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Linac2 Watchdog – Interlock Alarms Application

New Version

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Abstract

The application displays Linac2 watchdog status and interlock alarms function of the user being played by the Super Cycle.

Geneva, Switzerland
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1- Introduction

For the production of hadronic particles for the CERN accelerator complex, two types of pulsed ion source are currently in use. Ions from these sources are preaccelerated before injection into the linacs. Protons are produced in a **Duoplasmatron source**, injected into **Linac2** and accelerated to **50 MeV**. The beams from this linac are used (after additional acceleration) for nuclear physics at ISOLDE; the East Experimental Hall and the neutron Time of Flight facility; 450 GeV SPS fixed target physics; for antiproton production in the future Antiproton Decelerator (AD); and in the future for LHC. The annual operation time is about 6000 hours.

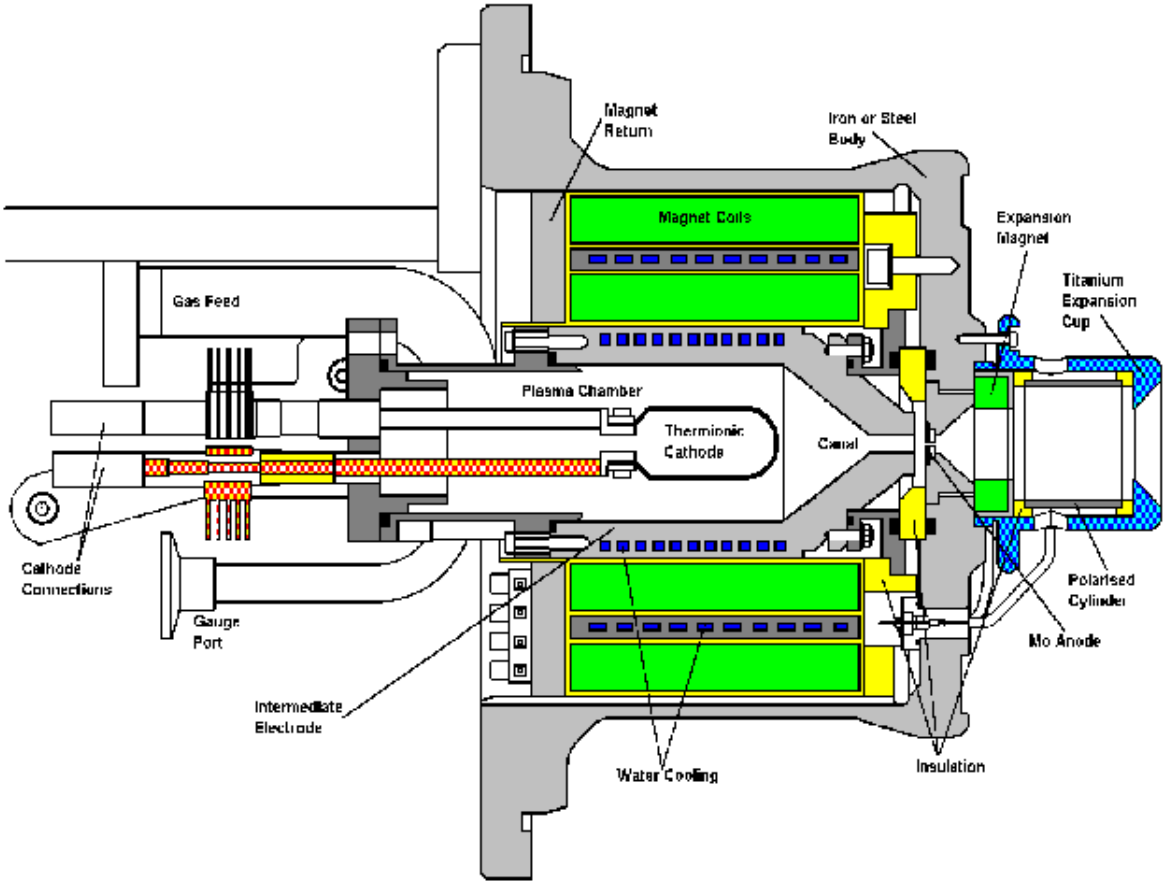


Fig 1. Duoplasmatron Proton Ion Source

The original design for this linac was for a 150 mA beam out of the machine. When the requirements for LHC became evident, effort was expended to increase the output to 180 mA at the transfer point to the PS Booster.

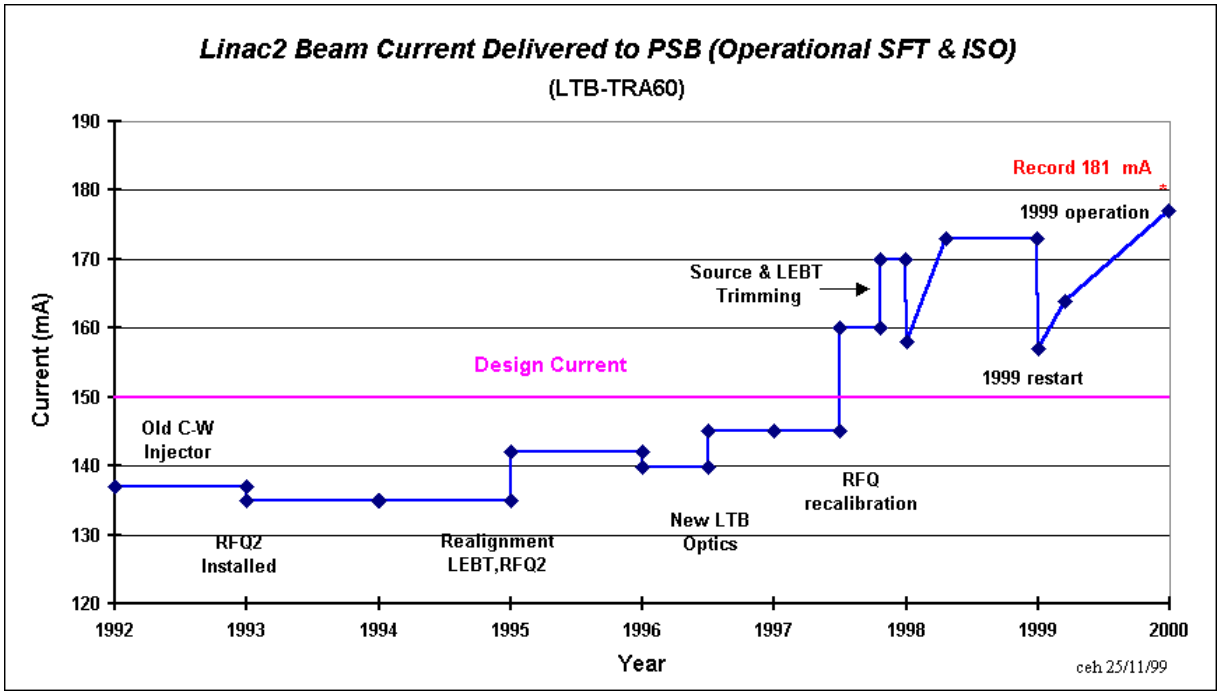


Fig 2. Linac 2's intensity over years

On 10th November 1999 this figure was attained in a controlled manner. However, to reduce the strain on the RF systems, we only run at these very high intensities when requested.

Fig 3. Linac 2 accelerating tanks

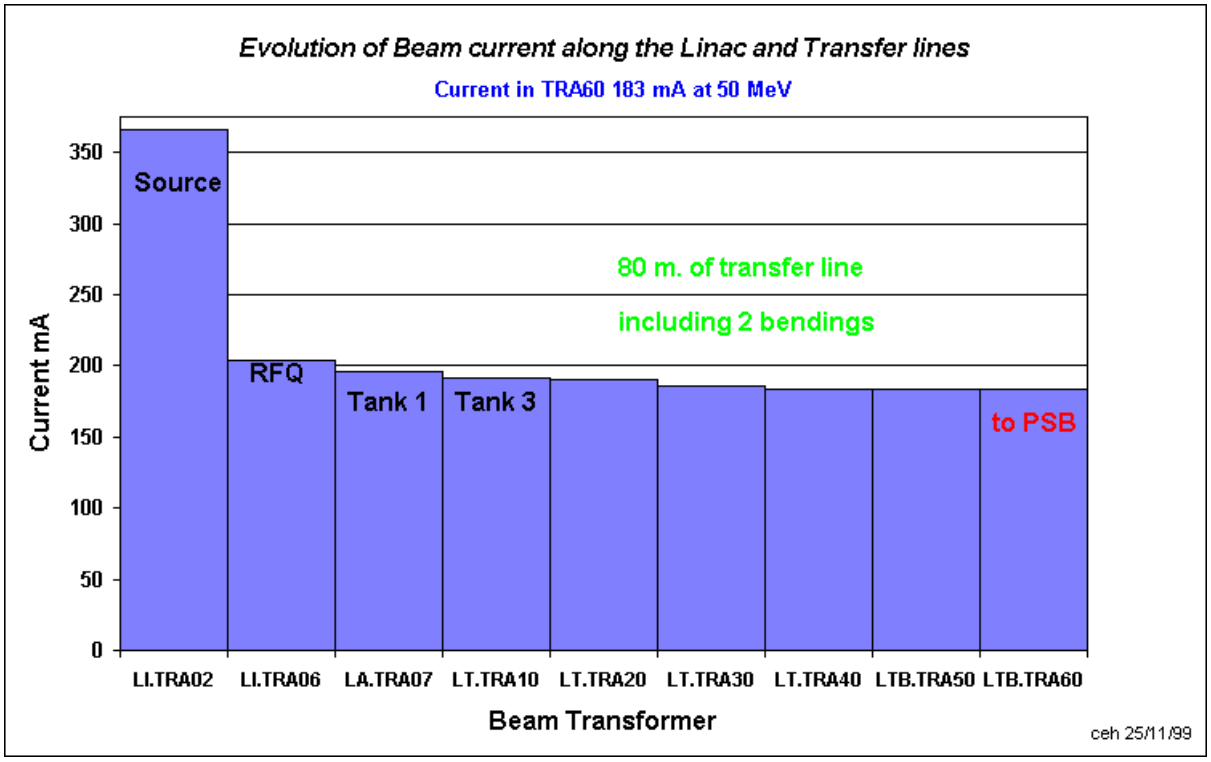


Fig 4. Linac 2**'s** Intensity evolution along the machine

The aim of this application is to check the losses between the different transformers, in order to stop the source to limit the radiation emissions. In this new version you can see the different timings relative to the source, the transformers' values actualized in function of the user being played in the Super Cycle.

1. Linac2 Watchdog – Interlock Alarms User's Guide

The application is launched from the LINOP Console Manager through General menu:

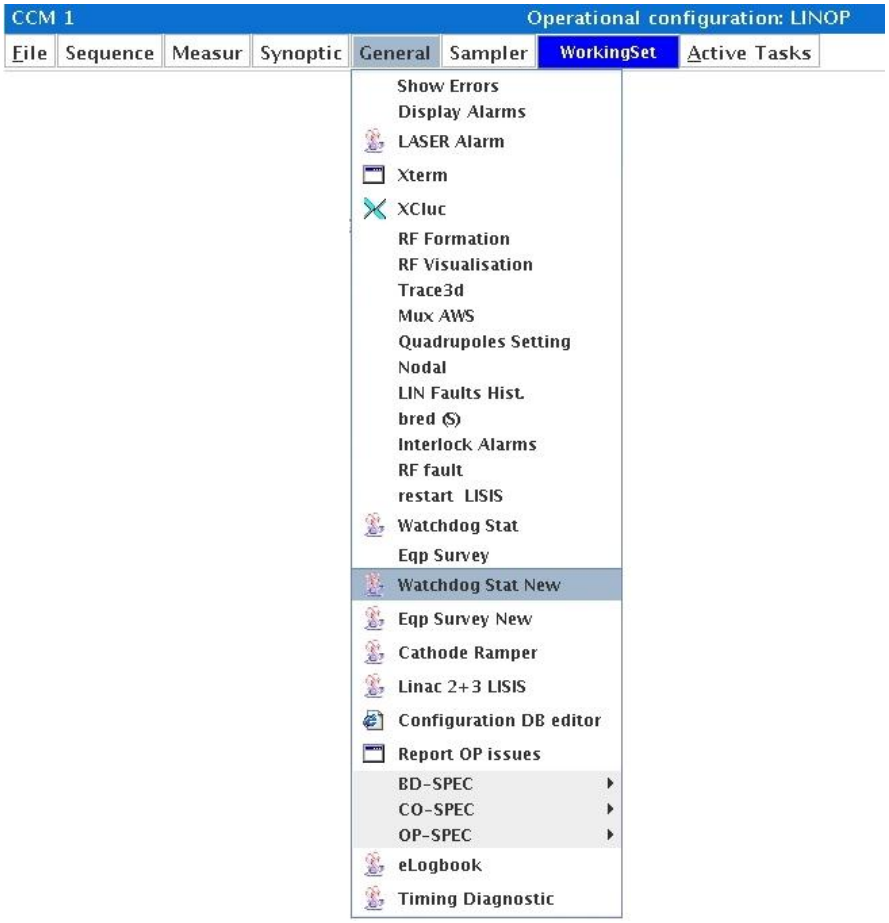


Fig 5. General Menu in LINOP Console Manager

2.1 Interface

2.1.1 The main window

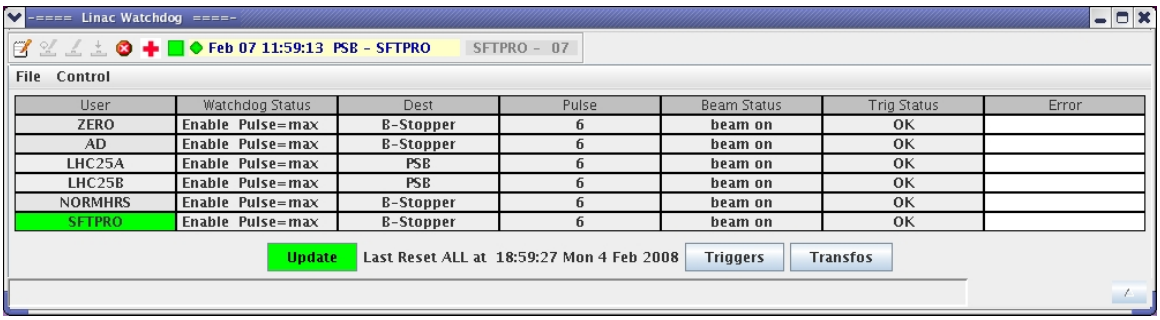


Fig 6. Main window

The essential information is displayed on the main window through 7 fields:

- **USER:** in this column are displayed all the users being in the Super Cycle, the active one is highlighted in green.
- **WATCHDOG STATUS:** shows if the watchdog is enabled or not for this user.
- **DEST:** shows the destination of the beam.
- **PULSE:** indicates the number of bad pulses before the source should be stopped.
- **BEAM STATUS:** indicates the state of the beam.
- **TRIG STATUS:** checks the trigger status.
- **ERROR:** displays information concerning the beam fault.

The **Update** button actualizes the users list.
Triggers and **Transfos** buttons actions are described further.

2.1.2 The Control Menu.

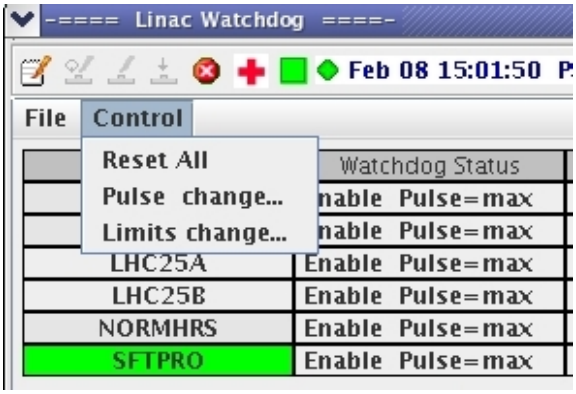
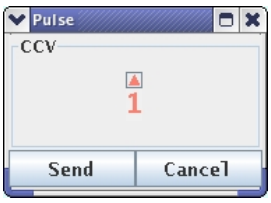
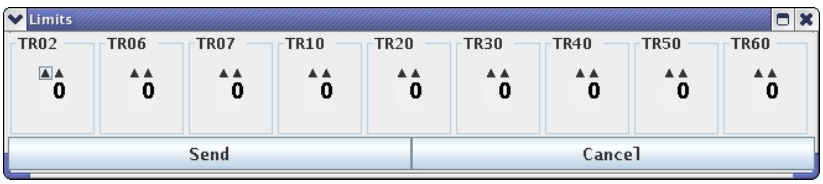


Fig 7. Control Menu

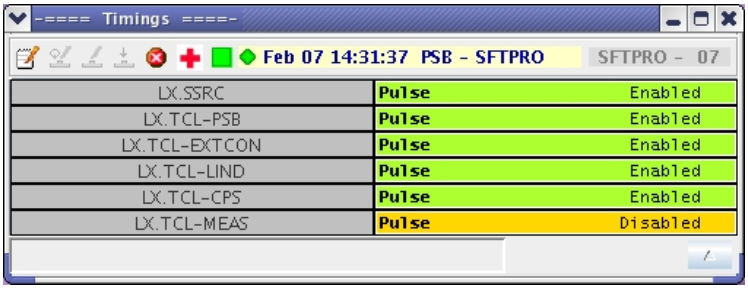


- **Reset All** the user's bad pulses counter.
- **Pulse Change…**
  maximum of bad pulses before stopping the source.
- **Limits Change…**



limit (in percent) of acceptable difference regarding the previous transformer. If the limit is reached the bad pulse counter increments by 1.

2.1.3 The triggers window



This panel displays the different timings and their statuses. The values are user dependant and change every basic period.
E.g. the active user is SFTPRO (BP7).
By clicking on the right button you can access the Diagnostics and Parameter Tools.

Fig 8. Timing Triggers window

2.1.4 The transformers window

This panel displays the different transformers. As for the trigger window this one is user dependant.
E.g. the active user is SFTPRO (BP7). By clicking on the right button you can access the Diagnostics and Parameter Tool.

Fig 9. Transformers window

3. References

[1] Linac2 home page, http://linac2.home.cern.ch/linac2/default.htm

4. Thanks

I would like to thank Eric Roux for the grateful help he provided me to develop this application.