

Test Program Standard and Conditions for

Digitaltest MTS-500/505 & Seica Pilot V8 Flying Probe Programs

Item 1

For each Circuit Card Assembly “CCA”, we require the following information and materials when placing your purchase order. Work will not commence on any purchase order until all of these items are received:

1. One (1) complete legible sets of electrical schematics. If schematics are 11 x 17 inches or smaller they should be provided by CAD, diskette or via e-mail. If schematics are larger than 11 x 17 inches a legible hard copy may be required.
2. An assembly drawing and mechanical layout drawing of the CCA.
3. A complete CCA parts list (BOM) showing the IC's used with their commercial type number and manufacturer in electronic format.
4. One known good board is required to fabricate a test fixture (Incase test fixture is needed). If possible, prior to debug, we would like six (6) or more known good boards to stabilize the analog and digital measurements.
5. If the board contains ROM, PROMs, PALs, or EPROMs, data should be provided.
6. If the board contains FPLD'S, JEDEC Files must be provided via e-mail or FTP.
7. CAD data with X/Y Pin, Net Listing, and Component Location files must be provided via e-mail or FTP. If you need the CAD file name, call TTCI for the file extension for your CAD system.
8. If special IC modeling is requested, TTCI may need specification sheets, timing diagrams, or functional description, etc. TTCI will acquire them over the WEB if available.
9. CAD data, preferably via e-mail or FTP. If card has to be digitalized, or CAD is not available and TTCI uses GERBER files, there will be an additional charge. TTCI

requires test point files either in the netlist or on a separate file.

10. In addition to the above, it is agreed and understood that TTCI shall have access to customer's Digitaltest or Seica Flying Probe for the purpose of selling off the test program. If such access is not available for any reason, then the time for performance under this contract shall be extended for a reasonable time after such access. If tester access delay occurs after TTCI test engineer travels to location of tester, an additional charge of \$175/hr. will be incurred. Most test programs are sold-off in a few hours.

Item 2

The test program(s) supplied by TTCI will conform to the following standards and requirements:

1. The test program(s) will be provided on a FTP or email.
2. Software models not included in the Digitaltest or Seica library will be included in TTCI format.
3. Devices will be used from the Digitaltest or Seica library. Devices not in standard library will be specified in the “Special Programming Considerations”. If a model is required that is not in the standard Digitaltest or Seica library, not stated in the “Special Programming Considerations” and requires more than two (2) hours preparation then the devices will not be tested or tested for an additional cost.
4. The test program will contain comments inserted to any area not generated by Digitaltest or Seica automatic program generation. This will indicate test activity at that point in the program. This eases changes that may be required later in the life of program to accommodate revisions to the board assembly etc.

Test Program Standard and Conditions for

Digitaltest MTS-500/505 & Seica Pilot V8 Flying Probe Programs

Item 2 (cont'd)

5. Upon completion, the test program documentation shall contain a final report consisting of the following information:
 1. Any circuit area which has design problems in the test engineer's opinion.
 2. Any errors on schematic or artwork.
 3. Any special interface problems.
 4. Schematic of the U.U.T. circuit interface, if any.
6. An operator's instruction page will appear on the monitor prior to the beginning of CCA testing and will include an operator's procedure.
7. Each test program will display a pass message on the monitor once it passes the testing process.
8. Limits will be used from B.O.M. or CAD data. Then Digitaltest or Seica system's limits will be used on all analog components when the circuit design allows. Limits will be open when the circuit design requires. See attached (Test Program Specification.) Test Program Specifications will be used as a guide line unless otherwise specified.
9. Functional block or Cluster testing can be performed on circuits that require a functional test for one reason or another. The price may change if not in TTCI quotation.
10. If special circuitry is added to the fixture, a wire list showing tester resources and a schematic of the interface circuit involved will be supplied.
11. The Fixture Costs are based on TTCI's actual costs plus shipping (where fixturing cost could vary). If the fixture costs vary more than one hundred dollars (\$100) from our estimated costs, plus shipping, we will credit or invoice the customer for the amount. See attached (Fixture Specifications.)

12. TTCI will supply a documentation package in a hard binder form having critical ASCII source files along with a set of back-up floppies with source files. In addition, TTCI will supply, within the binder, a copy of the schematics interface circuitry and any other associated special documentation needed as per this contract.

Item 3

Delivery and Acceptance

1. The program herein ordered will be complete and delivered to the customer on or before the date as quoted. Such completion shall be contingent upon the availability of parts and a known golden board that works at the start of the job.
2. Final acceptance of the test program and device adapter will be at the customer's facility on their Digitaltest or Seica system or at a facility agreed upon by both TTCI and the customer.
3. The final acceptance of all these test programs will be performed on TTCI's customer's Digitaltest or Seica using two or more known good CCA. Prior to acceptance testing, the customer will run diagnostics to verify the operating condition of the tester. If diagnostics are not run and problems arise while selling-off the test program because the customer's system is inoperative, the time spent for this delay may be billed to the customer. The CCA must pass error free. The customer then has the option of selecting up to twenty new boards or twenty faults for any of the testable analog and digital devices in order to verify the TTCI test program and fixture. If an ECO occurs and requires more than two (2) hours to incorporate, there will be an on-site fee charged at \$175/hr.

Test Program Standard and Conditions for

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Item 3 (cont'd)

4. Should the test program fail to pass the acceptance test because of a programming error, TTCI will correct the fault and rerun the test to the customer's satisfaction at no additional cost. If the test program fails because of the customer's hardware or software; the additional time incurred by TTCI personnel at the customer site will be charged to the customer at the hourly rate of \$175.00 and a charge of \$250.00 per diem. Work completed at TTCI due to customer's hardware and/or software problems will be charged to the customer at an hourly rate of \$175.00
5. All shipping charges for test programs will be F.O.B. shipping point, Hunt Valley, MD or shipped and billed to customers' carrier account number.

Item 4

Billing for test programs

1. See original Quote for specific payment terms.
2. Past due bills shall earn interest at the rate of 1.5% per month on the unpaid balance. If a past due bill is placed with an attorney for collection, customer agrees to pay an additional 15% of the balance due to compensate the collection attorney.
3. If a test program is delayed more than sixty (60) days due to the fault of the customer after the test program has begun, a partial payment will be required. If a test program is delayed more than three (3) months, a restart fee of \$1,500.00 is required.

Item 5

WARRANTY OF TEST PROGRAM

1. TTCI WILL REPAIR AT NO CHARGE FOR A PERIOD OF 90 DAYS AFTER DELIVERY, ANY DEFECT WHICH PREVENTS TEST PROGRAM FROM OPERATING IN ACCORDANCE WITH CONTRACTUAL PERFORMANCE SPECIFICATIONS. SOFTWARE WILL BE REPAIRED BY TELEPHONE IF POSSIBLE. PROGRAMS THAT CANNOT BE REPAIRED BY PHONE, WILL BE RETURNED TO TTCI AND REPAIRED AT TTCI'S FACILITY.
2. HARDWARE WILL BE REPAIRED AT NO CHARGE, BUT MUST BE RETURNED TO TTCI. IF TTCI MUST GO TO THE CUSTOMER'S SITE TO REPAIR, THEN COST OF TRIP WILL BE PAID FOR BY CUSTOMER. IF POSSIBLE, REPAIR MAY BE MADE BY TELEPHONE.
3. A COPY OF THE TEST PROGRAM WILL BE KEPT ON TTCI'S SYSTEM FOR A MINIMUM OF ONE (1) YEAR. TTCI WILL OFFER SUPPORT FOR ALL TEST PROGRAMS GUARANTEED FOR FIVE (5) YEARS AT THE COST OF TTCI'S ENGINEERING FEE AT THE TIME SUPPORT OCCURS.
4. EXCEPTIONS: *THE WARRANTY ON THIS PROGRAM AND DEVICE ADAPTOR DOES NOT APPLY IF MODIFIED BY THE CUSTOMER.*

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Item 5 (cont'd)

5. THE WARRANTY RECITED IN ITEM 5.2 IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THOSE DESCRIBED HEREIN. TTCI'S ONLY LIABILITY, UNDER THIS WARRANTY OR OTHERWISE, SHALL BE AS SET FORTH IN ITEM 5, PARAGRAPHS 1 AND 2. TTCI ASSUMES NO LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SUCH AS INJURY TO PERSON OR PROPERTY.

Item 6

Applicable Law and Jurisdiction:

1. The parties agreed that the law of the State of Maryland shall govern the interpretation of the rights and responsibilities of the parties under this contract.
2. Each party agrees that this contract was made in the State of Maryland, and that the

courts of that state shall have jurisdiction to resolve any dispute arising hereunder.

Item 7.

Hiring Practices:

With acceptance of this contract the customer agrees not to hire TTCI's programmers and staff for a period of one (1) year after said contract is complete. In return, TTCI will not hire the customer's programmers for a period of one (1) year after said contract is complete. It is the intention of this contract to supply programming services and we feel employee tampering and hiring practices should be restrained.

Item 8

No additions, corrections, or modifications to the original work or specifications shall be binding on either party unless evidenced by a separate writing, signed by both parties.

Item 9

Placement of a purchase order for this quotation is acceptance in full of the conditions in Items 4, 5, 6, 7, 8 and 9

The Test Connection, Inc. Hunt Valley, Maryland
Test Program Standard and Conditions (Item 2 Paragraph 8)
Test Program Specification (B) For Digitaltest or Seica Systems

Rev. 2.1
Date 11/21/04

Component Type	UUT Value	Component Tolerance	Tested Tolerance	Comments
Resistors	≤ 6 ohms			Will be tested as short
	> 6 ohms	1%	+/- 10%	
	> 1 Meg	1%	+/- 15%	Or greater %
	> 10 Meg	1%		No High, Low limit only
	≤ 6 ohms	5%		Will be tested as short
	> 6 ohms	5%	+/- 15%	
	> 1 Meg	5%	+/- 20%	Or greater %
	> 10 Meg	5%		No High, Low limit only
	≤ 6 ohms	10%		Will be tested as short
	> 6 ohms	10%	+/- 20%	
	> 1 Meg	10%	+/- 20%	Or greater %
	> 10 Meg	10%		No High, Low limit only
Capacitors	≤ 20 pf	1%		Will not be tested
	> 20 pf	1%	+/- 30%	
	> 40 pf	1%	+/- 20%	
	> 100 pf	1%	+/- 15%	
	> 100 uf	1%	+/- 10%	
	≤ 20 pf	5%		Will not be tested
	> 20 pf	5%	+/- 30%	
	> 40 pf	5%	+/- 20%	
	> 100 pf	5%	+/- 15%	
	> 100 uf	5%	+/- 20%	
	≤ 20 pf	10%		Will not be tested
	> 20 pf	10%	+/- 30%	
	> 40 pf	10%	+/- 25%	
	> 100 pf	10%	+/- 20%	
	> 0.01 uf	10%	+/- 20%	
> 10 uf	>10%	+40% -20%	Or Spec. which ever is larger	
Inductors (coil, transformers, relays,)	≤ 20 uh	10%		Will be tested as short
	> 20 uh	10%	+/-50%	Or greater
	> 10 mh	all %	+/-30%	Varies as function of freq.

When SOW is supplied:

Devices where system stray values result in exceeded SOW allowed measurement tolerances, will not be tested.

E.G. System Stray Capacitance is 10pF, DUT is 25pF 5% with measurement tolerance of ± 20% = 18.75pF to 31.25pF,

Nominal ± Stray = 15pF to 35pF ∴ because system stray has a range of 20pF and the allowable tolerance has a range of 12.5pF the DUT is not testable.