

SAFETY – IMPLEMENTED DURING NORMAL COURSE
OF PROVIDING SUPPORT

81142A-01A-S

S E R V I C E N O T E

Supersedes:
81142A-01-S

81142A – High Speed Pulse Generator

Serial Numbers: DE45B00101, DE45B00103, DE45B00104, DE45B00139, DE45B00142

POSSIBLE FIRE HAZARD

WARNING

HAZARD CLASS 3

There is an unlikely possibility of an instrument catching fire due to a short-circuit

Parts Required:

P/N	Description	Qty.
N4901-66577	Graphics Card for Intel PC Motherboard 845G	1
or		
N4901-69577	Graphics Card for Intel PC Motherboard 845G (refurb.)	1

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:	
SAFETY	
ACTION CATEGORY: X IMMEDIATELY	STANDARDS LABOR: 0.5 Hours
LOCATION CATEGORY: <input type="checkbox"/> CUSTOMER INSTALLABLE <input checked="" type="checkbox"/> ON-SITE <input checked="" type="checkbox"/> SERVICE CENTER <input type="checkbox"/> CHANNEL PARTNER	SERVICE INVENTORY: <input checked="" type="checkbox"/> RETURN <input type="checkbox"/> SCRAP <input type="checkbox"/> SEE TEXT
AVAILABILITY: ALWAYS	USED PARTS: <input checked="" type="checkbox"/> RETURN <input type="checkbox"/> SCRAP <input type="checkbox"/> SEE TEXT
<input type="checkbox"/> Calibration Required <input checked="" type="checkbox"/> Calibration NOT Required	NO CHARGE AVAILABLE UNTIL: 30-Sep-2017 or EOS (which ever occurs later)
	PRODUCT LINE: 24 AUTHOR: HK
ADDITIONAL INFORMATION:	

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Rev. 22



Agilent Technologies

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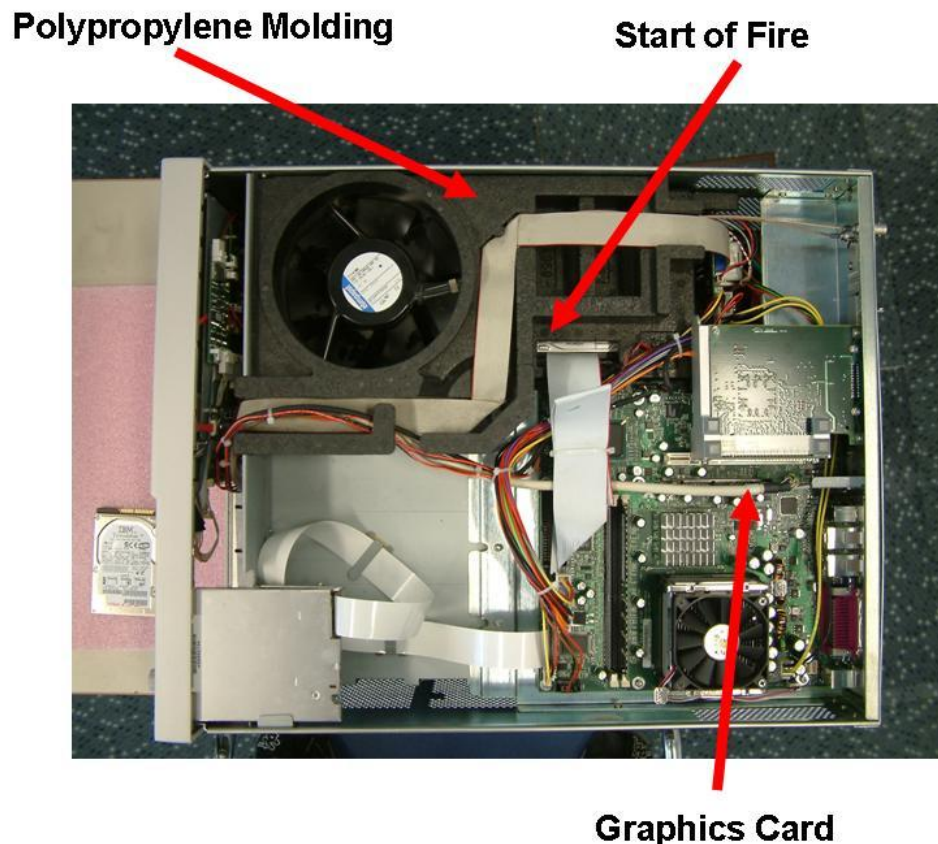
Situation:

Agilent was alerted by a customer of a serious event involving one of their 81142A units. The unit, which they had received in April 07, caught fire in a controlled lab environment. The customer reported a several inch large fire-ball inside the instrument. The fire was extinguished immediately with a fire extinguisher and did not cause damage outside the unit. The damaged product was shipped to Agilent for inspection.

The root-cause analysis leads to the following result:

A surface-mount ceramic capacitor suffered physical stress during the manufacturing process, leading the capacitor to crack. During operation this crack placed stress on the internal structure of the capacitor, and caused the plates to short together. (The plates are separated by very little space, made up of very thin insulators.) This caused the capacitor to have very low residual impedance, resulting in a very high current conducted through the capacitor and the 12V path on the motherboard for some period of time. The low impedance didn't lead to a current high enough for blowing the fuse. Therefore the higher current was available long enough to create a very high temperature ($T > 300^{\circ}\text{C}$). The high temperature ignited the polyurethane molding used to conduct the airflow for cooling through the instrument.

The following photo illustrates the layout of the instrument. It shows the polypropylene molding, the graphics card and the starting point of the fire.



All other potential root causes (cables, hard disk, fan, and modules) could be excluded after thorough investigation. Some parts of the equipment were even still operable.

Solution/Action:

The countermeasure for this issue is to exchange the graphics cards. The new graphics cards are produced with an improved manufacturing process eliminating the risk of micro cracks. They either have an additional fusing to protect the 12V path or they have eliminated the 12V path altogether. The graphics card can be exchanged by Agilent authorized personnel only.

The concerned part is the graphic board: N4901-66577 (exchange part: N4901-69577):

**What to do at the customer site:**

- Users verify that the instrument(s) corresponds to the above models and serial numbers (see first page).
- If the users have an affected model, they contact the nearest Agilent Customer Care Center to schedule a repair service to correct this problem. Information and phone numbers can be obtained at: <http://www.Agilent.com/find/contactus>.
- When scheduling, please reference to Service Note Number 81142A-01A-S

What to do at Agilent:

A customer letter and a list of customers with affected products are available. The Agilent CCC will send the letter to the customers with affected products. In some cases the letter will be delivered by the FE. The letter:

- Notifies the customers of the safety event
- Asks the customers to contact the Agilent CCC and schedule a repair date.

What to do at the Service Center:

Stick to the following instructions for the correct exchange of the 81142A.

Shock Hazard

Only service-trained personnel who are aware of the hazards involved should remove the cover and configure the instrument. Before you perform the graphics board installation disconnect the AC power and field wiring from the mainframe after switching off the unit.

Caution

STATIC SENSITIVE DEVICES: You must perform disassembly and reassembly at static safe work conditions only. To prevent damage to the electrical components in the mainframe and on the plug-in boards, observe anti-static techniques whenever handling a board!

Parts Needed

- p/n N4901-66577 “Graphics Card for INTEL 845G”
- or
- p/n N4901-69577 “Graphics Card for INTEL 845G” (refurbished part)

The Tools You Need

The following tools enable the fixings to be removed and replaced:

- Torx screwdriver, T-20 (case handles)
- Torx screwdriver, T-15 (rear feet)
- Torx screwdriver, T-10 (PC-boards)
- Small Phillips screwdriver (slot cover of new graphics card)

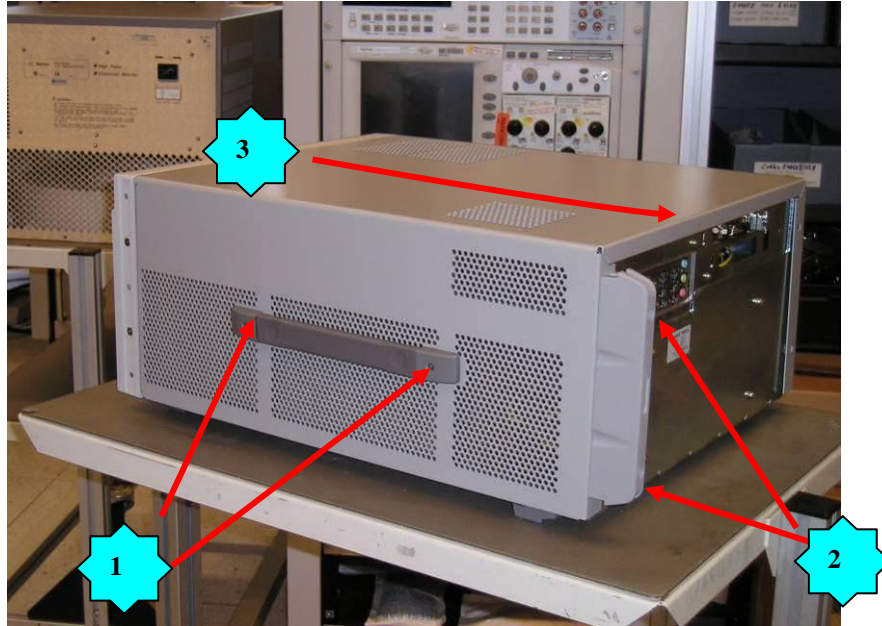
Prepare the Unit

- Save your settings. It is helpful to make data backups of your daily used settings.
- Switch OFF the power switch on the mainframe
- Disconnect the AC power cord from the mainframe
- Disconnect the cables connected to the instrument front panel

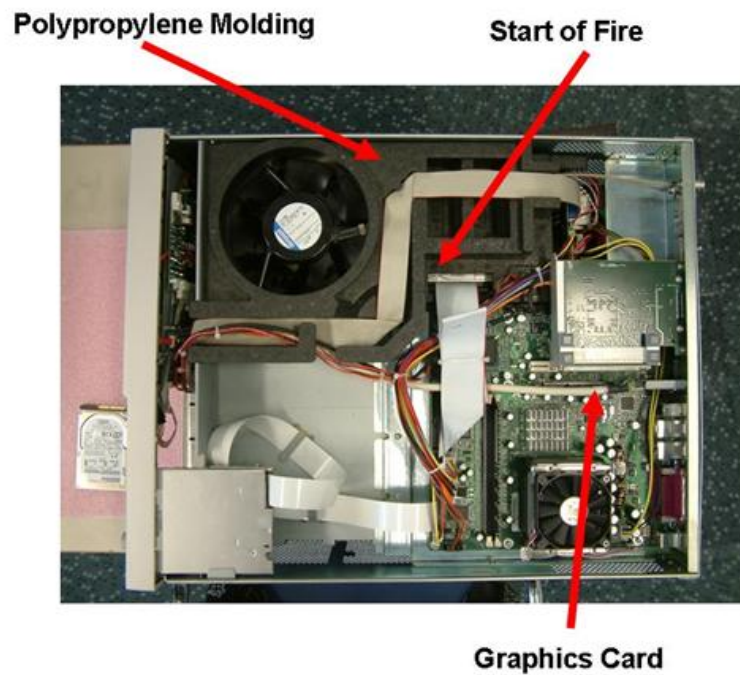
At the Agilent Service Center please execute the following steps:

1. Open unit

- Remove the carrying handles from each side of the case by removing two screws (Torx 20) each.
- Remove the rear feet by removing two screws (Torx 15) each
- Remove the top cover by slightly lifting it up the back and then pulling it backwards until the cover comes free of the front frame slots.



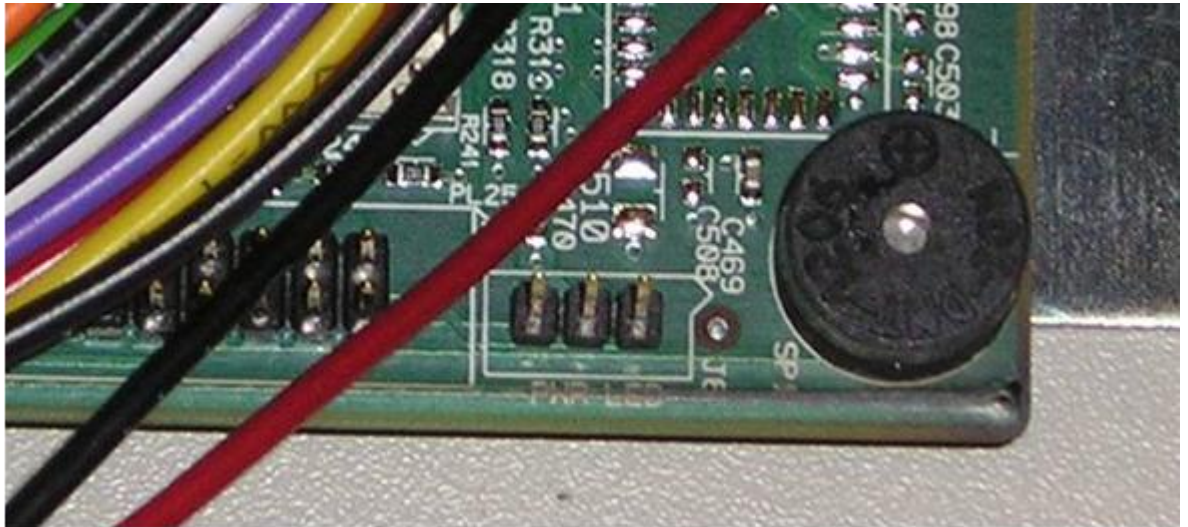
2. Inside View and Initial Inspection



3. Important: Check potential motherboard discoloring

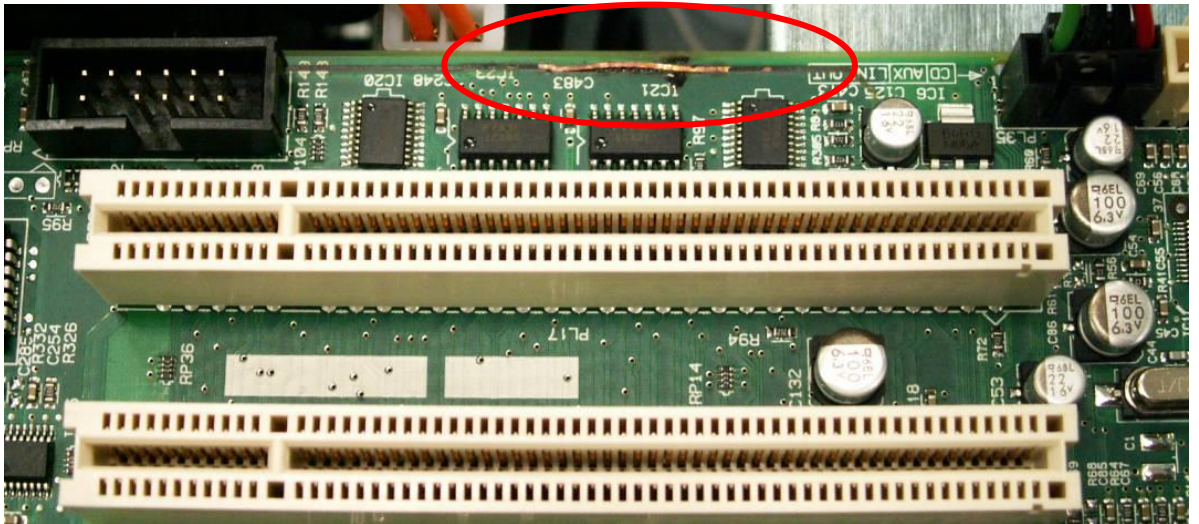
There might be discoloring on the PC motherboard in the shown corner (brown color). This can be ignored. The function or the quality of the motherboard is not affected by this.

Motherboard still considered being good – no exchange required:

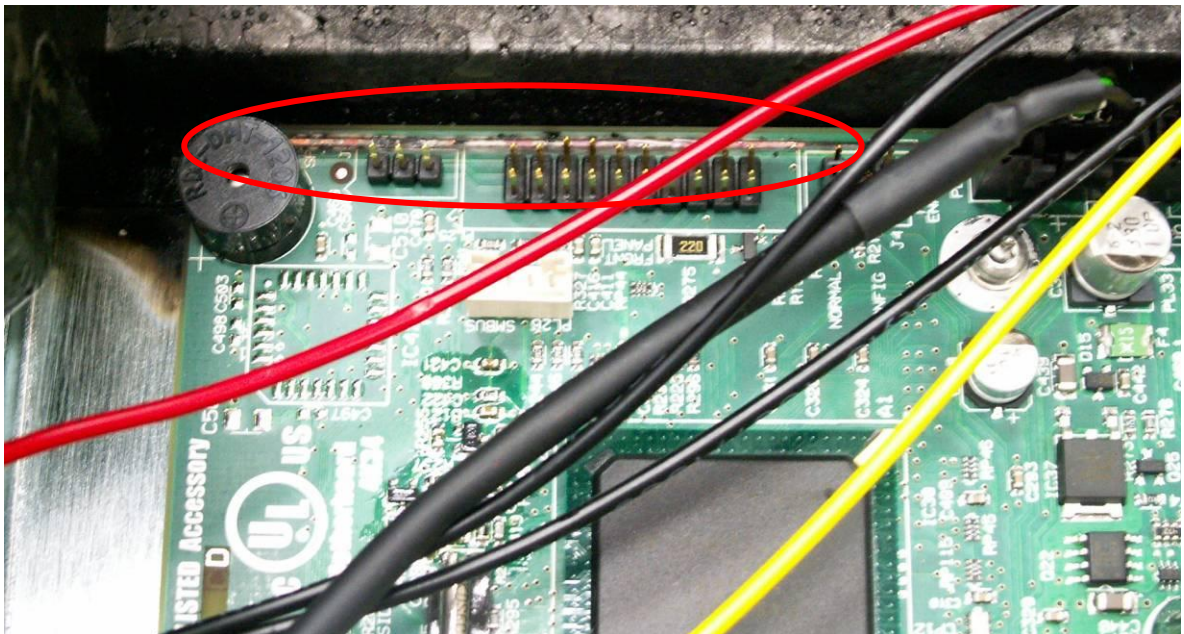


In very exceptional cases if you see traces of smoke or fire, the motherboard needs to be exchanged. In these cases typically the integrated display of the instrument would not work anymore. The exchange of the motherboards can only be done in the Service Center - onsite repair is not possible.

Motherboard considered being bad – please exchange:

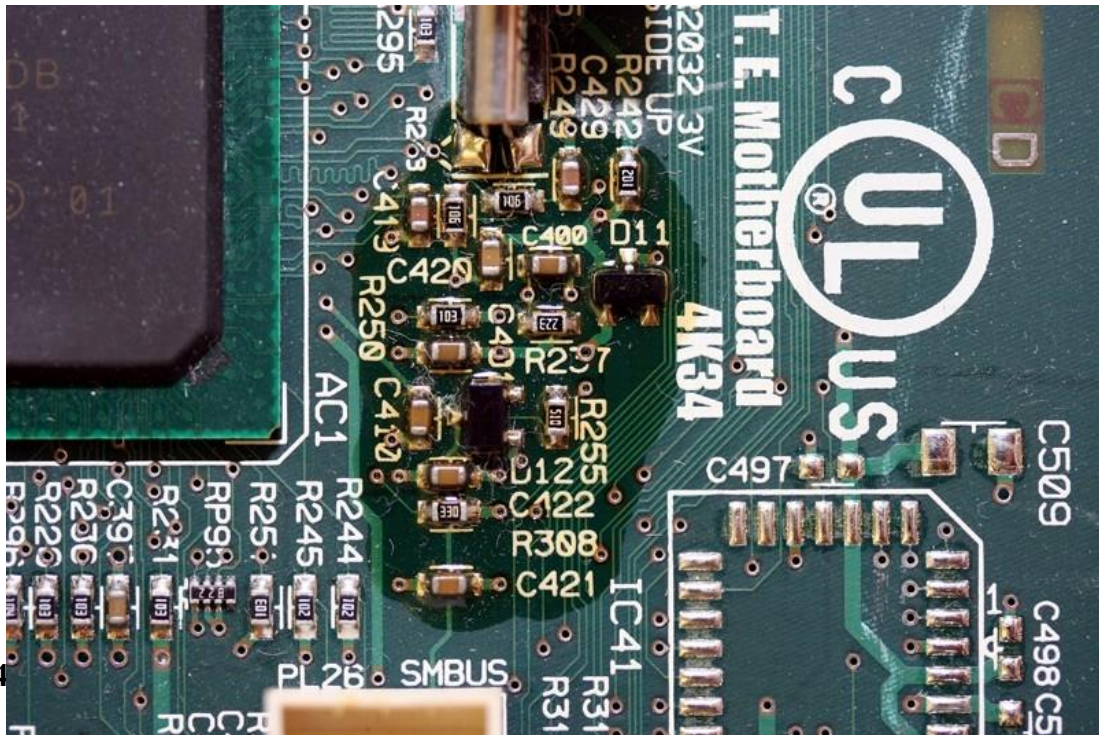


Motherboard considered being bad – please exchange:



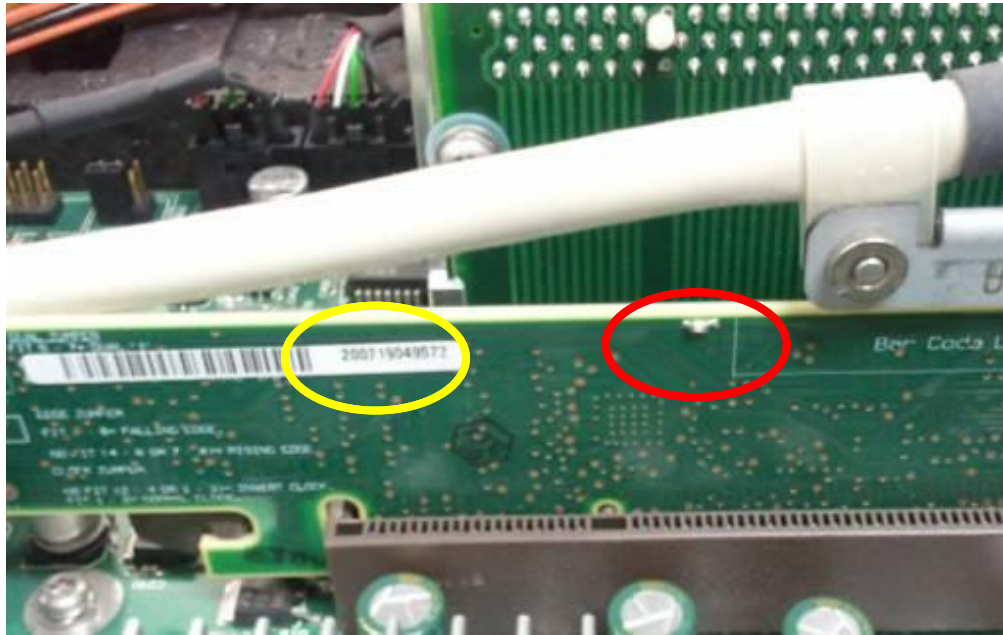
The following discoloring is intentional – no exchange required:

This effect is caused by an intentional sealing of a high impedance area to avoid issues in environments with a high degree of humidity. No exchange of the motherboard is required here.



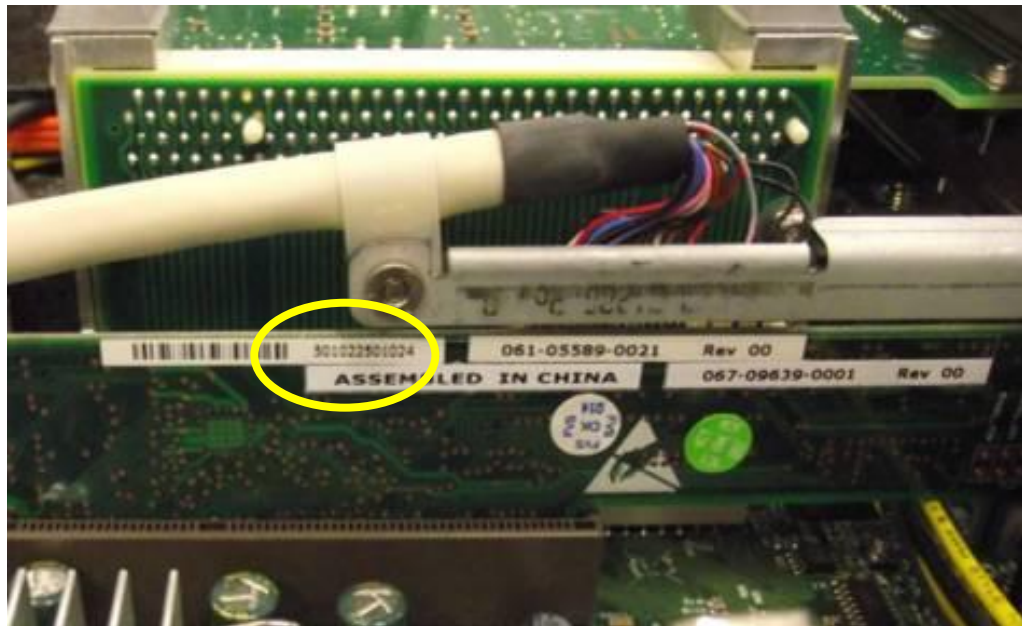
Please check if one of the following 2 graphic board samples is inside the unit. If you find one of the 2, then the correct board is installed and the unit is safe and OK:

- Sample #1 (Revision NM2501):



The board has a fuse on top (red circle) and a serial number (yellow circle) starting with 200... In the case above it is 200719049572)

- Sample #2 (Revision NM2502):

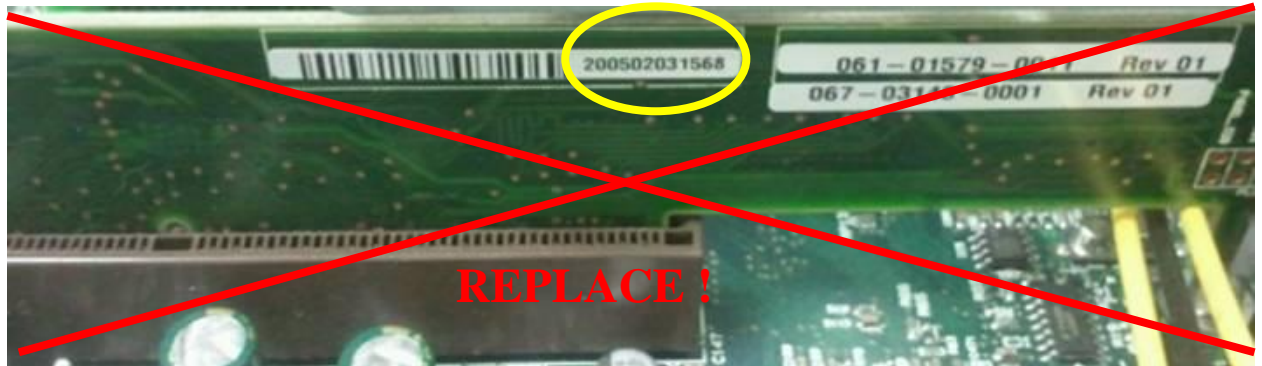


The board has a serial number (yellow circle) **NOT** starting with 200... In the case above it is: 501022501024.

If the graphic board

shows a serial number starting with 200... AND no fuse is visible

it is potentially **hazardous** and the **unit must be set out of operation** until the graphic board is replaced (part number: N4901-66577 or N4901-69577). The graphic board can be exchanged without impacting the instrument's performance.



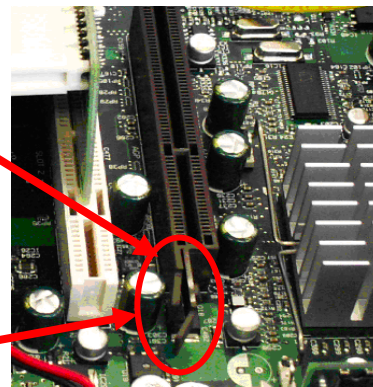
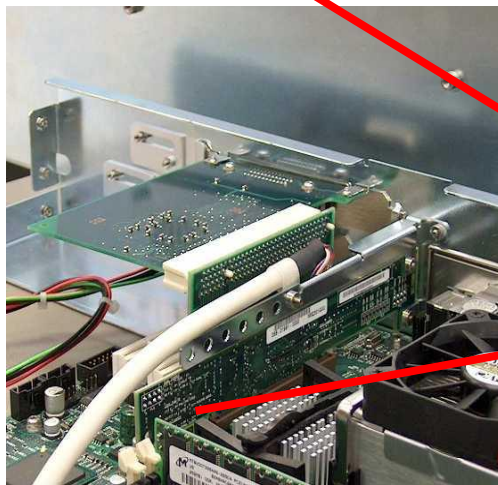
5. Replacement of Graphics Card

Handle with care and avoid all mechanical stress!

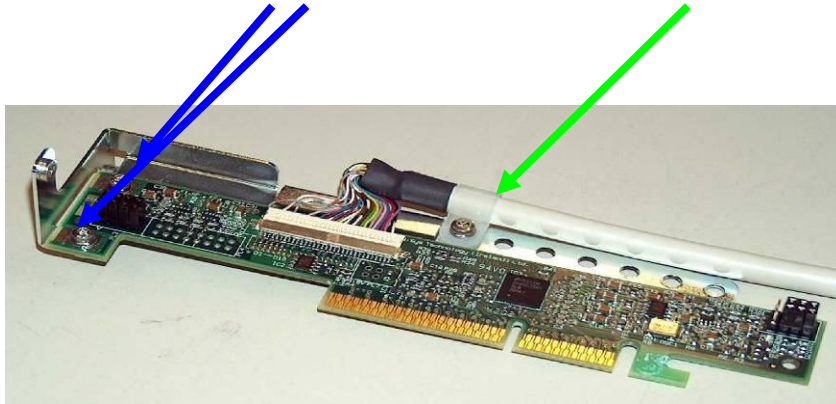
- For easier access, unplug the HDD cable from the PC motherboard connector
- Remove two Torx 10 screws from the ATX shelf on the back panel



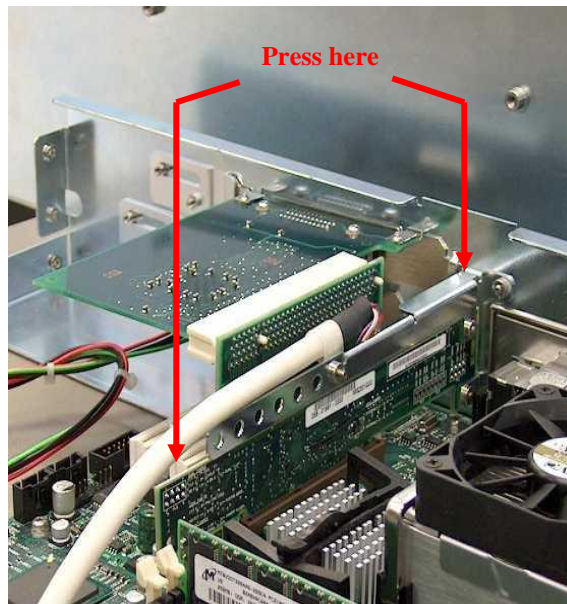
- Bend away the AGP slot's graphics card holder (circled red) with your right hand's index finger and carefully remove the graphics card, using both hands



- Unplug the graphics cable from the graphics card (green arrow)
- From the new graphics card remove the big slot bracket (2 blue arrows)



- Attach the new graphics card to the small slot bracket, using the existing Torx screws
- Connect the graphics cable to the connector on the graphics card
- Insert the graphics card into the AGP slot of the motherboard and carefully press it into the socket by pressing on the slot bracket **ONLY** directly on top of where the screws are **and** at the far back of the card



- Make sure that the card sits correctly in its slot. No copper should be seen from the connector
- Reconnect the HDD cable into the “Primary IDE” slot
- If the cable for the ATX power switch has become loose, connect it as shown below (upper row of the post connectors, with the red wire into the third connector from the left, the black wire into the fourth one)



Now cautiously reseal the cover of the unit by carefully sliding it into the slots of the front frame, but do not fasten the screws (yet).

6. Functional Verification

Caution

Make sure to not clamp the red display cable in between the cover and the front frame

- Connect the AC power cord and switch on the unit
- Power up the unit and wait for the GUI to appear:
- If the GUI shows up and no error messages are displayed, the card replacement was successful. Power down the unit.
- If the unit does not boot successfully or if an error message occurs after boot up, indicating that there is missing hardware, one or more of the plugin-cards on the mother board might have become loose.
Power down the unit, open up the cover and try reseating all of the PCI cards and take special care of the memory module. Then power up the unit to verify a proper boot up.
- Once the proper function of the new graphics card is verified, power down the unit (if not already done) and tighten the screws that hold the rear feet and the handles.
- If a calibration seal had to be broken for opening the unit replace the seal with a new one.
- A complete Calibration / Performance Verification is NOT necessary, as there was nothing done affecting the original instrument calibration

Important

Do not forget to keep track of the product and serial number of the reworked units.