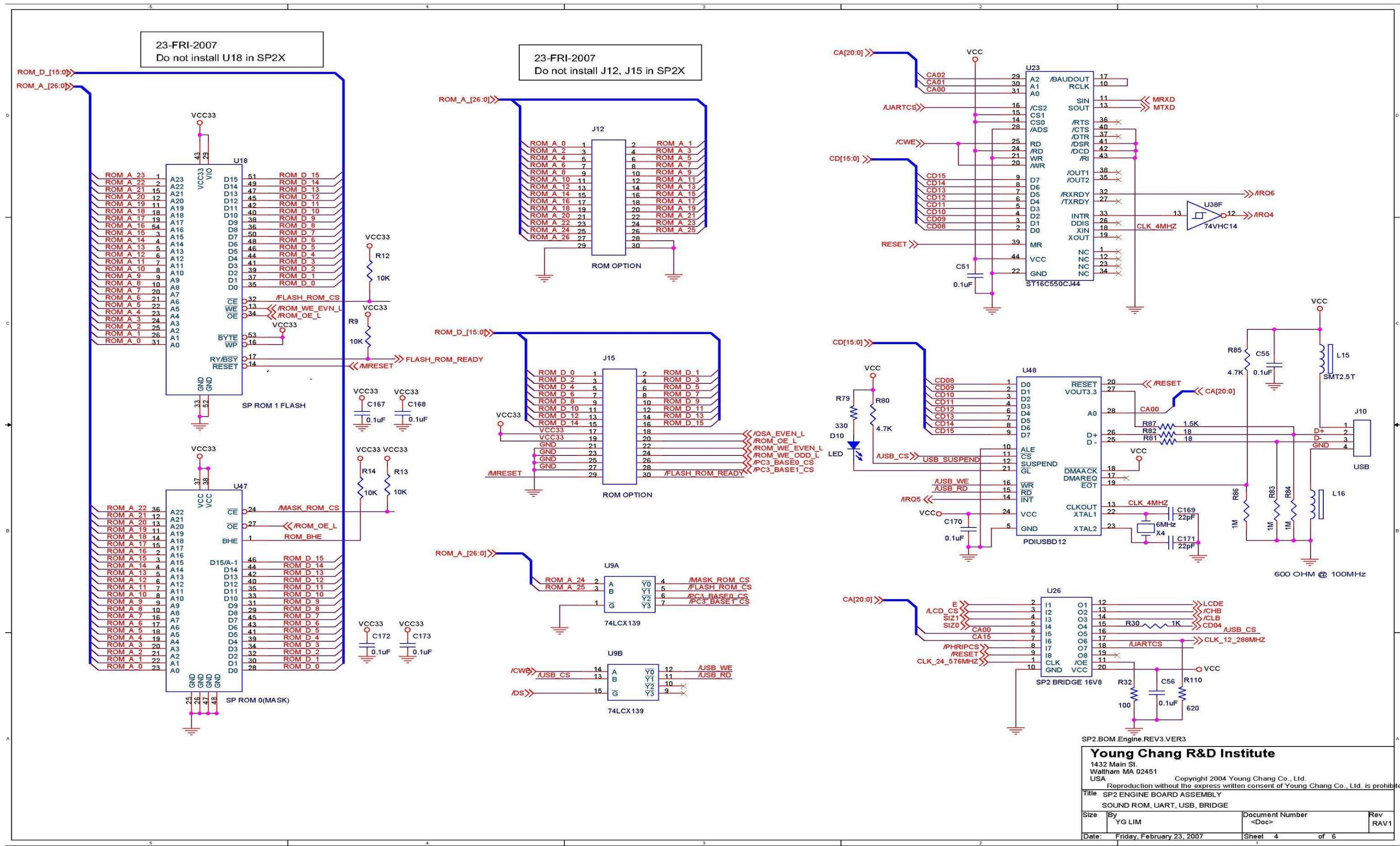
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Waltham MA 02451
USA

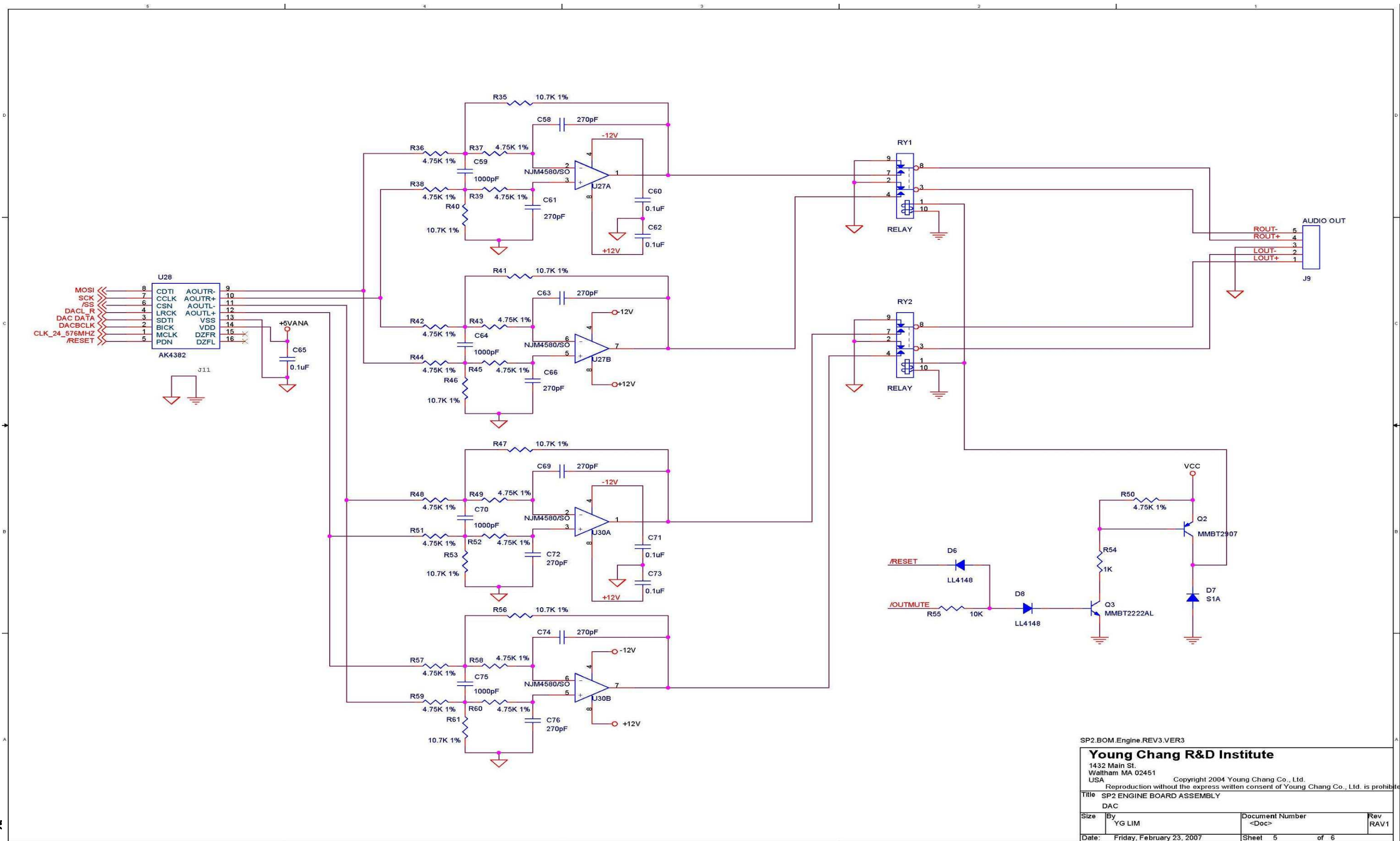
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Title: SP2 ENGINE BOARD ASSEMBLY
DRAM, LEVEL SHIFTER

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Date:	Friday, February 23, 2007	Sheet 2 of 6	

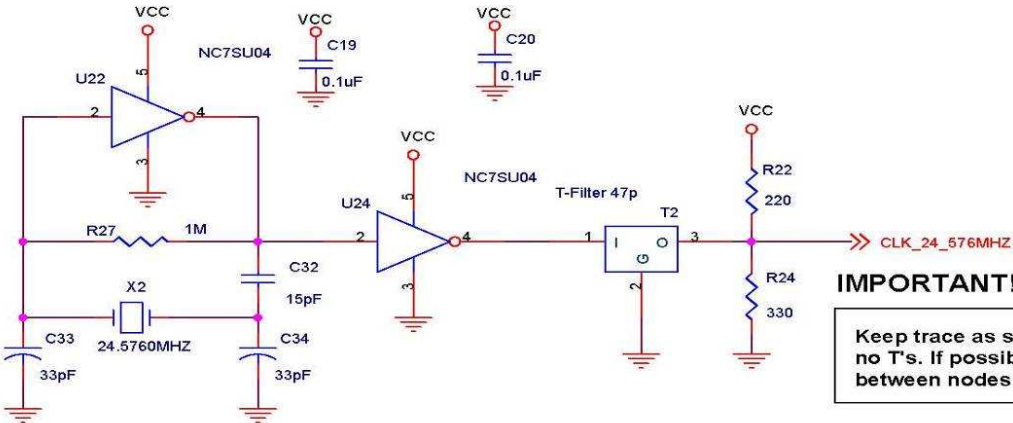
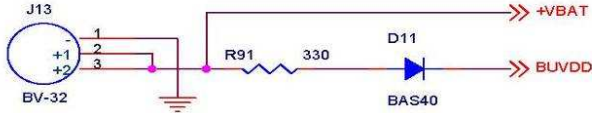
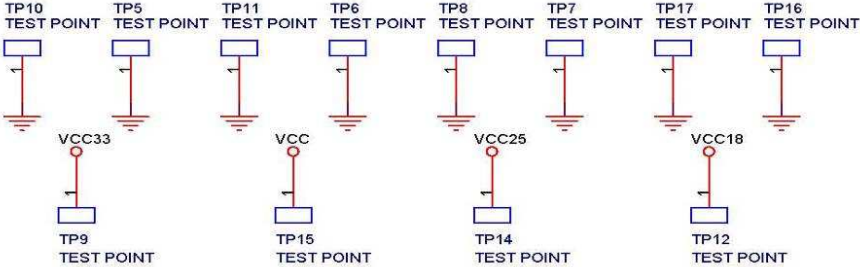






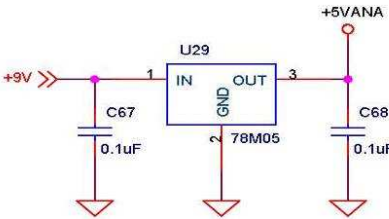
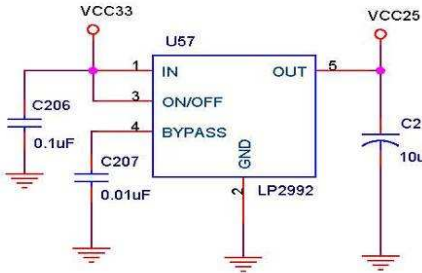
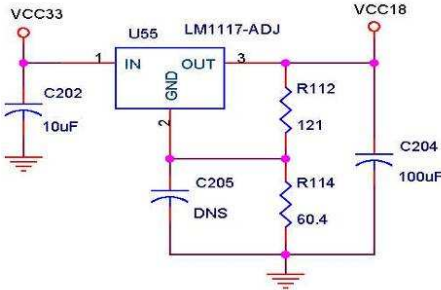
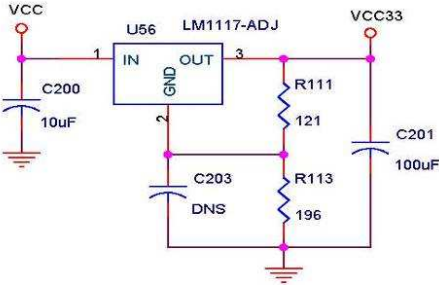
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DAC			
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	YG LIM	<Doc>	RAV1
Date:	Friday, February 23, 2007	Sheet 5 of 6	

Place the oscilloscope power and ground test points below with approximately equal spacing around the board.



IMPORTANT!

Keep trace as short as possible with no T's. If possible, keep distance between nodes equal.



SP2.BOM.Engine.REV3.VER3

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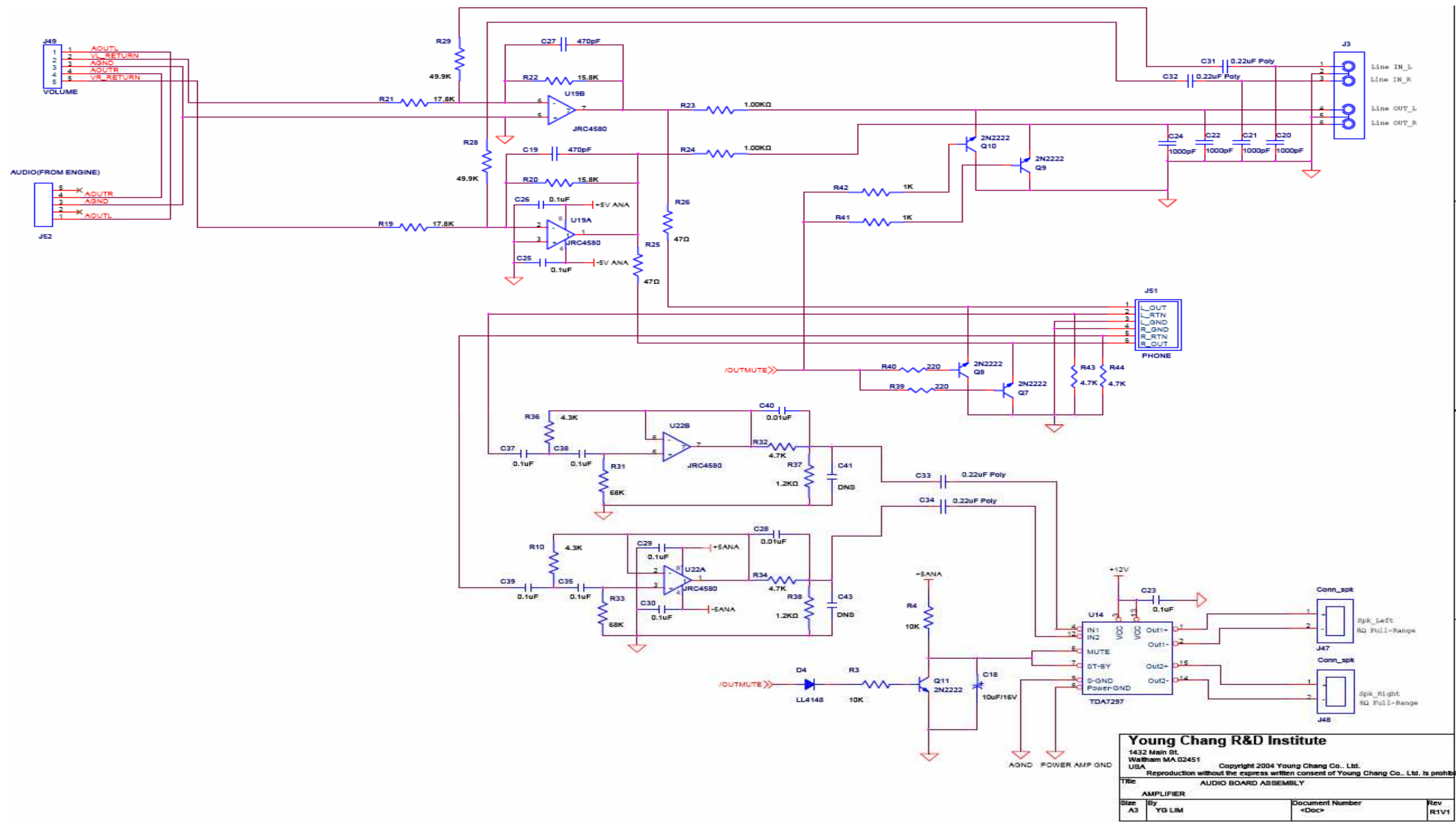
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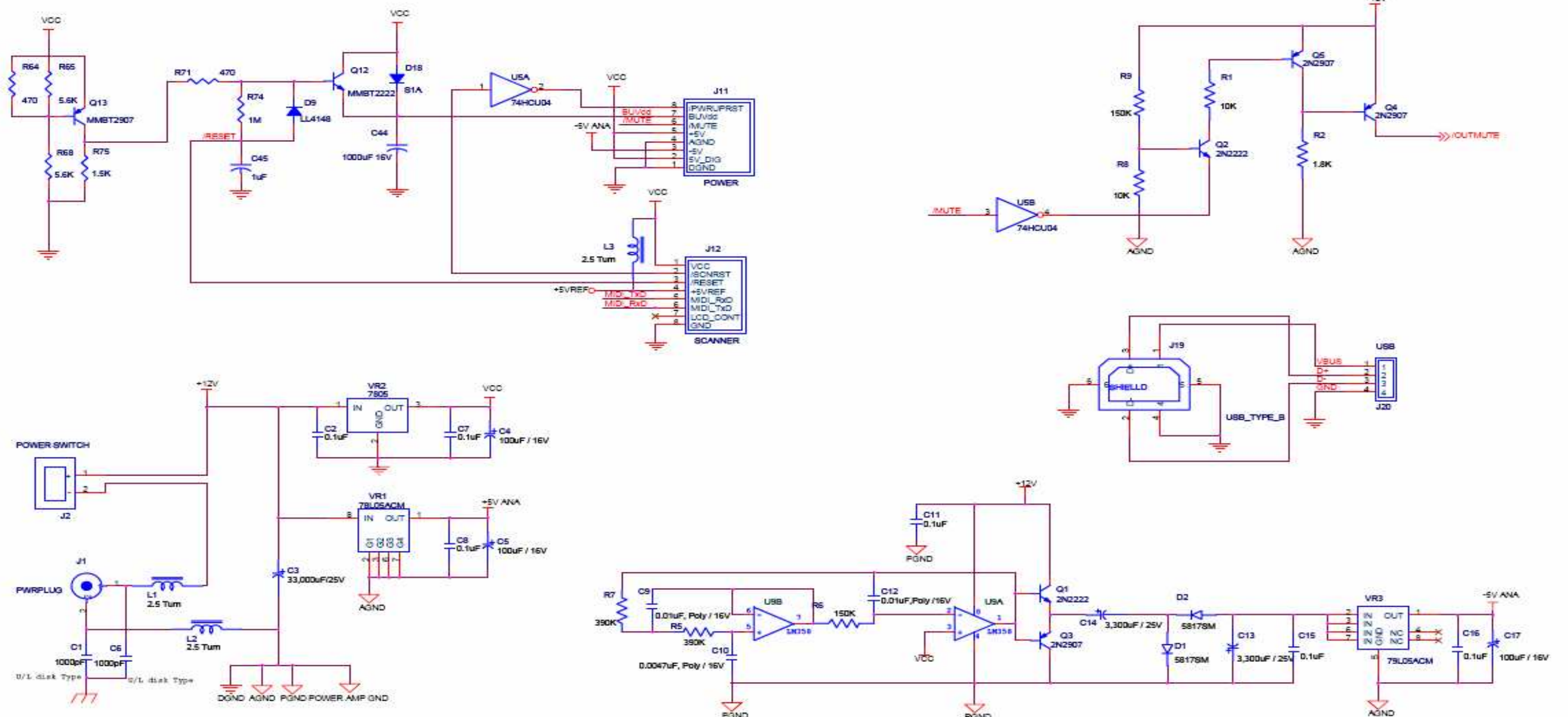
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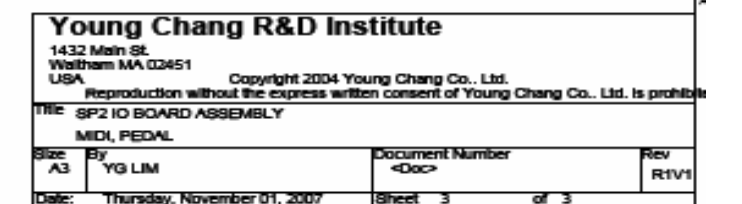
POWER, CLOCK, PLL

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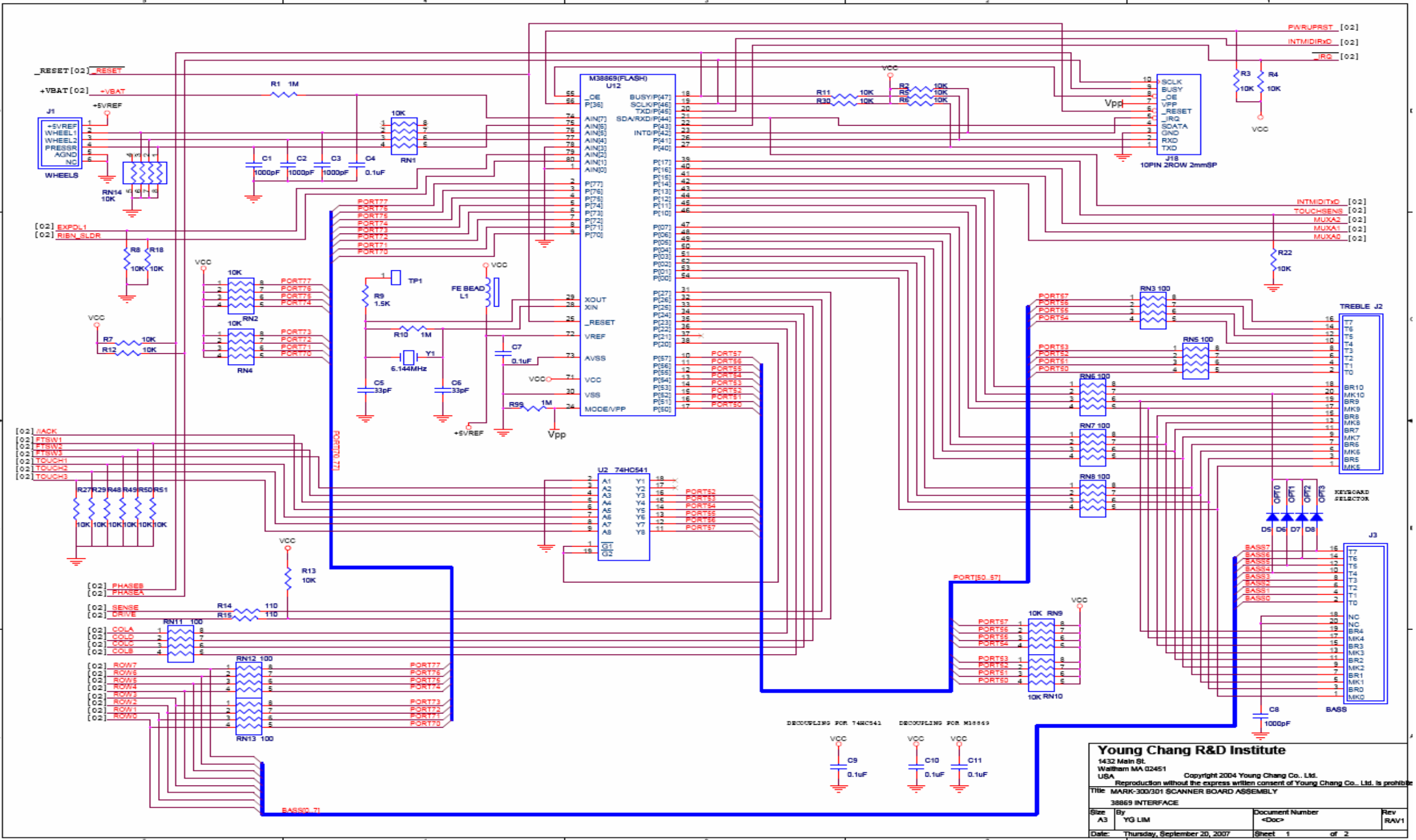
AUDIO BOARD

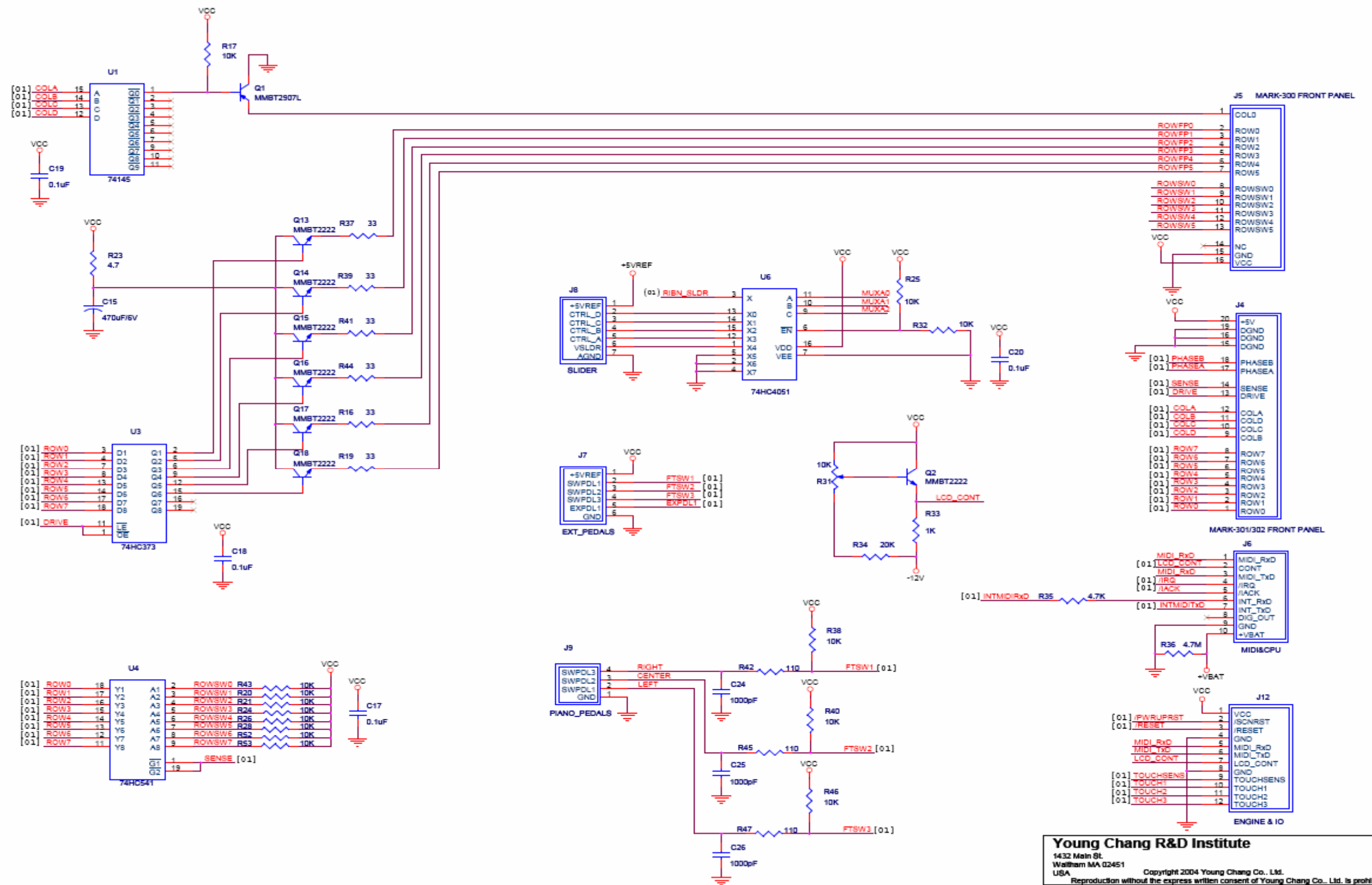






SCANNER BOARD





FRONT BOARD

