The circuit board manufacturing community is now ready to embrace the concept of moving probe in-circuit test systems, also known as Flying Probers. This is due not only to the ability of Flying Probers to eliminate the cost of fixturing, but also to their new ability to satisfy the overall test requirements. This opens up the opportunity to test a new class of boards that are not cost effective to test on fixture based systems, and were not able to be tested on previous Flying Probe test systems. Requirements such as prototype development, low to medium volume manufacturing, high net count boards, and field returns are examples of prime targets for Flying Probers. What then are the capabilities a user should look for in a Flying Prober that will insure it’s most effective overall use as a quick-turn around, highly flexible test tool?

The capabilities of a Flying Prober should be separated into two categories, Electrical Test and Mechanical Interface. First it is necessary to physically contact the board, then to perform a test. Deficiencies in either of these areas will rapidly diminish the effective use of the system. But first and foremost, a Flying Prober is still an in-circuit tester. The lure of the physical motion of a Flying Prober will often overshadow the focus on a system’s actual test capabilities. The extent of the capabilities in both of these areas can significantly enhance the usability of the Flying Prober, depending on the level of complexity of the board to be tested. The more capabilities that the system has will result in more board types or board mix that the system can test, and more parts tested on each board. A full spectrum of capabilities, both electrical and mechanical, will spell the difference between testing or not testing a board, and provide much faster payback. For the sake of brevity, the capabilities to look for in each of these categories are described below in list format.

### Desired Electrical Test Capabilities

- Wide range current/voltage sources for analog component testing
- Active and passive analog tests
- Network Analyzer (for high frequency L, R, C networks)
- Reverse polarized capacitor tests
- Connector tests
- Vectorless IC tests, passive and active
- Crystal and oscillator tests
- Function test capability (VXI, IEEE, or ‘any bus’ instruments, power supplies, etc.)
- Boundary Scan capability
- Shorts tests
- Automatic discharge before/after every test (to insure high test stability)
- Unrestricted allocation of electrical resources to any probe
- Automatic program generation from CAD (test program and test point data)
- Automatic probe positioning software (transparent to programming effort)
- Automated program optimizing tools (i.e. guard generation, merging parallel device tests, best test point selection for multi-point nets, program re-sequencing for highest execution speed)

### Desired Mechanical Interface Capabilities

- Highest possible number of probes (for higher test speed and test coverage)
- Top and bottom side simultaneous probing
- 360 degree probe angle placement (for placing probes around objects)
- Highest possible probe movement speed
- Fully automatic probe placement for top and bottom probes
- Full 3-dimensional X, Y, Z positioning (independent between probes)
- Conveyor system for in-line or manual use
- Real time program and test point editing capability (automatic probe placement)
- Highest possible number of cameras (for fiducial find and optical inspection)
- Highest possible probe retraction height (to clear objects on the board)
- Automatic object position recognition (for fast programming and unrestricted testing on the component side of a board)
- Smallest possible test point target size
- External resource ports with automatic switching
- Look-ahead probe placement with ‘Bed-of-Nails’ style switching for high probe counts (maximizes execution speed)