LuckyStar LS-486e Rev:D Hardware Upgrade Guide

Revision 6

Preamble

This guide summarizes the experience of modifying LuckyStar LS-486e Rev:D motherboards. All upgrades described below are proven to work.
To follow this guide you have to have medium soldering skills, basic knowledge of electronics and appropriate tools. It's understood that if you have sufficient skill you already know or even have the tools you need to complete these upgrades.
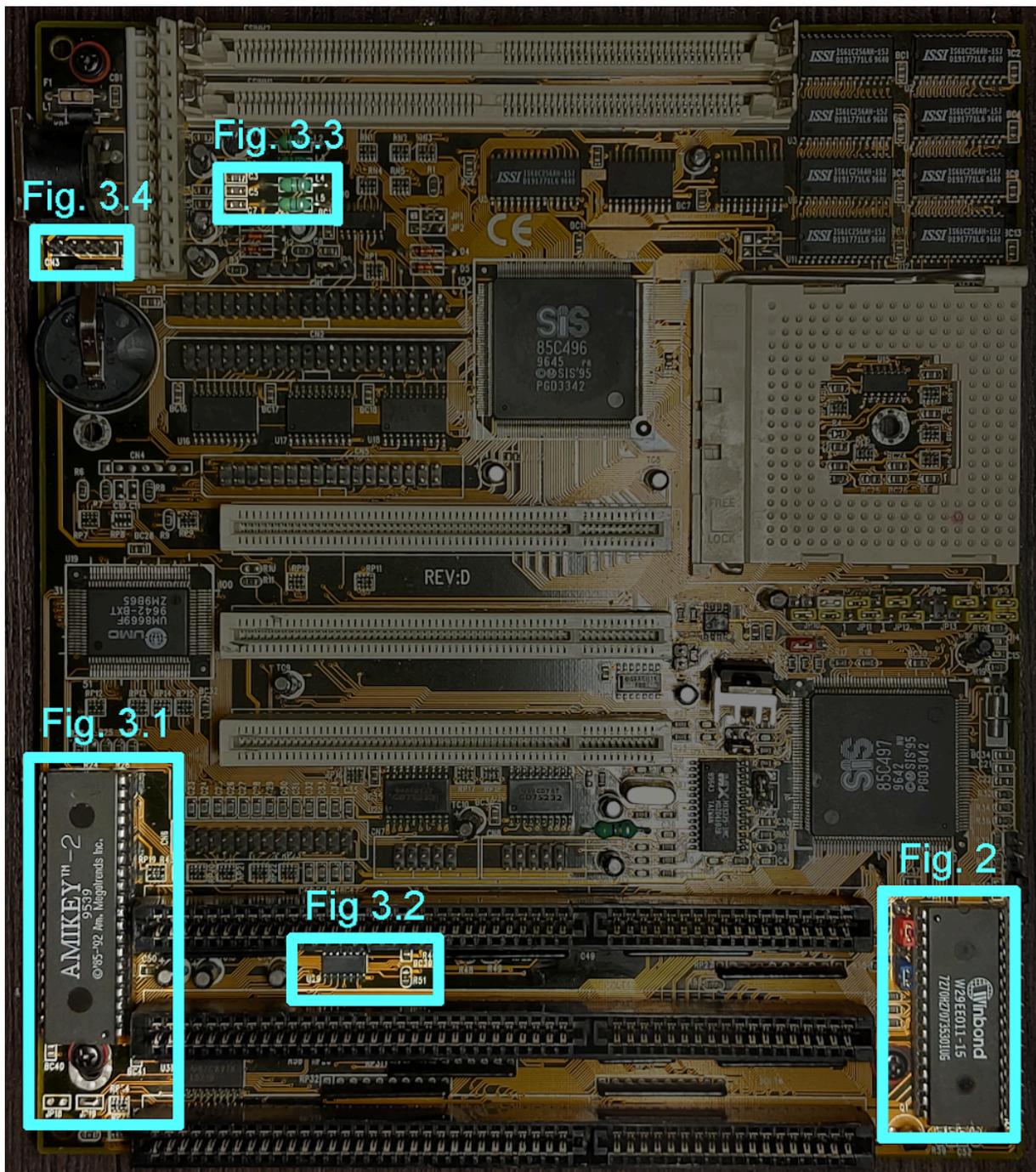
Changes overview

Fig. 1

Re-flashable BIOS EEPROM

Required materials

Part	Package	Qty.	Part No.	Known alt.
1Mbit 128K × 8 EEPROM chip	15.24 mm (0.600") DIP-32	1	W29EE011	28F010 AT29C010 AT49F010 SST39SF010A
Jumper header	2.54 mm (0.100") pitch 5-pin	1	68000-105HLF	
Jumper cap	2.54 mm (0.100") pitch 2-pin	2	SNT-100	

Upgrade procedure

Hardware

1. De-solder jumper wires from JP17 pins 2-3 and 4-5. Save them for later use.
2. Solder 5-pin header into JP17 footprint (see Fig. 2)
3. Set jumper caps between pins 2-3 and 5-6.

Fig. 2

Software

1. Boot DOS (no HIMEM.SYS allowed)
2. Read current firmware from ROM
   `awdflash.exe /Pn backup.bin /Sy`
3. Remove existing ROM chip from socket
4. Install new FLASH chip (W29EE011) into socket
5. Write current firmware to FLASH
   `awdflash.exe backup.bin /Py /Sn`
6. Reset or power-cycle computer

Jumper settings

JP17

1-2	+12V programming
2-3	**+5V programming ***
4-5	Write disabled *
5-6	**Write enabled**

*) factory default setting

For 29EE011, 29C010, 49F010, SST39SF010A
JP17: 2-3 closed, 5-6 closed

For 28E010
JP17: 1-2 closed, 5-6 closed

On-board PS/2 mouse

Required materials

Part	Package	Qty.	Part No.	Known alt.
Intel 8042 compatible MCU	15.24 mm (0.600") DIP-40	1	HT6542B	VT82C42 AMIKEY-2
6 inverter buffers with open-collector outputs	3.9 mm (0.150") SOIC-14	1	SN74LS06D	MM74HCT05M
4 × 10 kOhm resistor array	1206	1	CAY16-103J4	
4.7 kOhm resistor	0805	1	RCG08054K70JNEA	
47 pF capacitor	0805	2	C0805C470J5GAC	
470 µH inductor	3.0 × 6.8 mm axial	2	78F471J-RC	
Connector header	2.54 mm (0.100") pitch 5-pin	1	68000-105HTLF	

Proven non-working similar chips: Regional HT6542, Intel P8042 and any 8042-compatible chip with onboard ROM/OTP EPROM.

Upgrade procedure

Hardware

1. De-solder existing keyboard controller U28 (VIA VT82C41)
2. Solder resistor array RP19 (4 × 10 kOhm)
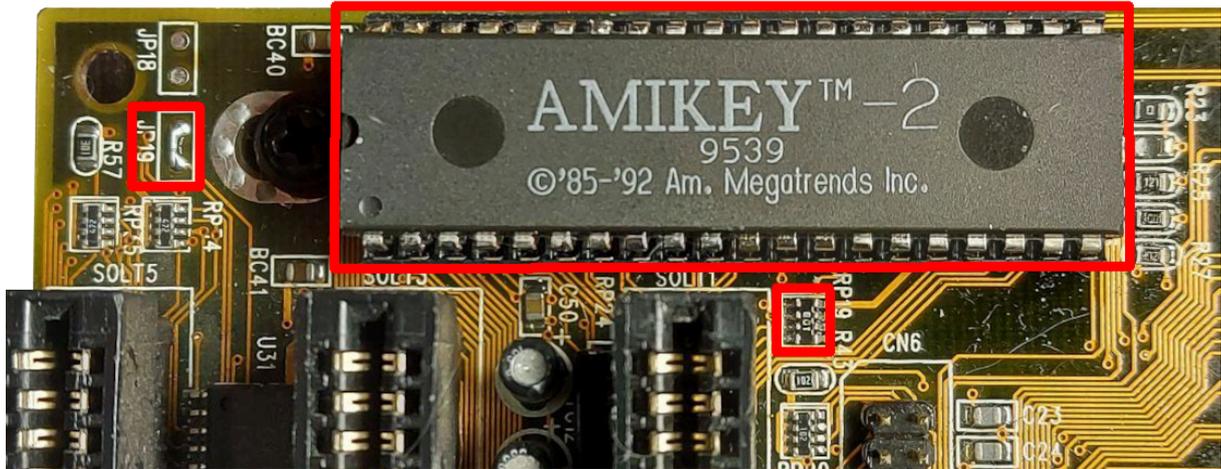3. Solder JP19 close with jumper wire as shown on Fig 3.1

Fig. 3.1

4. Solder resistor R51 (4.7 kOhm)
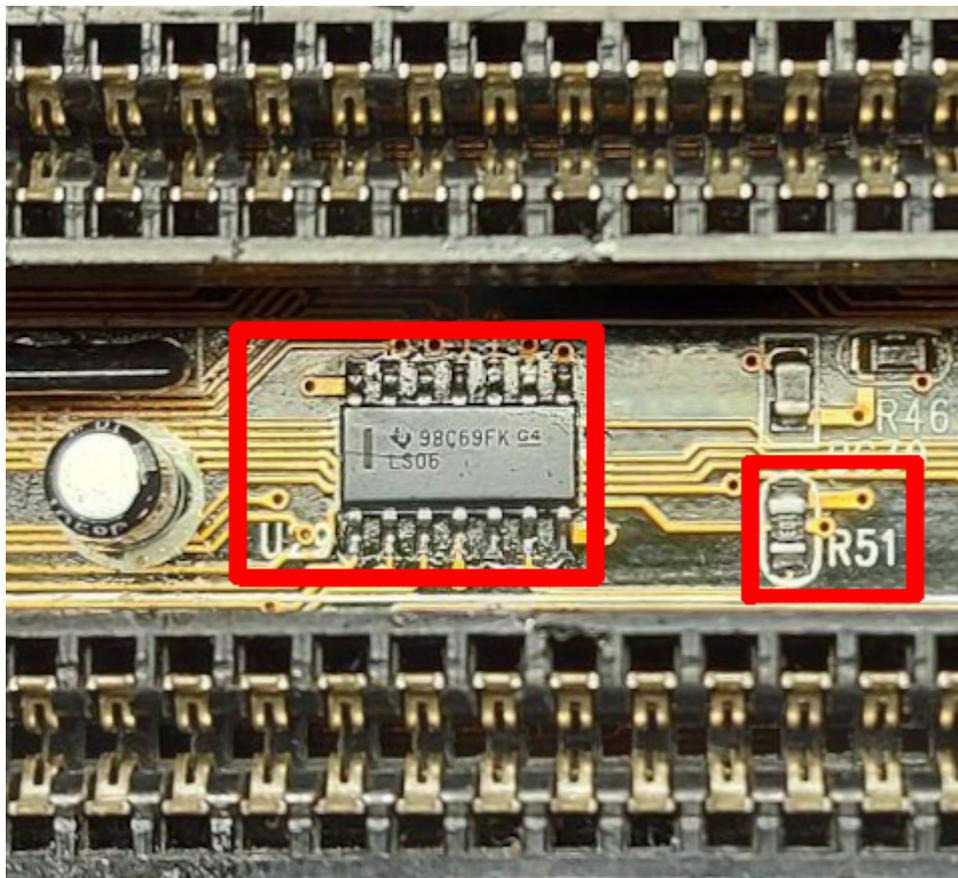5. Solder inverter buffers U29 (SN74LS06D) as shown on Fig 3.2

Fig. 3.2

Note   Due to interference of outputs once you solder inverter buffers you won't be able to revert back to VT82C41 keyboard controller unless you remove the inverter buffer chip completely.

6. Solder new keyboard controller U30 (HT6542B) as shown on Fig 3.1
7. Solder capacitors C5 and C7 (47 pF) as shown on Fig 3.4
8. Solder inductors L4 and L5 (470 µH) as shown on Fig 3.4

9. Solder jumper wire between pin 26 of U30 (HT6542B) and pin 24 of U28 (VIA VT82C41) on the bottom side as shown on Fig 3.3

Note Tying pin 26 of U30 to +5V is required for proper initialization of Holtek HT6542B. AMIKEY-2 was tested and worked fine without this option.
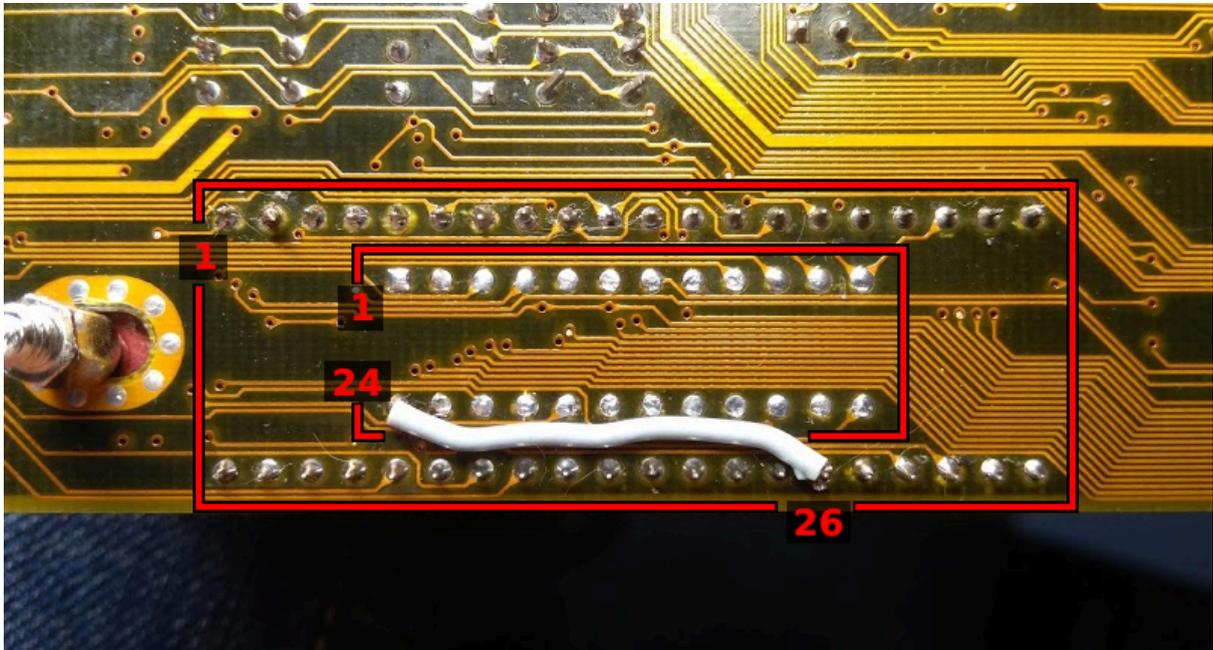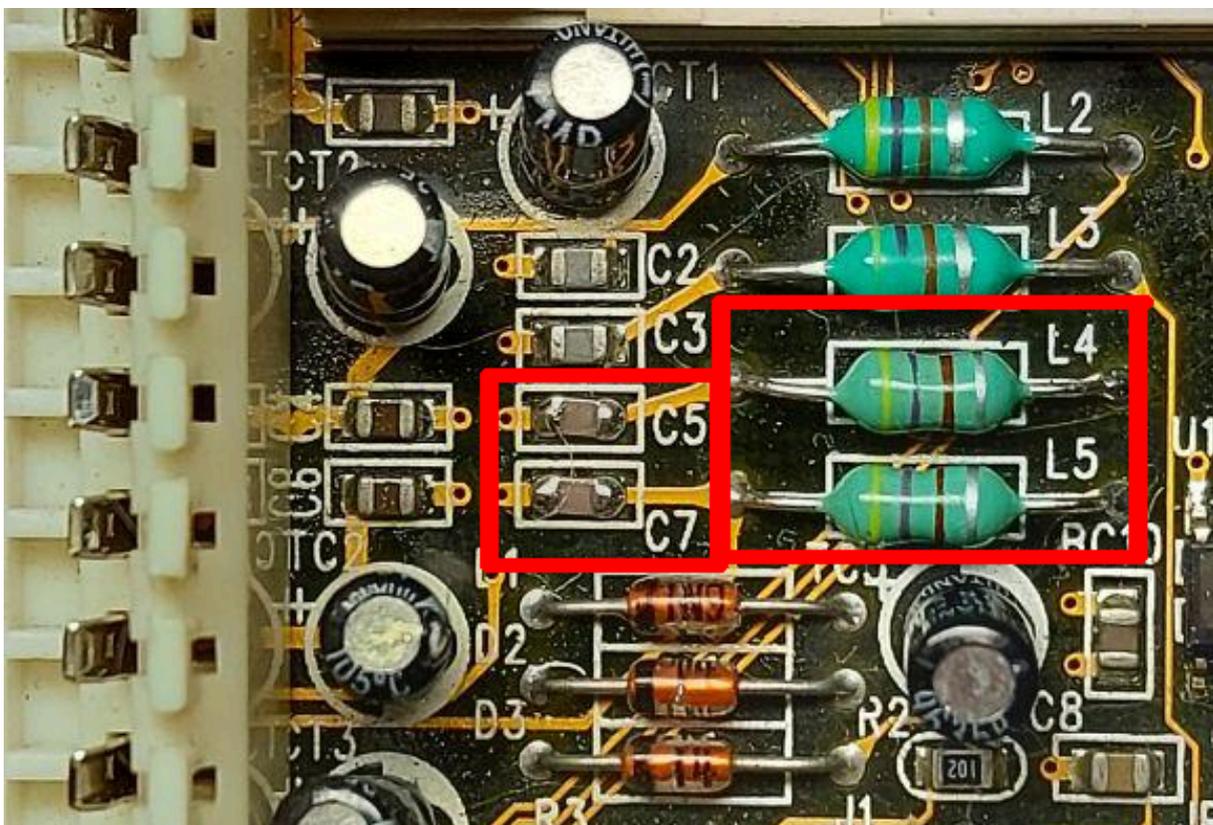

Fig. 3.3

Fig. 3.4

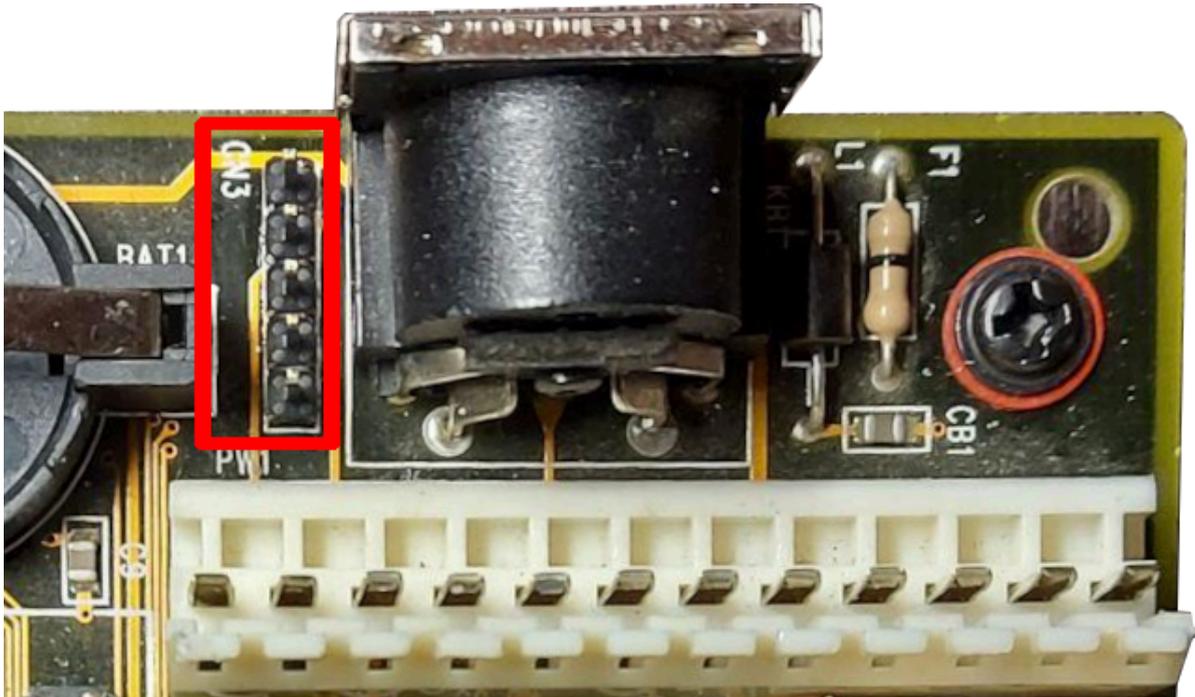10. Solder connector CN3 (5-pin header) as shown on Fig 3.5

Fig. 3.5

Software

1. Flash new firmware with PS/2 mouse support
   `awdflash 961021my.bin /Py backup.bin /Sy`
2. Reset or power-cycle the computer

Jumper settings

JP18

open	**Color display ***
closed	Monochrome display

*) factory default setting

JP19

open	IRQ12 disabled *
closed	**IRQ12 enabled**

*) factory default setting

Pinouts

CN3

1	Mouse data
2	Mouse clock
3	Not connected
4	Ground
5	+5V

BIOS

Note Don't be confused by the BIOS string. "UMC8669" is the name of a Super I/O chip used on this motherboard but not the chipset itself. "VT82C42" is the name of an implanted keyboard and mouse controller.

- [486E 96/10/24 UMC8669 VT82C42 Y2K PLUG & PLAY BIOS](#) (PS/2 mouse support)
- [486E 96/10/24 UMC8669 Y2K PLUG & PLAY BIOS](#) (no mouse support)

Credits

- [froller](#)
- [maxtherabbit](#)

License

Revisions

Rev.	Date	Changes
1	2021-03-19	
2	2021-03-29	● JP17 settings ● Keyboard controller alternatives ● Known non-working keyboard controller alternatives
3	2021-04-18	● R51 value changed to 4.7 kOhm to avoid mouse glitches
4	2021-04-23	● Jumper wire for Holtek HT6542B
5	2022-04-19	● RP19 value fixed in BOM ● Links to Mouser added
6	2023-12-19	● Y2K patch