

DISASSEMBLY AND ANALYSIS OF

THE CISCO-LINKSYS

WMLS11B

WIRELESS-B

MUSIC SYSTEM



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1.0 INTRODUCTION AND BACKGROUND

The Cisco-Linksys WMLS11B Wireless-B Music System (herein: WMLS11B) is a consumer-grade music streaming device designed to operate on both wired and wireless (IEEE 802.11b) Ethernet network connections. The device was first introduced by the Linksys division of Cisco System, Inc. in 2004. The devices reached End-of-Life (EOL) and were discontinued in late 2005.

As originally designed, the WMLS11B can stream MP3 audio streams from both Internet Radio stations as well as local network resources (using the MusicMatch Streaming Server software). Later revisions of the device's firmware also allowed for streaming of MP3 music streams from local network Universal Plug and Play (UPnP) resources.



Figure 1: Frontal View of the Cisco-Linksys WMLS11B



Figure 2: Rear View of the Cisco-Linksys WMLS11B

1.1 PURPOSE OF THIS DOCUMENT

This document is designed to demonstrate to the reader the proper method for disassembling the WMLS11B so that the reader may have access to the device's internal system boards. In addition, this document will illustrate to the reader the orientation of the device's internal electronics.

1.2 TARGET AUDIENCE

The target audience of this document is the enthusiast community interested in modifying or understanding the internal operation of the WMLS11B Wireless-B Music System.

This document assumes that the reader has a fundamental understanding of the device's basic operation. This document *does not* assume that the reader has any background in electronics or electrical engineering.

Where necessary, this document will explain the fundamental concepts required to disassemble, test, or modify the device. However, should the reader not feel totally comfortable performing the procedures described in this document, the reader *should not* perform any of the operations described.

2.0 DISASSEMBLING THE DEVICE

Note: The speakers are not needed for any part of this process so they can safely be removed and stowed in a safe location.

2.1 REMOVING THE FRONT BEZEL

2.1.1

Place the device on a hard, level surface so that the rear of the device is facing up and the bottom of the device is facing you. In order to prevent damage to the device, it is strongly recommended that you place some sort of towel or other cloth beneath the device to prevent it from being scuffed or scratched.



Figure 3: View of the WMLS11B for Step 2.2.1

2.1.2

The rear of the device has a sticker containing the LINKSYS logo, the device's serial number, and the device's Media Access Control (MAC) address. In order to properly disassemble the device, a hidden screw beneath this sticker must be removed.

Note: Using your finger, probe the right-hand edge of the sticker until an indentation is found. This indentation denotes the screw hole that must be exposed.



Figure 4: Locating the Hidden Screw Hole on the WMLS11B

2.1.3

Using a straight-edge razor or other pinpoint cutting device, remove the portion of the sticker that is covering the hole.

2.1.4

Once the screw hole is exposed, use a medium-size Phillips-head screwdriver to remove the screw. Place the screw in a secure location and mark it in some fashion that it belongs to this portion of the procedure. (*Note: marked Dixie cups work remarkably well for this purpose*)

2.1.5

Turn the device over so that the front of the device is facing up and the bottom of the device is facing you.



Figure 5: View of WMLS11B for Step 2.2.5

2.1.6

On the underside of the device, in the cut-away section where the audio and power connectors are located are two plastic clips. These clips are located on the left and right vertical wall of the device. Starting with the left-hand clip, use a small flat-head screwdriver to gently push this plastic clip outward to disengage it. Once disengaged, repeat the process on the right-hand side of the device.

At this point, the bottom of the device should begin to open as the front of the device's plastic casing separates from the rear of the casing. Gently, and simultaneously, pull the

top of the plastic casing up and push gently push away from you to disengage the casing's clips located near the top of the device. The device's front casing should easily be removed and can be stored in a safe location.



Figure 6: Disengaging the Plastic Retaining Clips

2.1.7: REASSEMBLY

Installation is the reverse of removal

2.2 REMOVING THE TOP SYSTEM BOARD (LCD SYSTEM BOARD)

2.2.1

The LCD system board is secured to the device's casing using four Phillips-type screws. These screws are located (clockwise) in the upper-right, lower-right, lower-left, and upper-left of the system board. Locate these screws now.

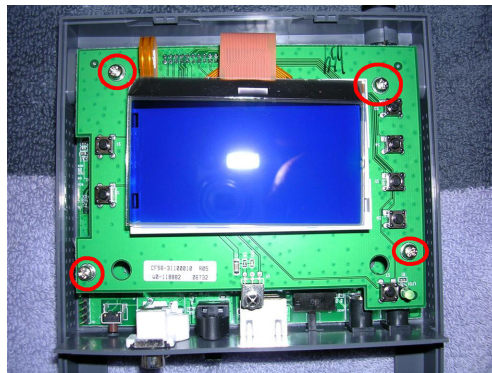


Figure 7: Location of Retaining Screws for Top System Board

2.2.2

Using a properly sized Phillips-type screwdriver, remove the FOUR (4) retaining screws located in **2.2. 1** and store them in a safe, marked location.

2.2.3

With the screws removed, gently pull the LCD system board directly and straight up to disconnect it from the main system board. (*Note: the LCD is not permanently affixed to its housing. Be careful not to let it dangle or become damaged during this process.*)

2.2.4

Store the LCD board in a safe, marked location.

2.2.5: REASSEMBLY OF THE TOP SYSTEM BOARD

Installation is the reverse of removal

2.3 REMOVING THE MAIN SYSTEM BOARD

Note: At the present time, I do not possess all of the tools required to completely remove the main system board. Total removal of the main system board should ordinarily *not* be required. There are no Integrated Circuits (ICs) or other important devices located on the obverse side of the board. Removal of the board should only be attempted with the proper tools.

2.3.1

Remove and stow the plastic cap from the Digital Output connector in a safe, marked location.

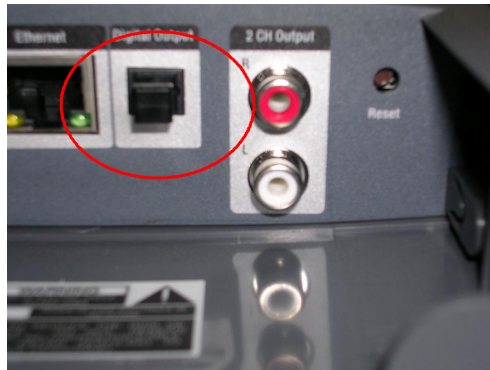


Figure 8: Location of Plastic Cap for Digital Output Connector

2.3.2

Using a pair of rigid tweezers, remove the glue covering the mounting points located in the upper-right and upper-left of the main system board. Be careful to ensure that you do not damage any of the surrounding electronics or system board traces.

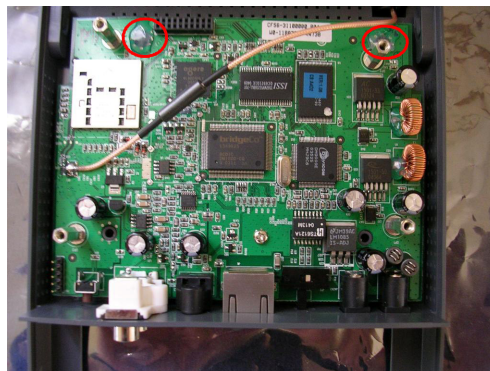


Figure 9: Location of Glue on Main System Board

2.3.3

Remove the screw located in the bottom-center of the main system board and stow it in a safe, marked location.

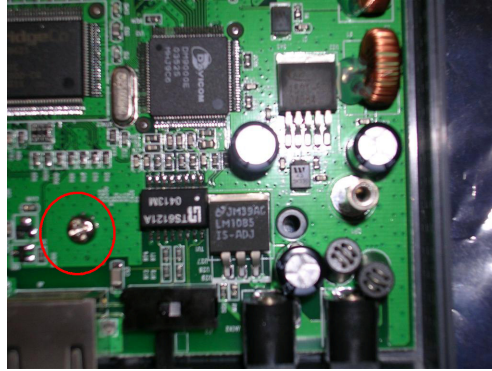


Figure 10: Location of Main System Board Retaining Screw

2.3.4

Using proper tooling, remove the screws that secure the two-channel audio output barrel connectors and the digital output connector to the device's casing. Store these screws in a safe, marked location.

2.3.5

Using a low-intensity (less than or equal to 20 watts of power), electrically-grounded soldering iron, remove the solder that secures the Wireless Ethernet antenna to the center-left of the main system board.

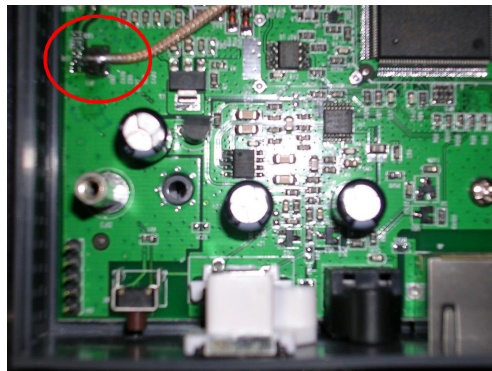


Figure 11: Location of Wireless Antenna Solder Pad

2.3.6

Remove and store the main system board in a safe, marked location.

2.3.7: REASSEMBLY OF MAIN SYSTEM BOARD

Installation is the reverse of removal

3.0 ANALYSIS OF THE WMLS11B WIRELESS MUSIC SYSTEM

3.1 ANALYSIS OF EXTERIOR OF WMLS11B

3.2 ANALYSIS OF THE TOP SYSTEM BOARD (LCD SYSTEM BOARD)

The top system board of the WMLS11B contains the LCD and pushbutton switches that form the functional user interface.

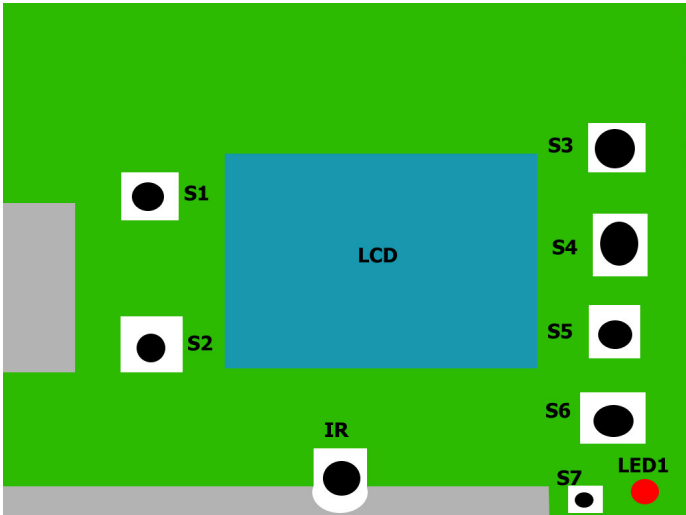


Figure 12: Generalized Map of Top System Board

3772-31100105

Table 1: Serial Number Found on Top System Board

CF56-31100010	R05
W0-11882	06732

Table 2: Sticker Markings on Top System Board

The top system board has a 32 pin connector that drives the LCD module. This connector is split between a two-pin set marked J2 and a thirty-one-pin set that form the parallel data path for driving data to the LCD.

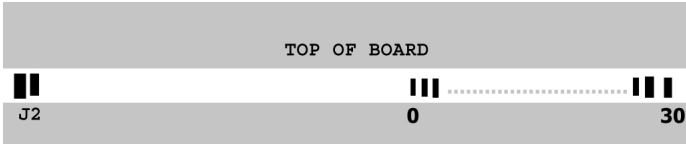


Figure 13: Pinout of LCD Data Cables

The larger (31-pin) of the two data cables is marked as follows:

VG-G120680-2BTLWA
D44002402

Table 3: Marking on Large LCD Ribbon Cable

The smaller (2-pin) of the two data cables is marked as follows:

VG-G120680-L V2.0

Table 4: Marking on Small LCD Ribbon Cable

3.3 ANALYSIS OF THE MAIN SYSTEM BOARD

The main system board houses all of the core logic that drives the WMLS11B. This board contains all of the primary logic ICs as well as the input and output connection headers.

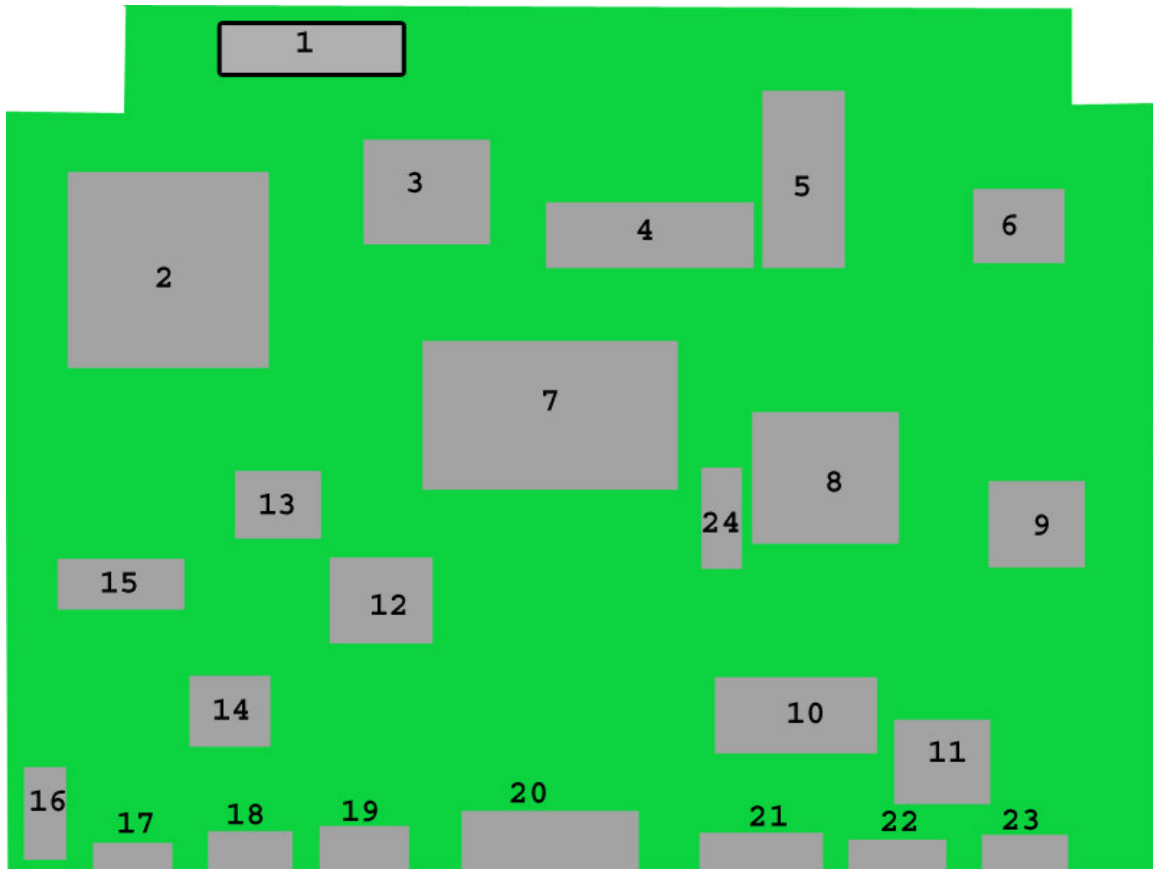


Figure 14: Generalized Map of Main System Board

The main system board contains the following Integrated Circuits and connectors, denoted by the number found on the map above:

(1) Pi connector for the LCD board

(2) AGERE
WL1141M1
41100318
025690D

(3) AGERE
WL600101LY
0408S
5288725

(4) ISSI
IS62WV51216BLL-70T
QC692101E 0409

(5) [Blue Sticker]
Ver: 1.06
CS: A4D2

[On-Chip]
MX
M040460
29LV320TTC-90
2I750300
TAIWAN

(6) AC
1501-33
03524

(7) bridgeCo
L5A9625
BCOIC
DM1000-CQ
G 0311

(8) DAVICOM
DM9000E
0352S
MHJ9C6

- (9) AC
1501-50
04084
- (10) HB
TS6121A
0413M
- (11) National Semiconductor
JM39AC
LM1085
IS-ADJ
- (12) AKM
438IVT
9N405
- (13) CY2302
SC-1
3462842
- (14) National Semiconductor
37AD
722M
- (15) ATC 3JC
1117
- (16) 5-pin Serial Connector
- (17) Reset
- (18) 2-Channel Audio Out
- (19) Digital Audio Out
- (20) Ethernet Connector
- (21) Ethernet Crossover Switch
- (22) Speaker DC Power Connector
- (23) Main System DC Power Connector
- (24) 25.000B40 (Main System microcontroller Oscillator)