LOI-4

March 12, 2007

PROGRESS SUMMARY

(Hall 2 until February 23, 2007)

Y Irie

for the LOI collaboration group

After move to the Hall 2, cabling, plumbing and partitioning works for the new arrangement of LOI have been performed intensively in February, 2007. Y Irie, A Takagi (JAEA/KEK), D Horan and M Middendorf (ANL) have joined for these works. Since the present status as of February 14 has been reported in the minutes of the 10th collaboration meeting, the progress after the meeting till February 23, 2007 is described briefly in this report.

CABLING

The LOI will be developed in the Hall 2, and will be moved to the SP6 of the ISIS synchrotron for the beam test in near future (Fig.1). The breakout boxes are introduced near the HPD test area to facilitate the cable re-connections associated with the movement of the LOI system between SP6 and Hall 2. Every cable which goes to the HPD, the cavity and the water manifold is relayed at the breakout boxes, which include in the following:

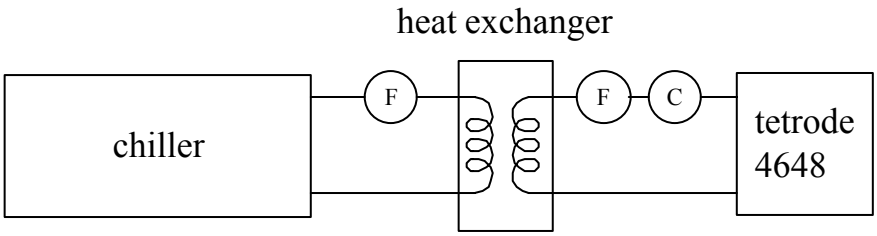
Breakout Box 1: all cables except for high voltage cables (fig. 2),
Breakout Box 2: anode and screen supplies for tetrode (fig. 3),
Breakout Box 3: anode supply for triode with Ross relay for discharge (fig. 4).

As seen in the figures, all connections have been completed except for those between breakout box and anode terminals at the HPD. The power cables to feed the cavity bias current do not pass through the breakout box, but are newly laid to the cavity at the Hall 2 from the power supply which is adjacent to the cavity: the supply is also used to feed the cavity at the SP6. Schematic diagram of the cable connection is shown in fig. 5. Details are shown for the multicore cables in breakout box 1 in Table 1, the chiller cables in Table 2 and the BNC cables in Table 3.

COOLING WATER SYSTEM

The circulating cooling water at 20˚C in the Hall 2 is used for cooling the triode anode, tetrode grids and the resonant resistor in the HPD via the cooling water manifold. The first flushing test was made successfully on February 21, where the input and output pressures to the

water manifold were 6.5 and 2kg/cm2, respectively. The water flows were 140ℓ/min for triode anode, 30ℓ/min for resonant resistor, and 7.5ℓ/min for grids. The tetrode anode cooling will be performed with the 195kW chiller and heat exchanger system (fig. 6). The plumbing work for this system is under construction as well as the cavity and liquid resistor.



F: flow, C: conductivity

Figure 6. Cooling system for tetrode anode

Interlock signals such as chiller flow, flow and conductivity at the 2ndary circuit should be incorporated.

To-Do-List at the next LOI EXPERIMENTS

Assuming the chiller system for tetrode and the cavity bias cable will be ready, the following items should be performed before generating RF voltage.

(1) high voltage, insulation, crawbar tests,
(2) interlock test,
(3) sequence test: on/off control of the power supplies.

In the RF generation test, items to be pursued are,

(4) investigation of the waveform deformations at the driver stage,
(5) stable high-voltage production,
(6) cavity tuning,
(7) cavity phasing to fundamental ones.

LOI ARRANGEMENT IN HALL 2

FEBRUARY 2007.

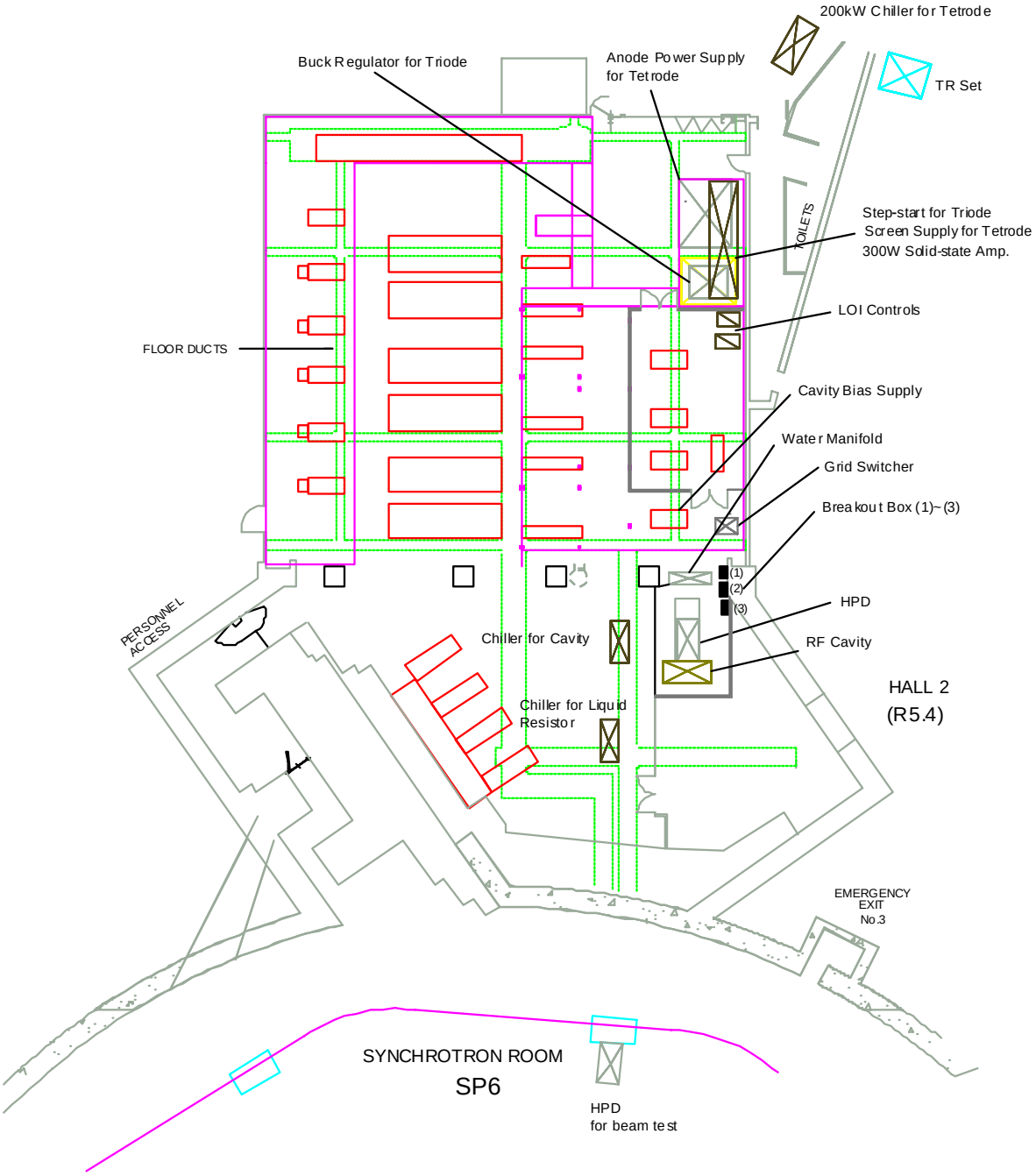


Figure 1

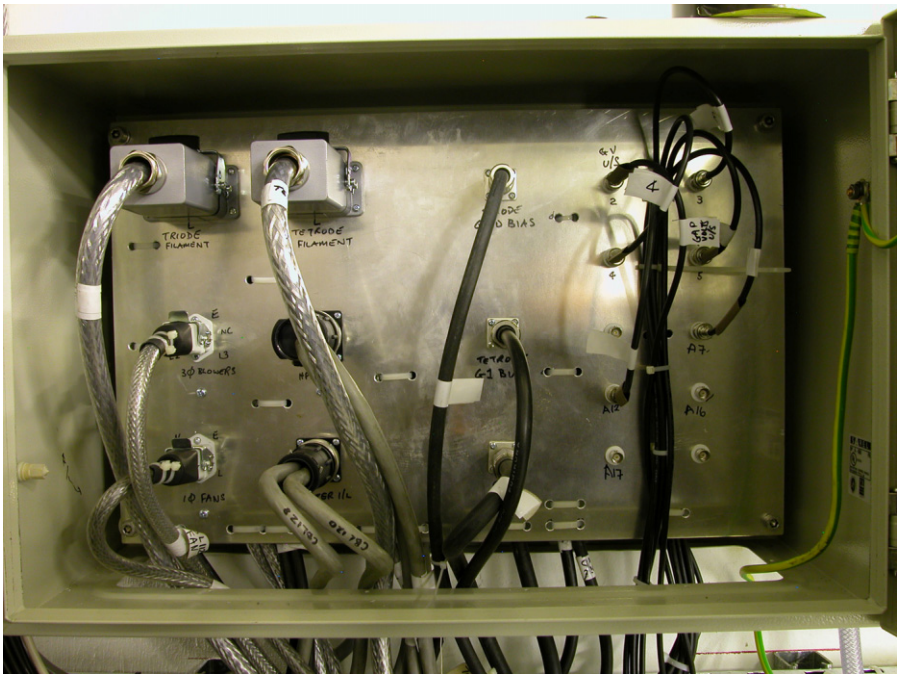


Figure 2a. Front view of the breakout box 1.

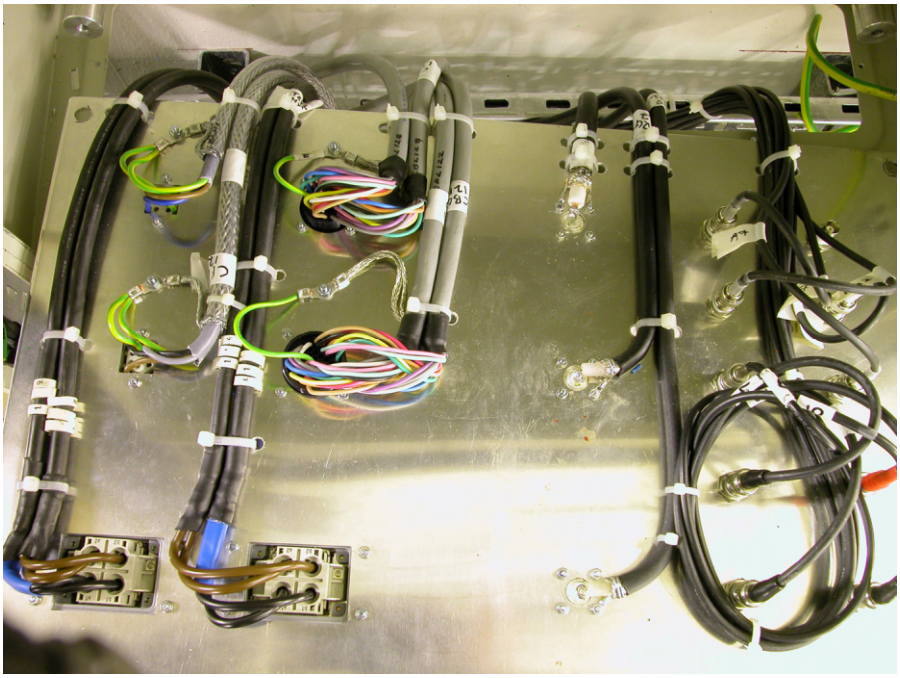


Figure 2b. Backside view of the breakout box 1.

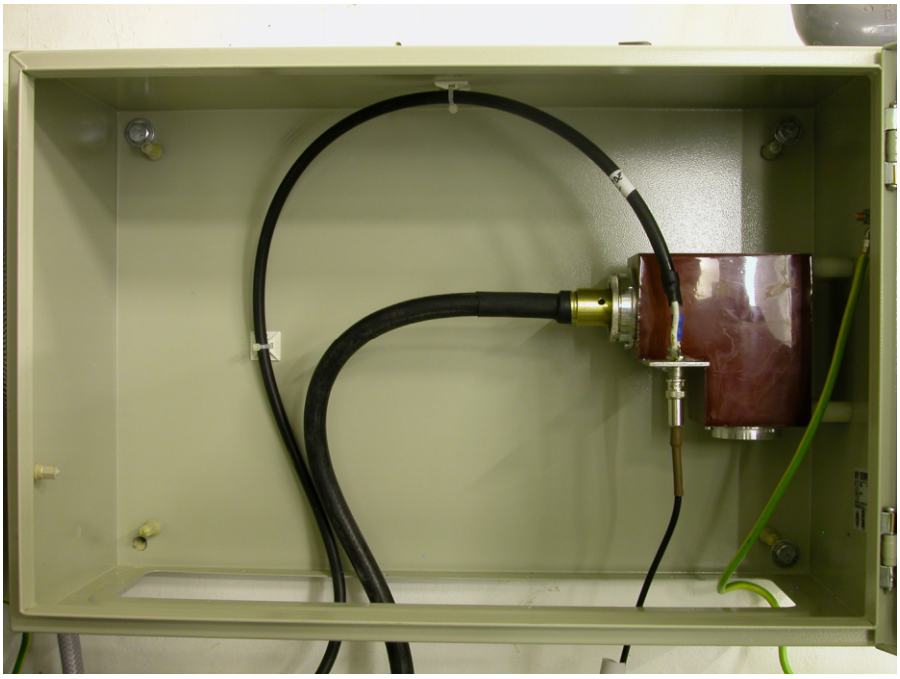


Figure 3. Breakout box 2 for the tetrode anode and screen supplies.

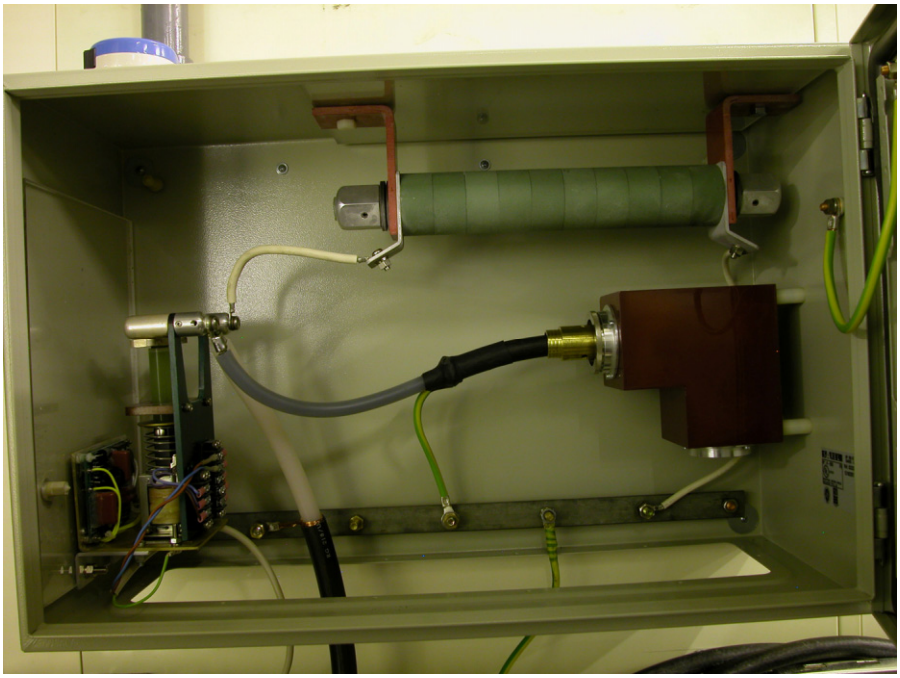
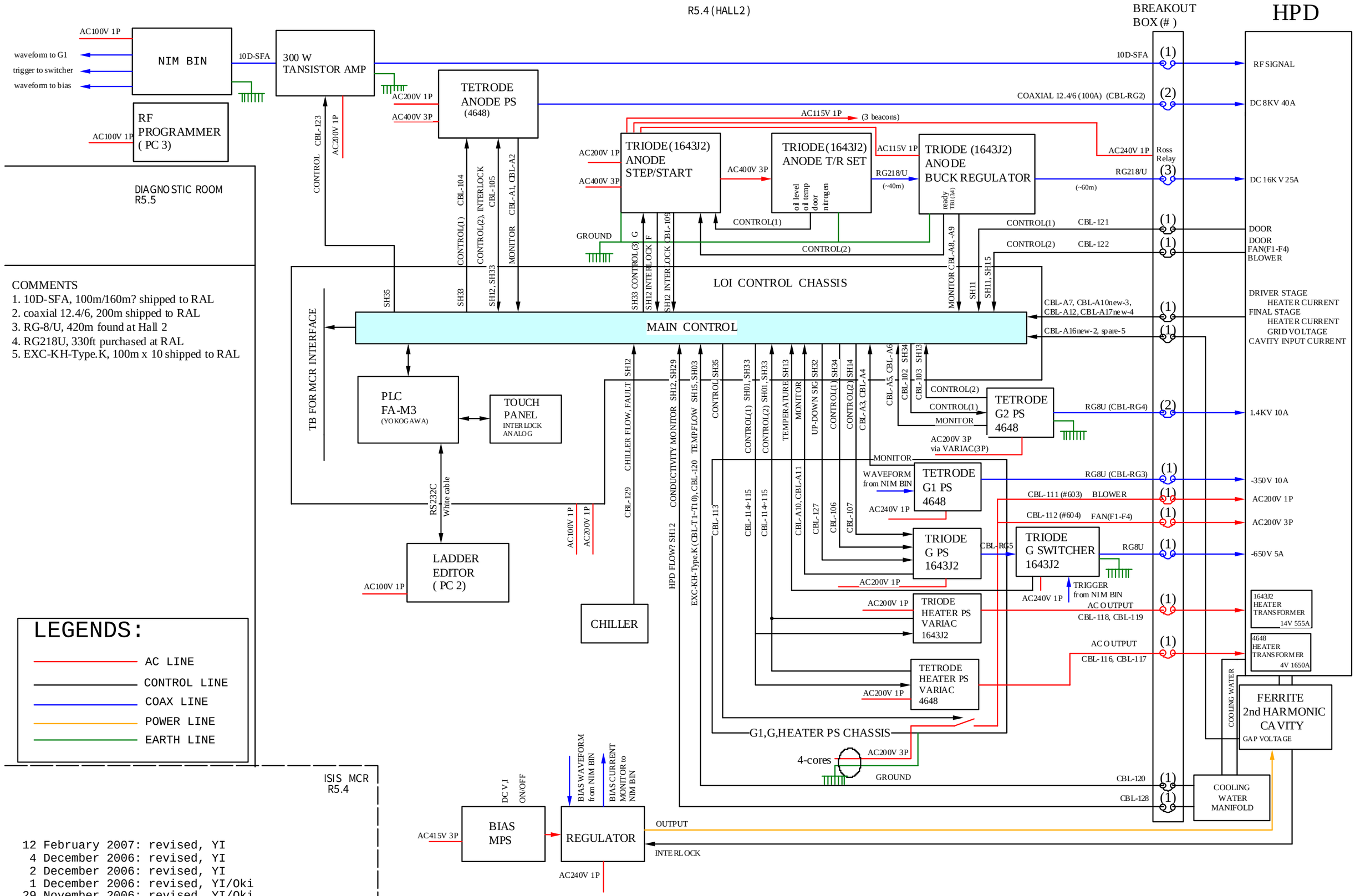


Figure 4. Breakout box 3 for the triode anode supply with Ross relay.



CABLE CONNECTIONS OF THE LOI 2nd HARMONIC RF SYSTEM

Figure 5

MODULE	NAME	SIGNAL TYPE	TERMINAL	CABLE	LINE NO. (colour)		Breakout box		LINE NO. (colour)	LOI CONTROL			
HPD Water Manifold	flow common	contact	TB1-N1	CBL-120 12-core with shield	N24A (red)				red	TB7	56	PLC	
	flow1. 4648 anode		1		X06A (white)				white		55	SH15	X343
	flow2. 4648 G1		2		X06B (black)				black		57		X344
	flow3. 4648 G2		3		X06C (green)				green		59		X345
	flow4. 4648 filament		4		X06D (yellow)				yellow		61		X346
	flow5. 4648 filament grnd		5		X06E (brown)				brown		63		X347
	flow6.				X06F (blue)				blue		65		X348
	flow7.				X063 (gray)				gray		43		X336
	flow8. 1643 anode		8		X064 (purple)				purple		45		X337
	flow9.				X065 (orange)				orange		47		X338
	flow10. shunt resistor		10		X066 (pink)				pink		49		X339
	flow11.				X067 (light green)				light green		51		X340
	shield	shield sheath											
HPD	door1	contact	X020	CBL-121 12-core with shield	red				red	TB6	1	SH12	X233
	door2		X021		white				white		2		X234
	door common		N24A		black				black		3		
	door3		X022		green				green		4		X235
	door4		X023		yellow				yellow		5		X236
	door5		X024		brown				brown		7		X237
	door6		X025		blue				blue		8		X238
	door7		X026		gray				gray		10		X239
	door8		X027		purple				purple		11		X240
	door9		X028		orange				orange		13		X241
	door10		X029		pink				pink		14		X242
	door11		X02A		light green				light green		16		X243
	shield	shield sheath											
HPD	door12	contact	X02B	CBL-122 12-core with shield	red				X02B (red)	TB6	17	SH11	X244
	blower		X065		white				X068 (white)	TB7	53	SH15	X341
	P5	+5V	P5		black				P5 (black)	TB6	73	SH11	
	fan1		0101		green				X02C (green)		19		X245
	common		N5		yellow				N5 (yellow)		21		
	fan2		0102		brown				X02D (brown)		20		X246
	fan3		0103		blue				X02E (blue)		22		X247
	fan4		0104		gray				X02F (gray)		23		X248
		shield sheath											
HPD Water Manifold	conductivity	contact		CBL-128 12-core with shield	red				red	TB6	35	SH12	X254
					white				white		36		
	(spare)	contact			black				black		37		X255
					green				green		38		
	flow	contact			yellow				yellow		39		X256
					brown				brown		40		
	+24V	+24V			blue				blue	TB5	51	P24A	
	-24V	-24V			gray				gray		52	N24A	
	conductivity	analog			purple				purple		53	SH29	F3AD08-IN-CH.2
					orange				orange		54		
					pink				pink				
					light green				light green				
		shield sheath							(sheath)		55		ground

MODULE	NAME	SIGNAL TYPE	CABLE		Breakout box	CABLE GROUPING	LINE NO. (colour)	LOI CONTROL					
195kW Chiller for BURLE 4648	flow	contact	CBL-129 12-core with shield				red	TB6	49		PLC SH12	X261
							white		50			
	conductivity	contact					black		51			X262
							green		52			
	(spare)	contact					yellow		53			X263
							brown		54			
	+24V	+24V					blue	TB4	51		P24A	
	-24V	-24V					gray		52		N24A	
	conductivity	analog					purple		53	2903	PLC SH29	F3AD08-IN-CH.3
							orange		54	2904		
		shield sheath					(sheath)		55	ground		
52kW Chiller for Cavity			12-core with shield									
52kW Chiller for Liquid Resistor			12-core with shield									

MODULE	NAME	SIGNAL TYPE	TERMINAL NO.	CABLE NO.		BREAKOUT BOX		LOI CONTROL	
Driver Anode Supply	anode voltage	analog	X1 terminal (SH No.G-14)	CBL-A1					
	anode current	analog		CBL-A2					
	anode current	analog	Tektronix A6303+AM503	CBL-A2new					
G1 Supply	G1 voltage			~~CBL-A3~~					
	G1 voltage	analog	monitor output	CBL-A3new					
	G1 current			~~CBL-A4~~					
G2 Supply	G2 voltage	analog	monitor output	CBL-A5					
	G2 current	analog	monitor output	CBL-A6					
Driver Heater	heater current	analog	HPD BNC	CBL-A7					
Final Anode Supply	anode voltage	analog	BR J2	CBL-A8					
			BR J2	CBL-A8new					
Final Anode Supply	anode current	analog	BR J3	CBL-A9					
			BR-J3	CBL-A9new					
Grid Voltage Monitor/ Upstream	voltage			~~CBL-A10~~					incorporation into MCR cavity lock system
	RF voltage	analog	HPD BNC	CBL-A10new-sp.3					
Grid Current Monitor	current			~~CBL-A11~~					
Final Heater	heater current	analog	HPD BNC	CBL-A12					
300W Amplifier				~~CBL-A13~~					
Bias Supply	voltage			~~CBL-A14~~					
	current			~~CBL-A15~~					
Gap Voltage Monitor	RF voltage	analog	Cavity Voltage Divider	CBL-A16					incorporation into MCR cavity lock system
				CBL-A16new-sp.2					
Cavity Input Current Monitor Pearson 310	RF current	analog	HPD BNC	CBL-A17					incorporation into MCR cavity lock system?
				CBL-A17new-sp.4					
Grid Switcher	TTL trigger		Grid Switcher BNC input	sp.1					
Grid Voltage Monitor/ Downstream				sp.5					
(spare)									

LEGEND:
Existing
Extension
New