

Beam Line Beam Loss Monitors

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Introduction

A loss monitor system has been developed for the Main Injector Beam lines. The system is a stripped down version of the present BLM system employed in the Tev and Main Ring. Functionality such as snapshots and profiles have been removed because they are not needed in a single pass machine. Multibus control has been eliminated. Functions such as abort demand and high voltage control has been reduced to a more basic form. The daughter card was designed to offer more versatility than those of the Tev and Main Ring.

The Hardware

1.) The Beam line BLM chassis has a 12 channel card cage that utilizes the same bus standards established by the Tev BLM system. This allows the daughter cards to be interchangeable with the Tev and Main Ring system.

2.) The system uses the ion chamber loss monitors developed for the Tevatron. The ion chambers high voltage supply is contained within the BLM Chassis. It is capable of supplying 2500 volts at 500 uAmps. The High Voltage is set to 2000 volts during chassis testing and no further adjustment is required as the Ion Chamber has a flat high voltage to gain response.

3.) An Abort Demand signal is produced by feeding the analog "or" of the 12 daughter card outputs to a voltage comparator circuit. The comparator reference level is set by adjusting a rear panel pot.

4.) The daughter card can be set up to operate as a Set-Reset integrator, a fast amplifier or as a Log Amplifier (fig 1). The Integrator has a full scale range of either .14 rad or .014 rad dependent upon which branch is used. The fast amp has a rise and fall time of 1 uSec and a full scale range of .014 rad. The Log Amp has a 6 Decade dynamic range allowing loss readings from .001 rad/second to 1000 rads/second (Fig.2). One and only one of these signals can be jumper configured to provide the output to the MADC. The Daughter Card also has a track and hold circuit that can be inserted in the signal path before outputting to the MADC. The Start Track and Start Hold triggers are provided by a Camac 377 card. A timing card within the BLM Chassis fans out these triggers to the 12 Daughter cards. The Start Track signal also resets the integrator circuit when the daughter card is configured as an integrator.

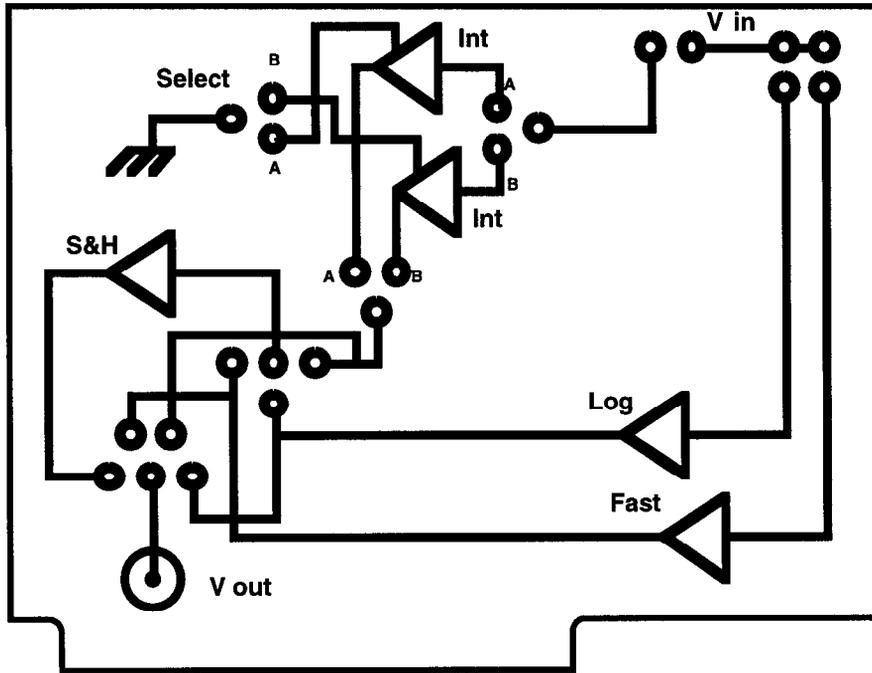


Fig 1. Beam line daughter card jumpers

Log Amp Response

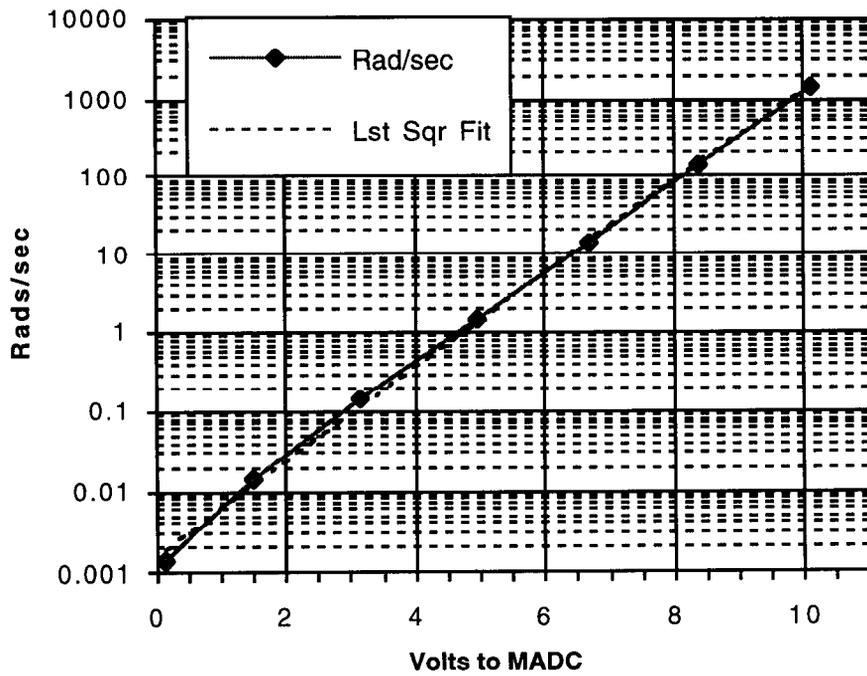
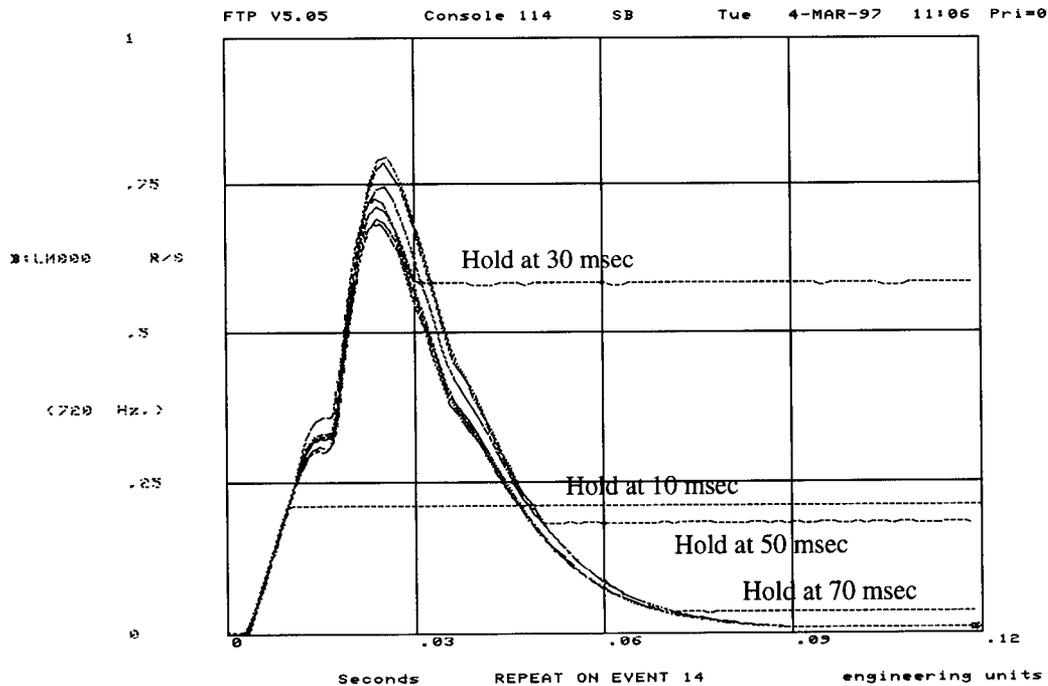


Fig. 2 Log Amplifier response curve

The MI-8 Line Configuration

The MI-8 Line Beam Loss Monitor system utilizes 67 Ion Chambers distributed at appropriate tunnel locations. A list of these loss monitors can be obtained from Page I63 or I39. It requires six BLM Chassis to service these channels, three in the Booster West Tower and three at the MI-8 service building. There is also a Camac 377 card at each building to provide the Start Track and Start Hold triggers. A list of these times can be obtained from page I39.

The daughter cards are set up to function as a Log amp with a track and hold output. The daughter card outputs are feed into the Controls Group's MADC. From there they can be read from a parameter page, Fast Time plotted, or displayed graphically on I-39. Below is a sample plot of the first BLM in the MI-8 Line.



P150 and A150 Line configurations

This system will also be used in the P150 and A150 lines. The Daughter card configuration has not been determined for these lines.