

Pioneer AV Receiver VSX-1020-K Reverse Engineering

Justin An, Liam Teale, Thomas Lee

Team 1010A

West Vancouver, BC, Canada

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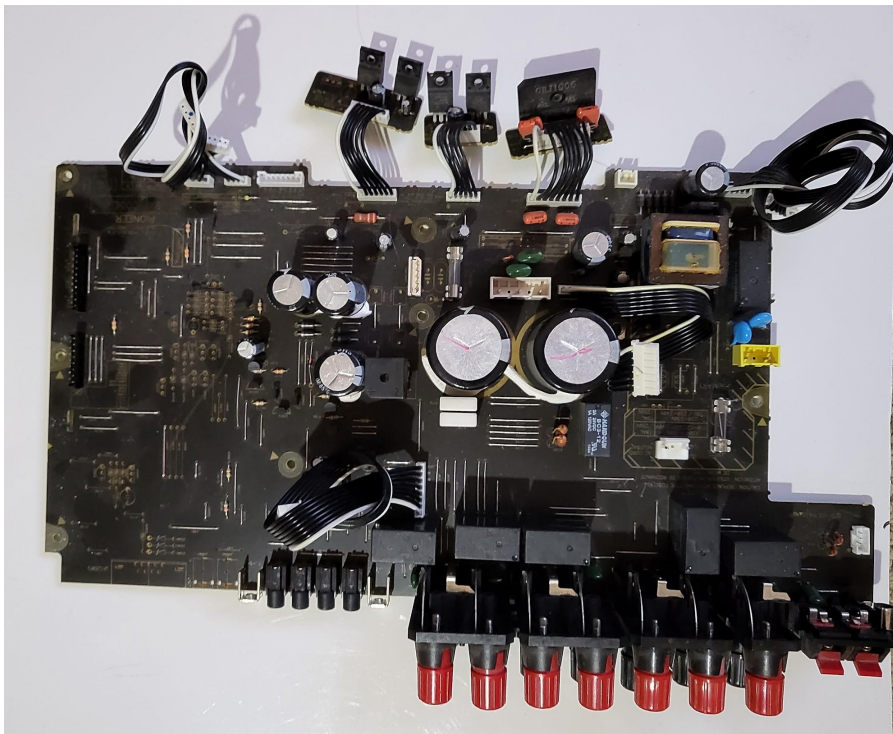
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1. About Pioneer AV Receiver VSX-1020-K and Why It Was Chosen

Pioneer AV Receiver VSX-1020-K, an audio-video receiver, amplifies the sound so multiple speakers generate surrounding sound and are mainly used for home theatre. Not knowing what AV receiver was when we first found this device, we were fascinated by the number of features and immediately jumped into dismantling it to see how this was possible.

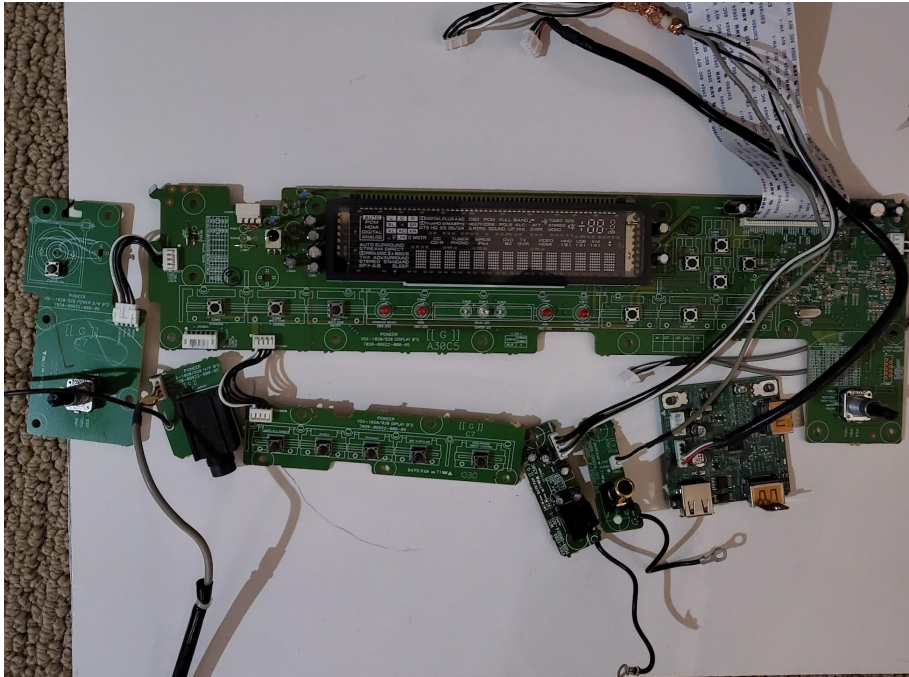
2. Parts

2.1 Main Speaker Board



The main speaker board is powered by a power cord that sends out electric signals through the black and red ports to the speakers which then vibrates the electromagnet in the speaker causing it to make sounds.

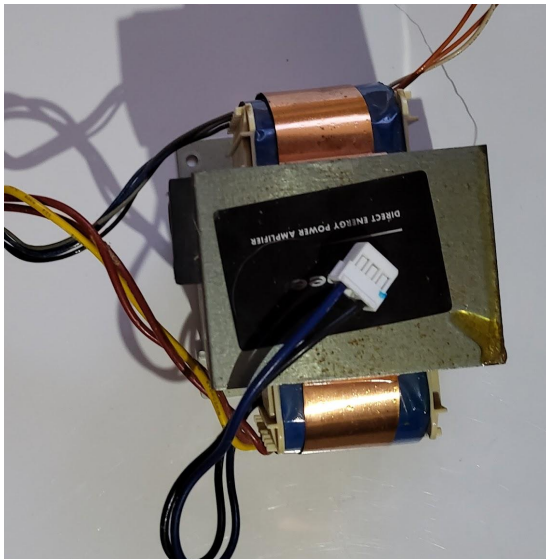
2.2 Front Cover Assembly/ PCB Board



(Front Cover Assembly)

With the front cover assembly, the user can easily control many features of the device through this control panel along with multiple ports to connect different devices.

2.3 Transformer VSX1020

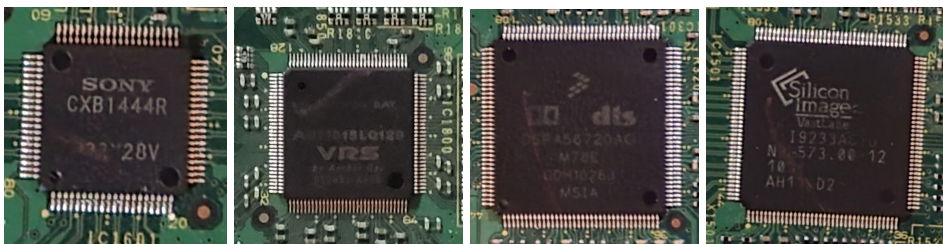


The transformer allows the AV receiver to increase or decrease the voltage to create a certain sound or audio.

2.4 Digital Main 5-In HDMI ANP 7740-6



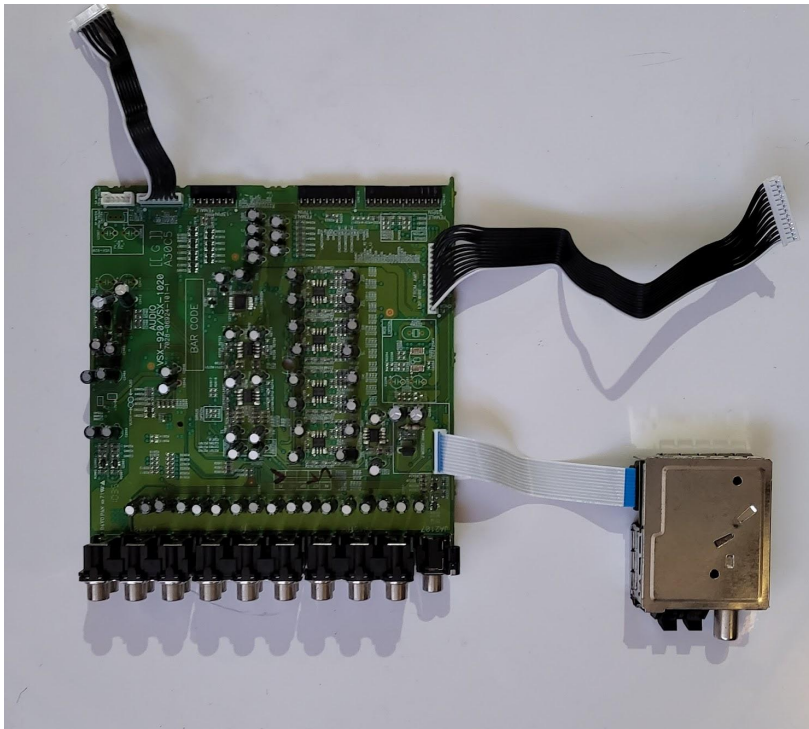
(main D assy)



(Sony decrypting chip, VRS, Dolby DTS, DSP respectively from left to right)

The main D takes electrical signals and sends them to the amplifier and main speaker board. For example, when the 5 input 1 output HDMI port receives signals, the signals will be split into video and audio through DSP chip and Dolby DTS chip (for video and audio respectively). Then the HDMI signals will go through the sony chip as the current signals are encrypted by default and cannot be understood by other systems. After the signals are decrypted, the signals are turned into composite input/output vice versa from composite to HDMI signal. Furthermore, the VSR chip can upscale 1080p resolution to 4k resolution by automatically finding the missing pixels while Dolby DTS splits audio signals into a number of speakers desired.

2.5 RCA Audio VSX-1020 and AM/FM Receiver



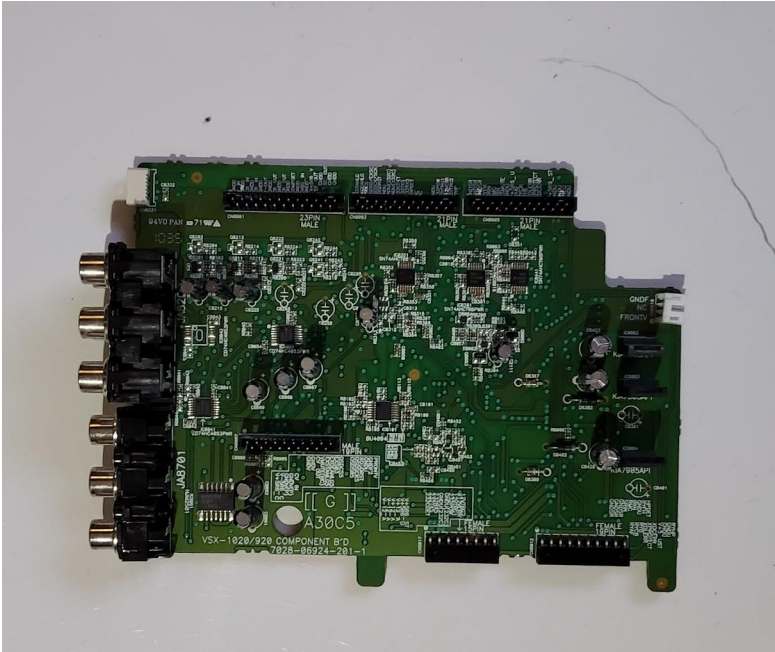
The audio board has red and white ports for multiple speakers while the black port is for the subwoofer. The receiver receives and tunes to a specific frequency. Then the audio board and receiver send the audio signals to the main D for processing.

2.6 RCA Video VSX-1020 Only Composite BD PCB



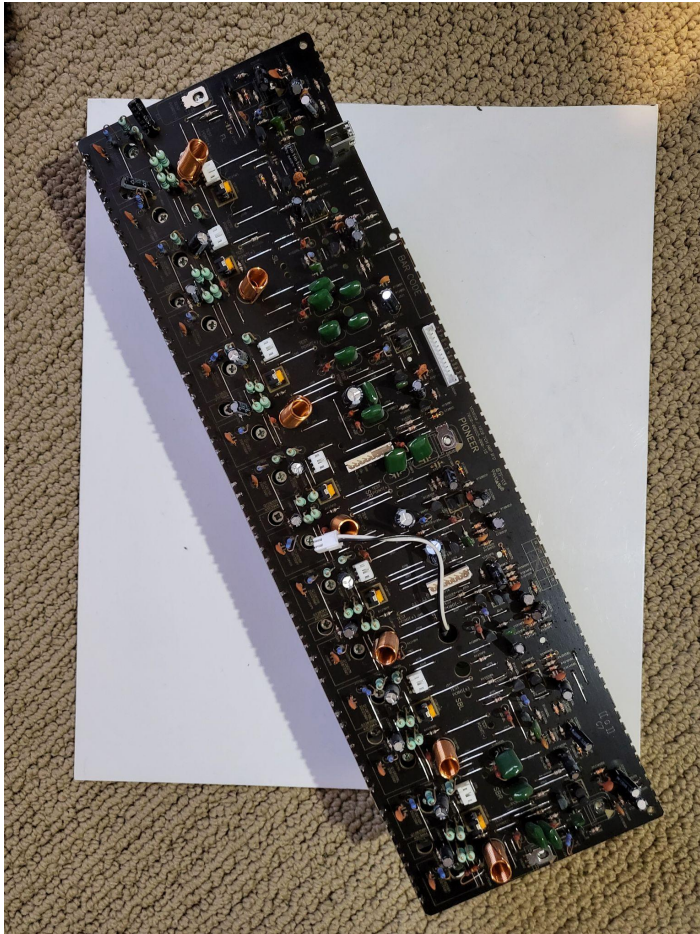
This video board sends input and output video signals to the main D for processing.

2.7 A30C5 VSX1020 Component BD

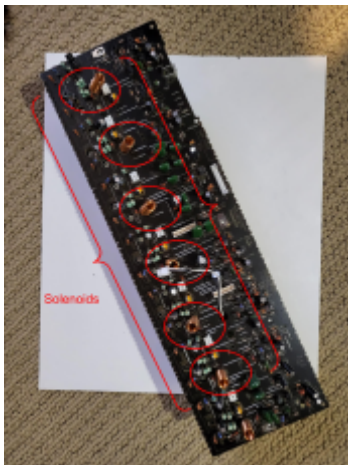


The red, green, and blue component ports are the same as a yellow video composite port. Its functionality is also the same as it sends input and output video signals to the main D.

2.8 Bar Code 7.1Ch AMP PCB VSX-1020 (Main Amplifier)



(High-quality image)



(Lower quality image pointing at solenoids)

The main amplifier receives video/audio signals from multiple sources and controls each copper coil solenoid to change the volume depending on the control panel volume level input

3. Conclusion

This challenge was fun but exhausting to research/dismantle while juggling schoolwork and robotics competition. We learned that constant communication was the key to avoiding errors when we are busy and to also research by asking people. We found over-complicated online manuals created by random people. We luckily were able to get in contact with an expert who gave us a perfect pdf service and customer manual for our device. With the overflowing info from 160 pages service manual and 404 pages customer manual, we had to carefully sort out info to make the most concise yet detailed explanations of each part. With these skills, we were able to successfully write a satisfactory document of this device.

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