The ABCStar (ATLAS Binary Chip) provides readout for 256 strips in the Inner Tracker (ITk) strip detector. Each channel has an analog amplifier, shaper, discriminator and masking. Each ASIC needs to be thoroughly tested to ensure it can accurately process the high rate of physics data in the HL-LHC.

There are two locations for ABCStar wafer probing:
- Rutherford Appleton Laboratory (RAL):
  • Semi-automatic 12" probe station with custom probe card for ABCStar
  • Custom interface FMC-1701 is used with a commercial FPGA board. Provides level translation, commercial ADCs and DACs to measure chip voltages
- Carleton University/DA-Integrated:
  • Carleton University has contracted the services of the private company DA-Integrated to test the wafers
  • Electroglas 4090μ Automated Wafer Test System (ATE) with a custom probe card for ABCStar
  • The system includes dedicated programmable power supplies and PMUs that can source/sink any voltage or current to/from the pad and have full control over clock frequencies and edge relationships

Die Categories:
- A: Passes all tests, good for use in detector
- B: Minor defect (e.g. 1-2 noisy channels)
- X: Major defect, chip is rejected
- T: Two category A dice from each lot will be designated category T and used for fast TID (x-ray) testing

Gain Results
Mean gain and input noise across all 256 channels:
- Gain and Noise are within specification
- Some variation between production lots
- Includes data from both RAL and Carleton (Carleton results are preliminary)

Die Categorization
Die Categories:
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Wafer Yield
- Expected yield is >90% Category A+B
- Currently seeing 94.45% average Category A+B yield
- Yield from dicing wafers will be >98%