

Repaired VA Module Test Procedure (Draft)

C.Perry 06feb02, 08feb02

A) STARTUP

1/ VA-DAQ software

Boot PC (with no floppy in drive)

Select Windows 95/98 from list of operating systems

Log on as 'Perry'

Double click LabView icon on desktop: *LabView start window appears*

Click "Open VI" button: *"Choose the VI to open" dialog box appears*

Click the 'up one level' icon: *to get to Desktop level*

Double click "vata.llb" filename: *File dialog box appears with list of VI names*

Double click "VA-DAQ VA-TA" VI name: *Load window appears*

...wait...zzz... : *... then VA-DAQ front panel appears*

2/ Hardware

Check Centronics cable is plugged into both VA-DAQ and PC.

Connect the appropriate adapter board to the ribbon cable from the VA-DAQ (with no VA module on adapter).

Turn on the triple-output power supply (voltages are preset and taped; output switches both 'on').

3/ Setup

Insert floppy with setup files in drive A:

Click 'run' icon (right arrow, at top left) on VA-DAQ front panel: *Initialization and calibration window appears, and then a file dialog box.*

Double click "My computer"

Double click "Floppy A:"

Double click filename "vadaq.ini": *Dialog box disappears*

...wait... : *Greyed-out "ok" button turns solid*

All red lights should have turned green.

If not:

- Check connections and power
- Click “ok”
- If any red light is on, click adjacent “Clear...” button
- Retry calibration by clicking on “Initialize and calibrate” in list

Click “ok”: *returns to VA-DAQ front panel*

Caution - a general note on the user interface: if a menu item has to be selected a second time, it is necessary to first click the first blank item, before clicking the wanted item again. Otherwise, nothing happens...

Click “VA-DAQ Setup” on list: *VA-DAQ Setup panel appears*

Click “Calibrate VA current” button: *Box with message “Disconnect VA” appears*

Note: if a VA module is fitted, unplug it

Click “ok”: *Message changes to “Reconnect VA”*

Click “ok”: *Returns to VA-DAQ setup panel*

Click “Read definition file” button: *Definition file panel appears, then file dialog box*

Doble click “VA32_HDR11_test.def” file name: *Dialog box disappears*

Note: file is found on Floppy A:

...wait... : Red light should turn green

Completion with error will be indicated by a message in the text box. Usual cause is the adapter board being disconnected. If so:

- Reconnect
- Click “ok”
- Click “Read definition file” button, and try again

Click “ok”: *Returns to VA-DAQ setup panel*

Fit a good VA module for setup (see below)

Click “Force bias and supply” button: “Force biases...” panel appears

...wait...: Greyed-out “Return” button turns solid

Note if red light turns green, or any message that appears

Click “Return”: *Returns to VA-DAQ setup panel*

- If light turned green, setup is *successful*
 - If message stated something other than “ibuf” “prebias” or “shabias” was not accepted, setup has *failed*.
 - Otherwise continue:
Click “Adjust VA Biasses” button: *“Bias monitoring and adjustments” panel appears*
Look in bias current (right hand) column at values for “ibuf”, “prebias” & “shabias”
 - If these are approximately 200, 600, 100 uA, setup is *successful*
 - Otherwise setup has *failed*
- Click “Accept biases: ok” button (right hand): *Returns to VA-DAQ setup panel*

Click “Return” button: *Returns to VA-DAQ front panel*

Remove VA module (see below)

B) CHANGING A VA MODULE

Start at the VA-DAQ front panel

Click “Swap VA chip/board”: *“Swap VA chip/board” message box appears*

Power is now not present at adapter board

Remove and/or insert VA module

Click “ok” button: *Returns to VA-DAQ front panel*

The red current limit light may come on if the module is faulty.

In this case no further tests can be done.

Swap to another module.

Click the “Clear” button by the current limit light.

If the light remains red, this module too is faulty.

Handling VA module:

- Press in by the two connector edges (not in the middle on the black epoxy).
- The arrow points to the side marked with a semicircle on the adapter board (left in the normal layout of the equipment).
- Pull out carefully and evenly without excessive tilt (which bends connector pins).
- A DIL extractor tool is effective in removing modules.
- Hold the adapter board down firmly when removing the module.

The module serial number is on the underside. Only the last 4 digits need to be recorded.

C) TEST #1: FOR REPAIR

1/ Setup

Connect adapter board #2 (freestanding)

Set the hot air gun to moderate airflow and 70C temperature.

Notes on using the hot air gun:

- Temperature setting is indicated by a suffix A while being adjusted; it then changes to C to show the actual temperature.
- Too much airflow will blow away the adapter board!
- It should be left on while testing, placed where it won't cook things
- To heat module, hold so nozzle is close to but not touching the module, and air is flowing both over the top and underneath. I use a piece of card held at the opposite side of the module to improve the heating and also keep hot air from adjacent sheets of modules.

Click "Gains and pedestals" button: *"Gains and pedestals" panel appears*

Enter 0.6 in bottom left box: "Wanted delay (us)".

Press enter key: *Value about 0.6 should appear in adjacent box*

Click "Return" button

Click "Channel oscilloscope" button: *"Oscilloscope" panel appears*

Make settings down left hand side (top to bottom):

- "Resolution": click down arrow to change "Coarse" to "Fine"
- "Start time (us)": enter 0 in box, press enter key
("End time (us)" - skip)
- "Calibration step (fC)": enter 64 in box, press enter: *about -25000 appears to right*
- "Averaging points": enter 1 in box, press enter key
("Channel" - skip)

Make setting on top edge:

- "Wait ms": enter 10 in box, press enter key *(Note: box is grey, not white)*

Click "Return" button

2/ VA test

Apply 6mm of 10mm wide black tape to the centre of epoxy on top of VA module.

Fit VA module (see above)

Click "Pedestals and noise" button: *"Pedestals and noise" panel appears*

Click "Run" button

...wait... : *green light turns red, then back to green, & data is displayed*

Pedestals should all be within range +/- 100mV

Noise should all be within range 0.20 to 0.40mV

If noise outside limits, click "Run" again (values sometime affected by interference)

Click "Return" button

Click "Channel oscilloscope" button: "*Oscilloscope*" panel appears

Note if trace is of normal shape

Note measurements reported at right side: "Peaking (mV)" & "Peaking(us)"

NB These values are not accurate, but are adequate to show changes

Apply hot air to chip for 30s

Watch trace for changes

Note if measurements have changed as expected:

- peak amplitude decreased by ~100mV (4%)
- peak time increased by ~ 0.06us (9%)

Reject module for any major deviation from normal behaviour

Click "Return" button.

3/ Conduct of testing

As the module is removed, read the serial number and add it to the 'good' or 'bad' list.

For good modules, no other data need be recorded.

For bad modules, record the nature and approximate temperature of the failure (eg: cold, during warm up, warm, hot), and any other anomalies.

Put the module according to the result on one of two sheets of antistatic foam.

It is expedient to make the layout of the lists correspond to the layout of the modules on the foam sheets. This makes it easy to notice and correct errors, such as putting the module in the wrong place or not writing down the serial number.

D) TEST #2: FOR DEAD CHANNELS

1/ Setup

Connect adapter board #3 (mounted on box lid)

Capacitor array must be fitted to input connector and charge injection header

Click "Gains and pedestals" button: *"Gains and pedestals" panel appears*

Enter 0.6 in bottom left box: "Wanted delay (us)".

Press enter key: *Value about 0.6 should appear in adjacent box*

Click "Return" button

2/ VA test

Fit VA module to be tested (see above)

Click "Gains and pedestals" button: *"Gains and pedestals" panel appears*

Click "Run" button

...wait... : Progress bar turns red, then the new data appears on the graphs

Examine gain plot

Channels from 2 to 18 should have equal gains (value 0.09 to 0.12).

Other channels should be approximately zero

Note: the channel numbers on plot are at the left edge of the bar representing the channel. So a good plot appears to be at a uniform level from number 2 to 19.

Any other abnormal result is also grounds for rejecting the module.

Click "Return" button

3/ Conduct of testing

As the module is removed, read the serial number and add it to the 'good' or 'bad' list.

For good modules, no other data need be recorded.

For bad modules, record the channel numbers which are bad, and any other anomalies.

Put the module according to the result on one of two sheets of antistatic foam.

It is expedient to make the layout of the lists correspond to the layout of the modules on the foam sheets. This makes it easy to notice and correct errors, such as putting the module in the wrong place or not writing down the serial number.