

Texas A&M cyclotron K150 radiation effects facility

April 1, 2018 – March 31, 2019

H.L. Clark, B. Hyman, and J. Thomas

Many updates have been made to the K150 Radiation Effects Facility during this reporting period, including a new data room and setup area and improvements to the backscatter detector system for high flux dosimetry measurements.

A data room and staging area have been constructed for use with the K150 Radiation Effects beamline. The new data room and setup area are located on the second floor between the K150 hi-bay and the office side of the Cyclotron Institute building. The data room is positioned above the entrance to the K150 vault allowing for short cabling distances between user equipment operated in the data room and their devices under test (DUTs). A patch panel has been installed in the data room with a companion patch panel located near the end of the beam line in the K150 vault. The panels include two DSUB-9 serial connections, two DSUB-25 serial connections, four usb 2.0 connections, ten BNC signal cable connections (RG-58), four BNC video cable (RG-59) connections, and five RJ45 jacks (CAT6 cable) (Fig. 1). The room is equipped with seven monitors, four for video feeds and three for customer computer



FIG. 1. Network, computer, and data patch for communication between K150 Data Room, K150 Radiation Effects Beamline, and the Control Room.

use. Work tables and chairs are also provided for testing needs (Fig. 2). A supply of USB, BNC, HDMI, and CAT6 cables of various lengths are also available if needed. Two cameras have been installed and integrated into our video system. For safety, these are viewable in the K150 control room. Fourteen hardwired network connections have been installed so that customers can connect to our computer network. Wireless network connections to the TAMULINK network are also available if needed.

A small staging area has been set up just outside the south exit of the new data room. This area is used to accommodate customers who need space to prepare their DUTs or just a place to work outside of the data room. The area has three workbenches (with overhead lights) and includes a stocked tool box and equipment cabinet. Carts for transporting equipment between the staging area and the K150 vault are also provided (Fig. 2). A refrigerator, microwave oven, and coffee maker are also provided for customer use. A new secured door was installed for access to the freight elevator located in the office side of the building. This allows for equipment to be moved between the data room and the K150 vault as needed.



FIG. 2. (Top) Full view of the inside of the K150 Data Room. (Bottom) K150 Radiation Effects Staging Area. Carts and extra chairs for larger testing groups. The entrance of the K150 Data Room. Work surfaces with overhead work lights, Shop-Vac, tool box, and equipment cabinet.

Improvements have also been made near the beam line in the K150 vault. Space for customer equipment and beam line access has been cleared by removing a beam pipe storage rack and equipment shelf. The sister patch panel to the data room patch panel has been mounted on the north wall near the

in-air positioning system. A toolbox containing 80/20 extrusions and hardware has been added for custom DUT mounting requirements. The cart used for computer access to our SEUSS positioning software has been relocated to the right side of the beam line.

Updates to beam line components have been made to help dosimetry accuracy and reduce residual radioactivity along the beamline. A new, thinner aluminum 4"-diameter beam collimator was installed directly in front of the beam line isolation valve. This collimator is designed to reduce beam exposure to the stainless steel valve. The collimator was thinned to minimize beam scattering along the inside circumference. A second 4"-diameter beam collimator has been installed between shutter #1 and the beam viewer to help reduce unanticipated irradiation on the backs and sides of the backscatter detectors. Extra aluminum shielding has been placed around the backscatter detector holders for additional protection. Material for shutter #2B has been changed from aluminum plate to conductive carbon with an aluminum support. This has been done to reduce the residual radioactivity of the beamline and prevent the inadvertent measuring of this radiation by the backscatter detectors.

These improvements and additions to the K150 Radiation Effects Facility should make testing at our facility more convenient, comfortable, and safer for our customers as the use of the facility increases moving forward.