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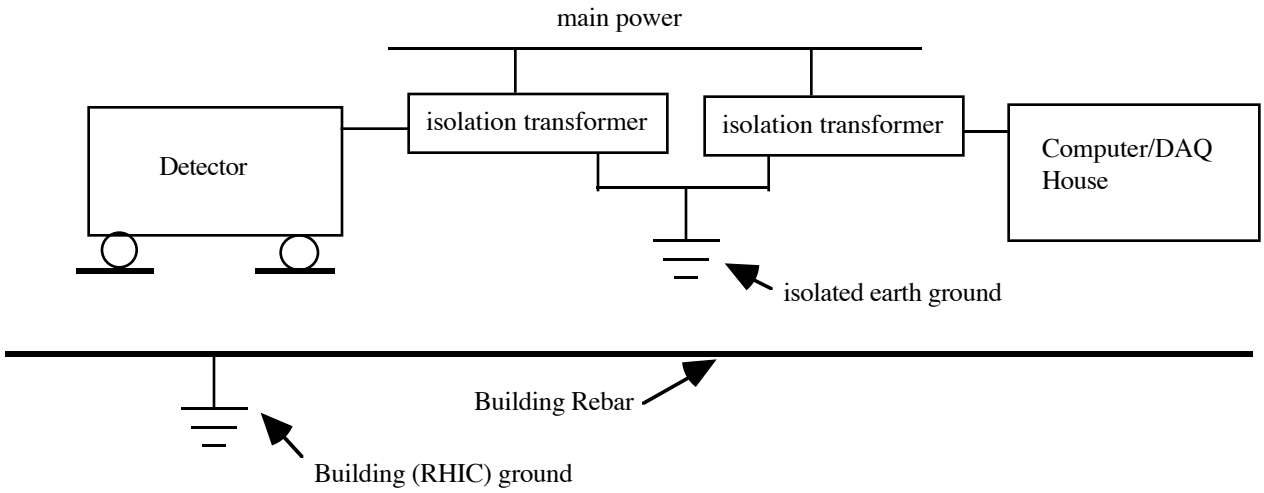
STAR Note #148

January 11, 1994

TO: STAR Technical Committee
FROM: Howard Matis
SUBJECT: Preliminary STAR Grounding Plan

From discussions with Dick Jared, we adopted the following grounding plan for the STAR detector. The STAR detector ground should be completely isolated from RHIC as shown in the following diagram.

STAR Grounding Plan



We are using the detector platform and the magnetic iron as electromagnetic shields from the building rebar which we assume will be in contact with RHIC ground. To implement the grounding plan, we need to make the following requirements:

1) The steel rails on which the detector slides shall be electrically isolated from the building ground. This implies that the rebar in the concrete should not touch

those plates. There needs to be a several inch separation so that there is only limited capacitance coupling. Consequently, there must be careful supervision during installation to make sure there is electrical isolation.

2) The bolts, which hold the steel plates to the floor, should also be several inches away from the rebar. When they are inserted into the floor, careful checks need be made to make sure that each bolt does not electrically connect to the rebar and building ground.

3) It would be advantageous to put small gaps in the steel plates so that the electrical path is broken. It is most important to put a gap between the steel plates near the usual resting places of the detector, i.e., in the Wide Angle Hall and in the Assembly building.

4) The grounds for the DAQ/ Computer House and the detector should be connected at the transformer. This ground should be connected to the earth in one place only and not make contact with any other ground. *There may be safety problems with this grounding scheme, so this idea needs to be approved by BNL.*

5) There needs to be filters installed on the "clean" power network to reduce high frequency noise.

6) All pipes, rails, support fixtures, etc. which contact the RHIC ground should be electrically isolated from the detector in both the Wide Angle Hall and the Assembly building.

7) Electrical shielding needs to be designed into the computer floors in the DAQ room. We will use the SDC note which is described below as a basis for design.

8) Special attention is needed to shield the EMC electronics located on the bottom of the detector as there may no metal between them and the building rebar.

9) All electrical signals which communicate with RHIC need to be electrically isolated. This includes such information as RHIC Clock and RHIC TV signals.

10) Pumps and other "dirty" electrical devices should be run off "dirty" power and be electrically isolated from platform.

A detailed document describing grounding can be found in the SDC note (SDC-SGT-00016) entitled, "Preliminary Design Report for the Grounding, Surge Protection and Noise Reduction For Electrical Power Distribution at the IR 8 Region" by W. Kampmeier. In the future, we will issue a more specific document detailing the specific grounding details for the STAR detector.