Information on the EMSURAM Board

**Warning:**

**Any section that is labeled in red is NOT to be shown to anyone but GTS personnel. Sections in black can be copied and sent to customers as needed. Only send what is necessary for the customer to see. Please do not send this document as a whole to anyone. Thanks.**

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10. **Part Numbers**
    * EAUA--535400
    * FBPCB-0069
    * FBPCB-0122
    * FBPCB-0123
    * FBPCB-0205
    * FBPCB-0293
11. **Troubleshooting**

Use the first section to find the solution in the second section.

* 1. *Common Problems*
     1. The machine does not boot.
     2. Any setup issue such as not performing a set up or performing one improperly.
     3. The machine will not initialize.
  2. *Common Fixes*
     1. There are a few causes for this.
        1. The battery is dead and the board needs to be repaired.
        2. If this board is a newly installed board, check section IX for compatibility and section III for DIP switches.
     2. Any setup issue that cannot be solved by another issue (wiring problems, water leaks, etc.) is usually the EMSURAM board. In some cases in can be fixed with a RAM clear or hard boot, otherwise the board needs to be repaired. Typically one of the relays is bad.
     3. Check the DIP switches and compatibility information.

1. **DIP Switches**
   1. *EAUA--535400*
      1. Rotary switch RSWH is used for the board address. Set to A.
      2. Rotary switch RSWH is used for the board address. Set to 0.
      3. Set DSW1-1 through DSW1-3 to ON.
      4. DSW1-4 is used for CE spec machines. Set to OFF for non CE spec and ON for CE spec.
      5. Set DSW1-5 and DSW1-6 to OFF.
      6. DSW1-7 is used for UPS enabled machines. Set to OFF for no UPS and ON for machines with a UPS.
   2. *FBPCB-0069 and FBPCB-0122*
      1. DSW1 is used to set the board address.
         1. Set DSW1-1 to OFF.
         2. Set DSW1-2 to ON.
         3. Set DSW1-3 to OFF
         4. Set DSW1-4 through DSW1-8 to ON.
      2. DSW2
         1. Set DSW2-1 through DSW2-3 to ON.
         2. DSW2-4 is used for CE spec machines. Set to OFF for non CE spec and ON for CE spec.
         3. Set DSW2-5 and DSW2-6 to OFF.
         4. DSW2-7 is used for UPS enabled machines. Set to OFF for no UPS and ON for machines with a UPS.
         5. Set DSW2-8 to OFF.
      3. JP1 selects the RAM. Set to short 1 and 2. 1 and 2 are for 1M RAM, 2 and 3 are for 4M RAM.
      4. JP2 selects the RAM. Set to short 1 and 2.
   3. *FBPCB-0123, FBPCB-0205, and FBPCB-0293*
      1. RSWH is used for the board address. Set to A.
      2. RSWL is used for the board address. Set to 0.
      3. Set DSW1-1 through DSW1-3 to ON for both the 3X0 and 3X1 series saws.
      4. DSW1-4 is used for CE spec. Set it to OFF for non CE machines (3X0 series) and ON for CE machines (3X1 series).
      5. Set DSW1-5 and DSW1-6 for OFF.
      6. DSW1-7 is used for UPS. Set to ON for UPS machines and OFF for non UPS machines.
      7. Set DSW1-8 to OFF.
      8. Set JP1 to open for both the 3X0 and 3X1 series.
2. **Voltage Checks**
   1. *EAUA--535400*
      1. VR1 should be 4.5V. Check across CP1-CP12G. Adjust if needed.
      2. VR2 should be 3V. Check across CP2-CP12G. Adjust if needed.
      3. VR3 should be 5V. Check across CP3-CP12G. No adjustment needed, only confirm voltage.
   2. *FBPCB-0069 and FBPCB-0122*
      1. VR4 should be 2.58V. Check across CP2-CP12G. Adjust if needed.
      2. VR5 should be 4.5V. Check across CP3-CP12G. Adjust if necessary
      3. VR6 should be 4.5V. Check across CP1-CP12G. Adjust if needed.
      4. Check for 5V across CP5-CP12G. There is no adjustment.
3. **Removal and Installation**
   1. *Removal*
      1. Turn the power off.
      2. Remove the front panel of the machine revealing the control box.
      3. Remove the front cover of the control box.
      4. The EMSURAM board is usually the third board from the left in the card cage. It has four connectors going to it. A metal connector at the top label “EMIN”. Then 3 white plastic connectors, “SUIN” is 8 pins, “SUOUT” is 4 pins (only 2 are used), and a 2 pin connector.
      5. Remove all connections to the board,
      6. Remove the mounting screws.
      7. Carefully pull the board out of the slot, if it is difficult gently move the board up and down while pulling.
   2. *Installation*
      1. Turn off the power.
      2. Remove the old board if necessary. See section V-1 for help.
      3. Insert the board into the slot in the card cage. It is best to install the board in the same slot it came out of but it can be installed in any slot in the cage.
      4. Install the mounting screws and connectors. The connectors are all different so you cannot plug them into the wrong location.
      5. Install the control box panel and the front panel to the machine.
4. **Board Repair**
   1. *Battery Replacement*

There is only one battery for all of the board versions. The original battery is a 3.6V 60mAh Ni-Cd battery. GTS uses a 3.6V 70mAh Ni-cd battery for the replacement.

* + 1. Replacement procedure
       1. Remove the old battery.
       2. Clean the board contacts.
       3. Install the new battery; make sure it is in the right direction for polarity.
       4. You will have to do a hard boot for machines with EPROM software after this procedure.
  1. *Relays*

There are two relays on the board that have to do with the setup circuit. These freeze sometimes and need to be replaced. As a precaution, if replace both if you find a bad relay.

* + 1. Replacement Procedure
       1. Remove the old relay.
       2. Clean the contacts.
       3. Install the new relay.

1. **Hard Boot**

A hard boot reset the memory of the EMSURAM and basically restores default values to the data. It is needed after a battery replacement in order to reload the proper machine information into the saw. If you are replacing the EMSURAM in a machine with EPROM software it is needed for the same reason and any old data might be incompatible with the new machine. Machines with hard drives do not have this issue as the machine information is stored on the drive and not on EMSURAM board.

* 1. *Boot Procedure*

A hard boot will erase ALL data from the machine (EPROM machines only) be sure you have back up floppies or pictures of the setting screens and data before you do this.

* + 1. Install the board into the machine if needed. See section V-2 for help.
    2. Press and hold the enter key.
    3. Turn the machine on while holding the enter key. Continue doing so until you see text come up on the screen. This screen will vary depending on the machine type and software version. The procedure should be similar regardless.
    4. Selection Options

These options and settings will vary in type and order from saw to saw, the on screen instructions will guide you through the correct process. Just be sure to hit all of the points listed.

* + - 1. You will need to select the model number, serial number, microscope type, and spindle type of the machine. These are the 4 most important settings for the machine to operate.
      2. There are several other options listed on the machine. Common ones include NCS, BBD, flow sensors, and CE spec. There are several others that may be listed. For these, the chances are that if you do not know them, they are not on the machine. It is necessary to activate all of the proper options in order to maintain full functionality of the machine.
      3. Keep in mind that these options may be under several layers of screens. The on screen prompts will guide you through the process of selection.
  1. *Language Change*

After you have finished selecting the proper options, the machine will boot and come up to the main screen. The screen will be in Japanese. To change to your native language follow this procedure.

* + - 1. From the main menu press F8 (F7 if F8 is not available).
      2. Press F4.
      3. With the arrow keys scroll down to where is says “JAPANESE”.
      4. Press F1 until “ENGLISH” comes up.
      5. Press enter and the text should change to English.

1. **Testing the Board**
   * 1. Install the board into a machine. Refer to section V-1 for help.
     2. Testing the board in a HDD spec machine is best, as you will not have to do a hard boot. If you are using an EPROM spec machine, you will need to do a hard boot.
     3. If the machine is HDD spec, turn the power on. The machine should boot. If not check section II for help. If it does boot, skip to step 5.
     4. For EPROM spec machines, do a hard boot from section VII-1. If the machine will not boot check section II for help.
     5. Initialize the machine. Check section II if there are issues.
     6. Perform the following operations in this order if they are available on the machine.
        1. Blade exchange.
        2. Focus maintenance.
        3. Setup.
        4. Hairline adjustment.
        5. Rotational alignment.
     7. The test is complete. If the machine boots and performs a set up it is good.
2. **Compatibility Information**
   1. *3X0 Series*
      1. FBPCB-0293, FBPCB-0205 and FBPCB-0123 are compatible with all machines (320, 340, 350, 360, and 380) that have software 2.14 or later. Version 2.13 or earlier versions will need to be upgraded.
      2. FBPCB-0122 is compatible with all 3X0 machines.
      3. FBPCB-0069 is compatible with machines 320, 340, 350, and 360. It is unknown if it will work with the 380.
      4. EAUA--535400 is compatible with machines 320, 340 and 350. It is unknown if it will work with the 360 or 380.
   2. *3X1 Series*
      1. FBPCB-0293 and FBPCB-0205 are compatible with all machines (321, 341, 351, 361, and 381).
      2. FBPCB-0123 is compatible with all machines (321, 341, 351, 361, and 381). Not recommended for use as there seems to be memory issues in some cases.
      3. FBPCB-0122, FBPCB-0069, and EAUA--535400 are not compatible with any machines (321, 341, 351, 361, and 381).
   3. *6X0 Series*
      1. FBPCB-0122 is compatible with 2.12 or earlier.
      2. FBPCB-0123 is compatible with 2.13 or later.
   4. 6X1 Series
      1. FBPCB-0123 Seems to have some issues with 5.23 software. Not recommened for use in 651 saws, and maybe others. This probably applies to older board versions as well. The saw seems to have trouble loading memory.
      2. FBPCB-0123 and older not recommended for use in saws, may work for temporary use, see not above.