

# **Networked Home Theater Block Diagram**

By  
Jeff Patrick

Advisor: Alexander Malinowski

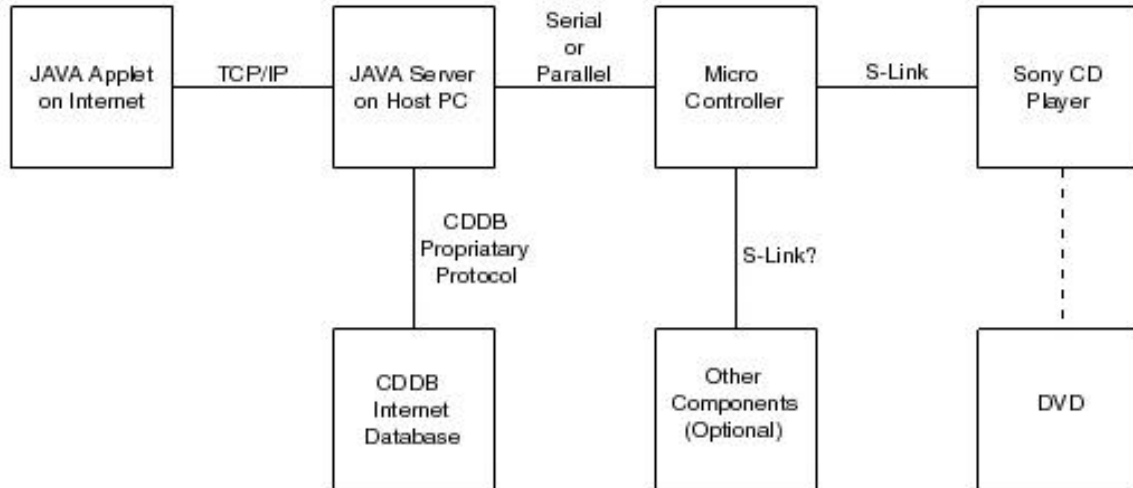


Figure 1. System Block Diagram

### Hardware Interface

In order to connect the CD player to the PC, several factors must be taken into consideration. The CD player outputs TTL (0-5) voltages, while the serial port on the PC outputs RS232 (-15 – 15) voltages. Some voltage conversion must be done in order to connect the two.

Second, the CD player communicates at a 600-microsecond time base. The Java server has a minimum wait time of 1 millisecond. In order to communicate at the speed required, the communications functions must be written in a separate language. In addition, the server PC will be slowed down considerably by the need to monitor a port at high speeds. This is a very large waste of processor power since the S-Link bus is unused 99% of the time.

To reduce strain on the PC processor, and reduce the complexity of the server software, a microprocessor will interface the PC to the CD player. The microprocessor has the ability to communicate to the CD player at a 600 microsecond base frequency. It can then talk to the PC at a slower speed. The microprocessor will also take care of the voltage conversions between TTL and RS232. Figure 1 shows the block diagram of the entire system with the microprocessor interface. In addition to controlling just Sony devices, the microprocessor will have the capability to talk to different bus's if the need arises.

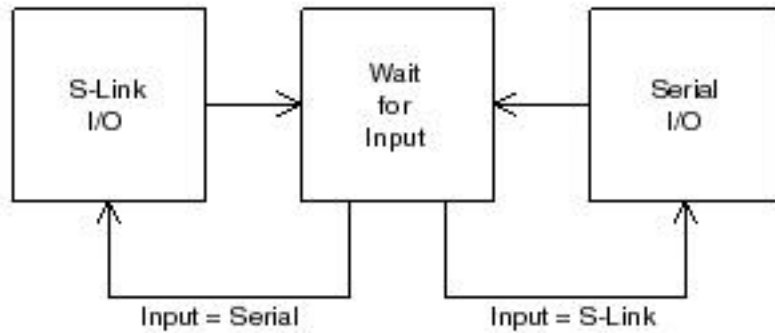


Figure 2. Microprocessor Code Flowchart

### Microprocessor Code

The microprocessor code is very simple. Figure 2 shows the entire microprocessor code flowchart. The majority of the time the processor will be in an idle state. While in the idle state it will listen to both the Serial and the S-Link bus. When it detects information on either bus, it will convert it into the format of the other bus and send it. If the ability to interface multiple buses is implemented, the microprocessor will also analyze the incoming signal and route it accordingly.

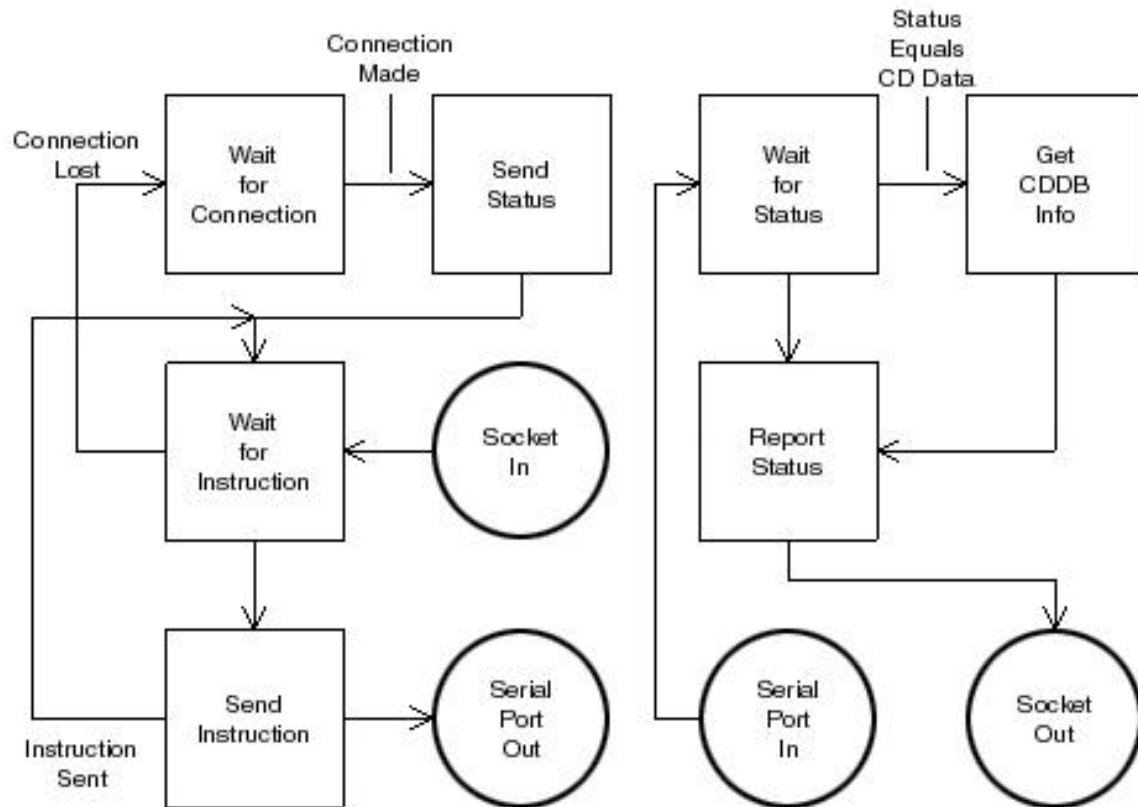


Figure 3. Server Code Flow Chart

### Server Code

The Java server has several functions, which are shown in figure 3. The first operation of the server is to wait for a connection from an applet. Once a client is

connected, the server will transmit status information about the system. After the status information is sent the server will wait for an instruction from the client. When an instruction is received, the server will pass the command to the microprocessor through the Serial Port Out. Finally, the server will return to the Wait for Instruction mode.

The server will also be running a separate thread to detect if any information is being sent from the microprocessor. When status information is received from the processor, the server will analyze whether the information is a CD identification number. If so, the server will connect to CDDDB using proprietary libraries from Gracenote/CDDDB. If the data is not a CD identification number, the server will skip the CDDDB connection step. The code then enters a Report Status block. This block parses the data received from the processor or from CDDDB.com and prepares it for display. Finally, the data to be displayed will be sent to an applet through the Socket Out block.

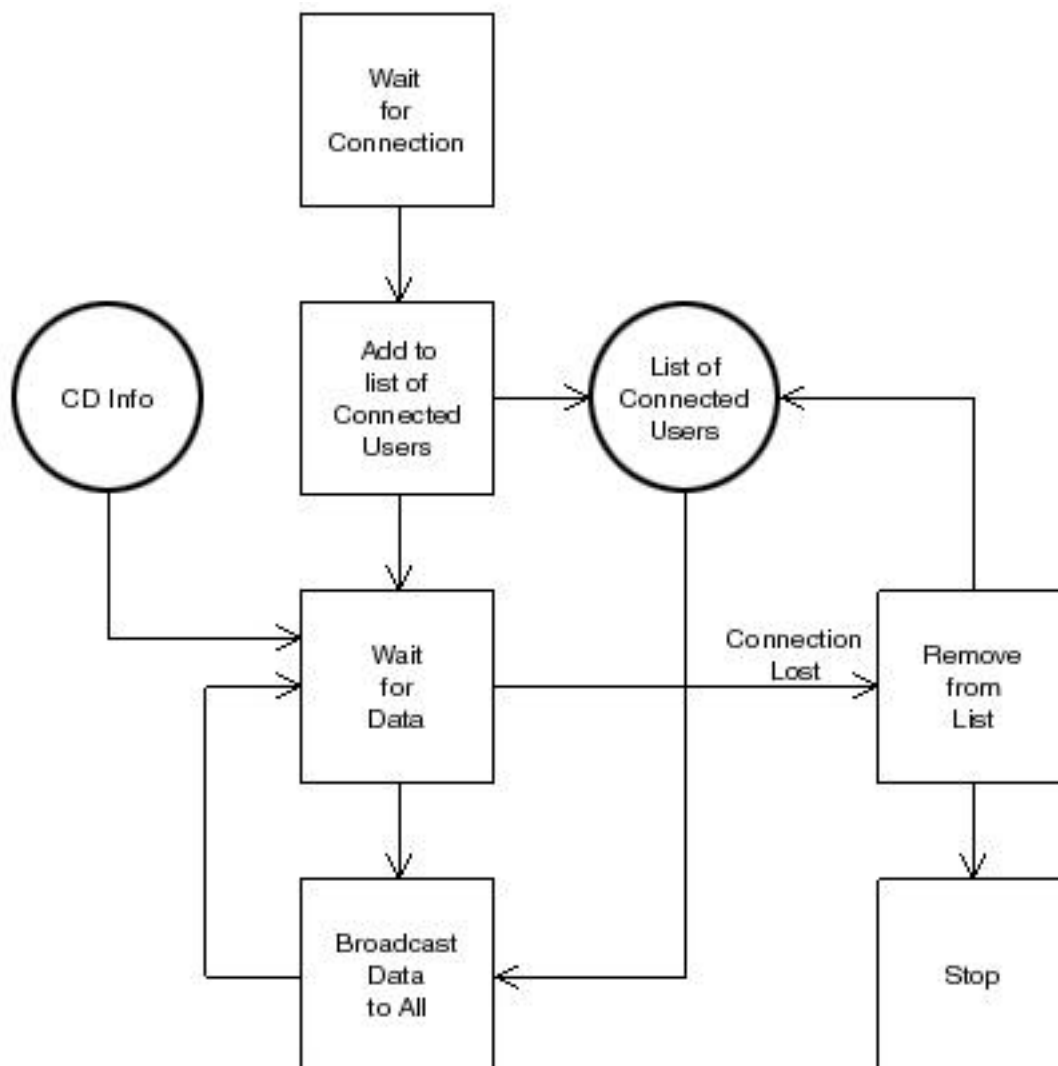


Figure 4. Chat Server Block Diagram.

A second server will be running to manage the chat functions. If a second user tries to connect, he will not be able to control the CD player, but he will be able to chat.

The user controlling the CD player will be using both flowcharts to control and to chat. Figure 4 shows the server flowchart when a user connects. First the user is added to the list of connected users. Next, the server will wait for new data to be transmitted. If a user connects, the updated list of users is considered new Data, and the server will go to the next step. All the data will be broadcast to all users. This data includes the user list, CD info, and any new chat data from the users.

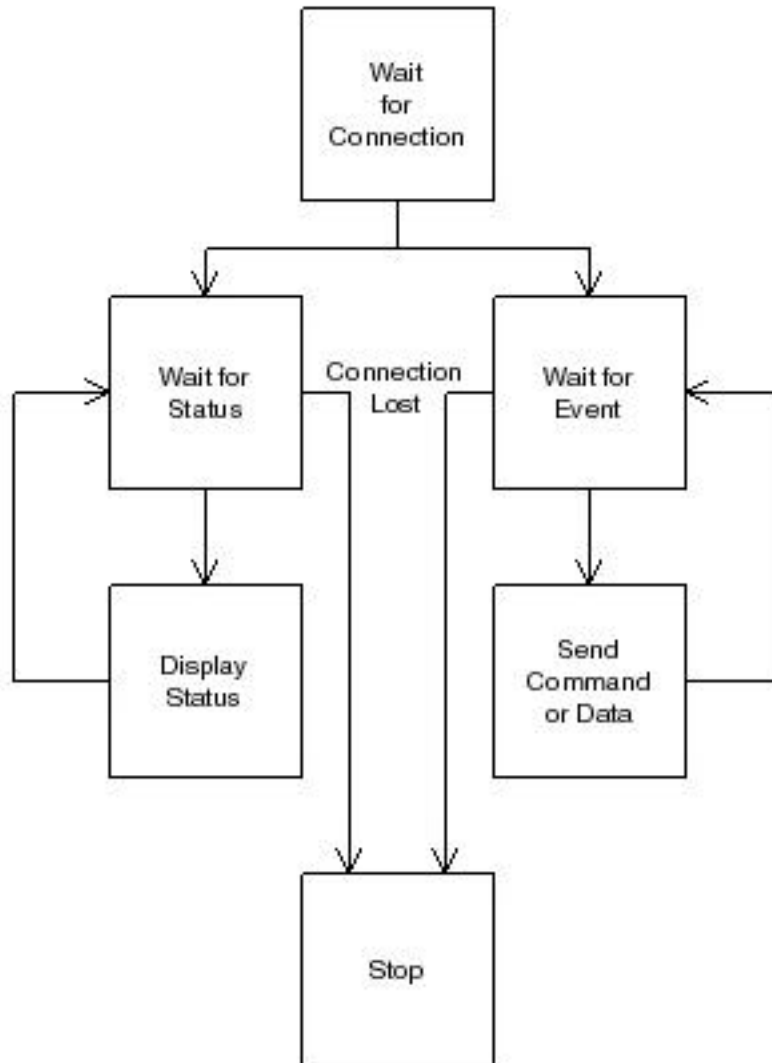


Figure 5. Applet Code Block Diagram

Applet Code

Figure 5 is the flowchart for the Applet. The applet will connect to the server and split into two threads. The thread on the left waits for data to be sent from the server. When the applet receives data (either chat or status data) it will display it for the user of the applet. The thread on the right waits for data to be input by the user. Once the user sends a command or types in the chat the applet sends the data to the server. The server will then send a reply to the applet with either the chat info or updated status on the CD player.