

# Linac Modulator Interface Chassis Modification

## Description of Work and Validation Steps (ref: WRQ # 16376) Alex Cours – 1/20/05

The Interface chassis located in rack L\*:CO:RA1 (where "\*" means "1" for L1, etc.) houses ten PC boards that include buffer amplifiers for the most of the modulator analog readback signals, optical-to-TTL converters for the "Thyratron Fire" and WG switch control signals, EMI power supply status control board, and the modulator Local/Remote control board. Also, it provides +15 VDC to the modulator ACIS chassis relay contacts that control the modulator external interlock. The modification is required in order to improve the klystron focusing magnet voltage and current readback and interlock performance.

The personnel who will perform this work must be aware that the Interface chassis is a "Critical Component" since it is a part of the Linac ACIS system, and that the work will require a very high level of attention and caution. The work must be logged in the corresponding modulator Logbook.

A properly documented verification by a responsible system engineer and the regular ACIS validation at start-up are mandatory.

Originator: A. Cours, ASD-RF Group \_\_\_\_\_ Date \_\_\_\_\_

RF Group Leader: G. Pile \_\_\_\_\_ Date \_\_\_\_\_

## Procedure

1. Shut the Modulator (L\_\_\_) completely OFF.

**The next step is considered to be a Cat.#1 work. Proper PPE must be used.  
A second person must be present as a Safety watch.**

2. Open Disconnect Switch DS-M\_\_\_ (that supplies control power to the modulator) located on the North wall behind the modulator. Visually inspect the switch, verify that the switch is really open. LOTO the switch.

The switches to be opened for work on a particular modulator are:

L1 - Disconnect Switch DS-M1,  
L2 - Disconnect Switch DS-M2,  
L3 - Disconnect Switch DS-M3,  
L4 - Disconnect Switch DS-M4,  
L5 - Disconnect Switch DS-M5.

Step #2 performed by: \_\_\_\_\_ Date \_\_\_\_\_

Safety watch: \_\_\_\_\_ Date \_\_\_\_\_

**Work within rack L\*:CO:RA1 is considered to be a Cat.#0 work since the Emergency Power system is still ON, and 120 VAC may be present on the Allen-Bradley monitor rear panel connector.**

**Use proper PPE.**

1. Disconnect all cables from the Interface chassis (Chassis #\_\_\_\_\_).
2. Remove the chassis from the rack and place it on your work bench/desk.
3. Using proper tools and PPE, perform rewiring in accordance with the attached drawing: "Focus Current and Voltage Readback Wiring Modification".

**Pay special attention to connectors P24 ("ACIS"), P25 ("±15V Supply") and inner connector "F" ("EMI Status Driver").**

4. Visually verify proper wiring of the focusing magnet circuits.
5. Using a Fluke ohm-meter, verify proper wiring of the focusing magnet circuits.
6. Visually verify that the ACIS related circuits have not been disturbed (no shorts, no cut wires, etc.). Use drawing number X.1.2.1.3.1.3.16 ("Interface Chassis Wiring Diagram") as a reference.
7. Using a Fluke ohm-meter, verify that the ACIS related circuits have not been disturbed (no shorts, no cut wires, etc.). Use drawing number X.1.2.1.3.1.3.16 ("Interface Chassis Wiring Diagram") as a reference.
8. Have the system engineer independently verify the work completion at this stage.

Rewiring performed by: \_\_\_\_\_ Date \_\_\_\_\_

Verified by the system engineer: \_\_\_\_\_ Date \_\_\_\_\_

9. Close the chassis, install it into the rack, and reconnect all cables **excluding the ACIS cable.**
10. Remove your lock from the Disconnect Switch. If no other locks are present on the switch, turn Control power ON (close the switch).
11. Make sure that the ±15 VDC power supply is ON.

12. Measure voltage between contacts A and B of connector P24 located on the rear panel of the Interface chassis. The voltage must be  $+15 \pm 0.2$  VDC on pin A vs. pin B. Have the responsible system engineer verify it.

Voltage to ACIS chassis measured by: \_\_\_\_\_ Date \_\_\_\_\_

Verified by the system engineer: \_\_\_\_\_ Date \_\_\_\_\_

**13. Reconnect the ACIS cable.**

14. During the Start-up, observe the ACIS chassis LED's. Make sure that at least one of them is ON. If not, contact J. Forrestal and A. Cours.
15. As soon as it becomes possible, bring the modulator ON up to "Magnets ON" state, check voltage and current readbacks and interlocks.
16. Log the work performed and voltage and current values (measured directly and the EPICS screen numbers) in the modulator Logbook. Place a copy of the Modification drawing that is attached to this Procedure into the Logbook.
17. Sign off this sheet and file it in the RF Group files.

Work performed by: \_\_\_\_\_ Date \_\_\_\_\_

Verified by the system engineer: \_\_\_\_\_ Date \_\_\_\_\_

**Required drawings:**

1. Interface Chassis Wiring Diagram (Drawing # X.1.2.1.3.1.3.16)
2. Focus Current and Voltage Readback Wiring Modification drawing.