



Fermilab

Accelerator Division / RF Department / HLRF Group

Bob Scala

Booster Watchdog Crates

The Watchdog Crate is a Nuclear Industrial Module (NIM) crate. In Booster, its purpose is to monitor the Central Utility Buildings (CUB) 95 Low conductivity water (LCW) system. The Central Utility building distributes its 95 LCW to both Booster Galleries and the Boosters Tunnel. Each of the Booster galleries contains a High Level Radio Frequency (HLRF) **Watchdog crate**. Its location is within the Radio Control Center (**RCCx-4**) relay racks. The local Internet Rack Monitor (IRM), which is a Controls Systems RCC Front End Node, also located at each (**RCCx-3**) rack monitors each of these crates digitally for module trips. This is done by the Watchdog Crate interface Module (**0437.01-ED-62667**) which monitors each slot for a fault and is interfaced to the IRM. The IRM'S ADC monitors the Watchdog Modules Analog output signals.

The digital data retrieved by the IRM is displayed on Booster Page 25 (High Level RF Status) under the Watchdog sub page. The analog data can be viewed from any ACNET Parameter page. The device names are as follows.

Booster Tunnel

B: TLCWSP	Tunnel 95 LCW Supply Pressure	Typical = 98- 108 PSI
B: TLCWRP	Tunnel 95 LCW Return Pressure	Typical = 30 - 35 PSI
B: TLCWC	Tunnel 95 LCW Conductivity	Typical = 13 Meg ohm
B: TLCWT	Tunnel 95 LCW Temperature	Typical = 86 - 89 Degrees F

Booster East Gallery

B: ELCWSP	East 95 LCW Supply Pressure	Typical = 100 - 105 PSI
B: ELCWRP	East 95 LCW Return Pressure	Typical = 40 - 45 PSI

Booster West Gallery

B: WLCWSP	West 95 LCW Supply Pressure	Typical = 95 - 100 PSI
B: WLCWRP	West 95 LCW Return Pressure	Typical = 34 -38 PSI
B: WLCWC	West 95 LCW Conductivity	Typical = 10.5 Meg Ohm
B: WLCWT	West 95 LCW Temperature	Typical = 86 - 89 Degrees F



Booster Watchdog Module Types

As mentioned earlier the system monitors the 95 LCW Supply and Return Pressures, Conductivity and Temperature of the water. The pressure and temperature modules are designed to report high level limits and the conductivity module is designed to report low level limits.

The Watchdog Crate also contains a module defined as the Cavity Water Leak Module. This module, which monitors a Cavity Water Leak daisy chain, notifies the Control System if there is a HLRF Cavity water leak in the Booster Tunnel. The cavity water leak daisy chain is an RG58 cable stretched across the High Level RF System, Station to Station. At each of the stations this cable is T-Off to the Modulator External Interlock Unit (MEIU) module in the RMU rack. This MEIU monitors the signal coming from the stations cavity water leak Micro Switch that is located under the lower Booster RF Cavity Tuner.

In the East Gallery, the Watchdog Crate contains Watchdog Modules for both the Tunnel and the East Booster Gallery.

Watchdog Module Schematic Drawing Numbers

Watchdog Conductivity Module DWG#: **0337.01-EC-63453**

Watchdog Supply and Return Module DWG#: **0337.01-EC-63452**

Watchdog Temperature Module DWG#: **0337.01-EC-63491**

Sensors and Measuring Device Part Numbers

Conductivity Meter: Beckman Industrial
Solu Meter Conductivity Controller
Model: SM1

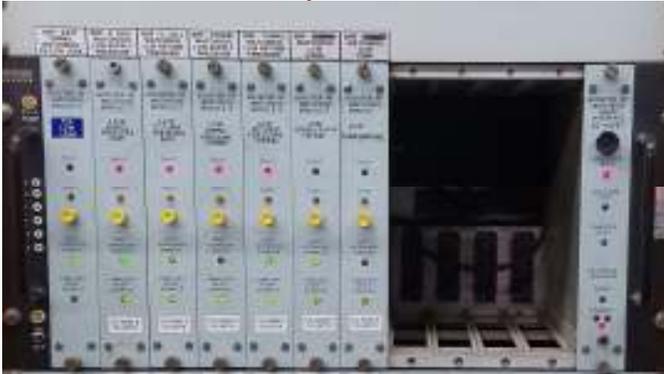
Conductivity Cell: Beckman Industrial
Model: 431 (0.01/CM)

Supply Transducers: Setra Systems
Natick Mass USA
Model 205-2 0-500 PSI

Return Transducers: Setra Systems
Natick Mass USA
Model 205-2 0-100 PSI

Temperature Sensor Probe: **Analog Devices AD2626**

Booster East Gallery and the Booster Tunnel



Booster West Gallery



95 LCW Sensors and Measuring Device Locations

The Booster Tunnels 95 LCW supply and return pressure Serta Systems transducers are located in the Booster East Galleries [Period 16](#), by RF station 6, behind this stations RMU rack on the wall. The Booster Tunnels 95 LCW Temperature probe and Conductivity electronics monitor is located in the Booster East Galleries [Period 14](#), by RF station 4, behind this stations RMU rack on the wall.

The Booster East Galleries 95 LCW Supply and return pressure transducers are located in the Booster East Galleries [Period 17](#), by RF station 7, behind this stations RMU rack on the wall

The Booster West Galleries 95 LCW Supply and return pressure transducers are located in the Booster West Galleries [Period 23](#), on the wall. The Booster West Galleries 95 LCW Temperature probes and Conductivity electronics are also located in this same area.

Supply and Return Pressure Transducers Temperature Probe and Conductivity Electronics

