

Pre-Job Briefing for Tape Assembly

The purpose of this project is to assemble dummy silicon pixel modules using double-sided epoxy tape. The complete module assembly procedure is documented on the ANL TWiki at the following address: <https://atlaswww.hep.anl.gov/asc/wikidoc/doku.php?id=itk:assembly>.

This document will outline what materials, equipment, and training will be required in order to begin work, and roughly what the procedure will entail. Once again, the full procedure is described in the above link.

To begin assembly, one will require access and permission to work in a lab with the following equipment, which may potentially require safety clearance (Fig 1):

- (low-vacuum) vacuum pump
- scissors, blades, and thin silicon detectors, which may count as sharps
- isopropyl alcohol (IPA)
- epoxy tape

EQUIPMENT

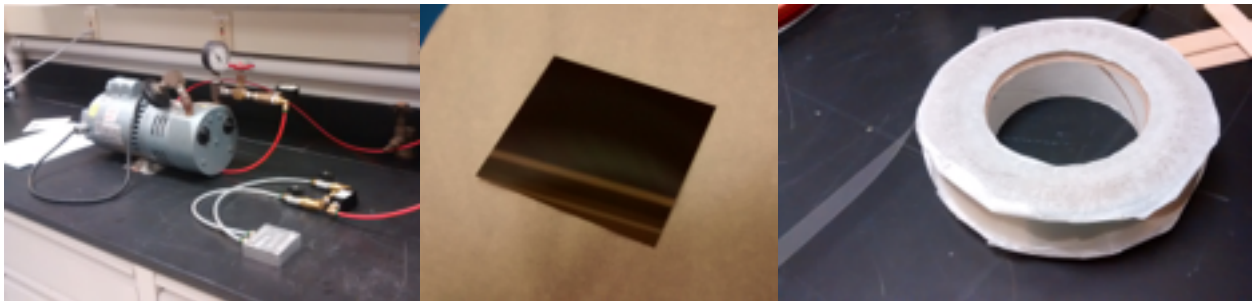


FIG 1: VACUUM PUMP, SILICON DETECTOR, AND EPOXY TAPE.

Assembly of a module will consist of putting together one of the above-mentioned detectors with four front-end chips and one flex cable (Fig 2).

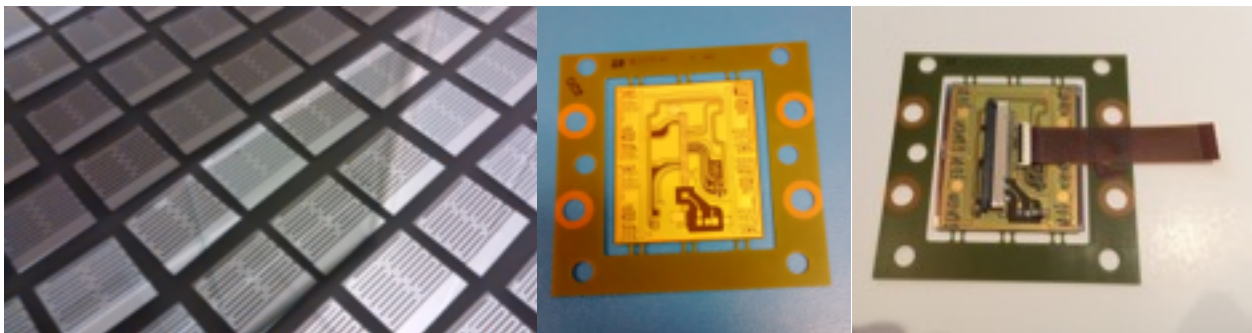
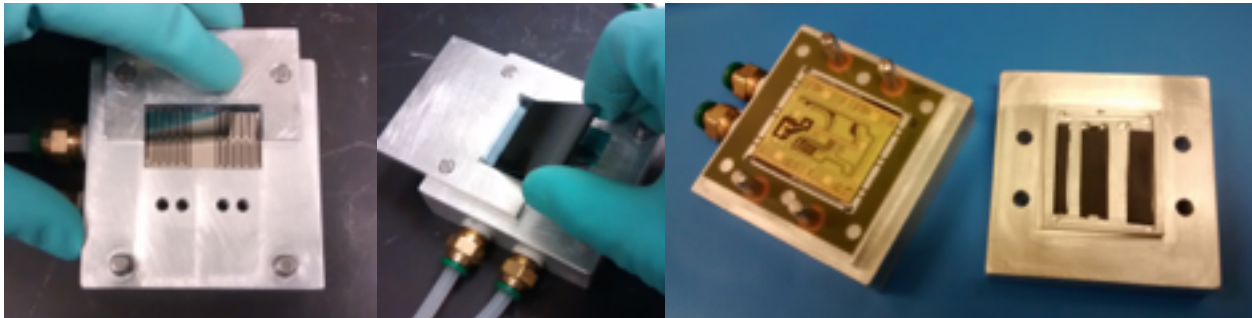


FIG 2: FRONT END CHIPS, FLEX CABLE, AND ASSEMBLED MODULE.

To make a quad-module, four front-end chips will be arranged using a jig and held down via vacuum suction. Double-sided epoxy tape is then cut and applied to one side of the silicon detector, and the detector is positioned and attached to the front-end chips using another jig.

After this, more double-sided epoxy tape is attached to the back of the flex cable, and a third jig is used to position and attach the flex cable to the rest of the assembly. The jigs required are



shown in Figure 3.

FIG 3: MODULE ASSEMBLY JIGS.

IPA may be used to remove epoxy, if tape ends up being applied poorly. In this case, the user will put on gloves, dip a Kimwipe in IPA, and manually scrub the epoxy off the applied surface.

We are also investigating the use of automatic glue dispensation to assemble modules. The user is advised to read the pre-job briefing for this procedure as well.

SAFETY

Do not work in the lab unless permissions and safety documents have been filled out. Talk with your supervisor to make sure you have access.

Unless trained and given permission, you are not authorized to perform electrical or mechanical repairs, or to machine jigs or replacement parts. These tasks are to be delegated.

Silicon detectors and front-end chips are sharp and prone to breaking. Be sure to wear gloves when handling them, and dispose of broken pieces in the sharps container, not the trash can! If a piece breaks, use thick gloves to handle them, not the thin lab gloves.

Always recap the IPA when finished using. This prevents evaporation, spilling, and IPA fumes. Use in the fume hood, preferably. Use lab gloves when handling IPA or epoxy.

Turn off the vacuum and have the suction channels closed off when not in use.

Always use a grounding mat with wrist strap (or equivalent protection) when working with real FEI4 front-end chips, as static electrical discharge can destroy the electronics.

Wear closed-toe shoes and eye protection when working in the lab.