

Test Program Standard and Conditions for

Teradyne TestStation/GR228X or Keysight Technologies 307X In-Circuit 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.
4. One known good board is required to fabricate a test fixture. If possible, prior to debug, we would like six (6) or more known good boards to stabilize the analog measurement.
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 on diskettes.
7. CAD data with Drill Tape, 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 CCA 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. If CAD data does not have drill data, a N.C. drill file of the board is required; if not an additional charge of .35 per hole will be charged, and a bare CCA is required. These items will be returned when the total test program is completed.
11. In addition to the above, it is agreed and understood that TTCI shall have access to customer's 3070 or TestStation/GR228X In-Circuit tester 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 less than one day.

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 FLASH Drive, CD, or a 3070 data cartridge.
2. Software models not included in the TestStation/GR228X or 3070 library will be included in TTCI format.
3. Devices will be used from the TestStation/GR228X or 3070 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 TestStation/GR228X or 3070 library, not stated in the "Special Programming Considerations" and requires more that two (2) hours preparation then the devices will not be tested or tested for an additional cost.

Test Program Standard and Conditions for

Teradyne TestStation/GR228X or Keysight Technologies 307X In-Circuit Programs

Item 2. (cont'd)

4. The test program will contain comments inserted to any area not generated by TestStation/GR228X or 3070 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.
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. The operator's instruction page will display the fixture for that U.U.T. Also included on the operator's instruction page will be any switch, test plugs, test proms or any other setting which may be required for the test.
7. Each test program will display a pass message on the monitor once it passes the testing process.
8. Limits will be used in CKT file from B.O.M. or CAD data. Then TestStation/GR228X ATG or 3070 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 Specifications for GenRad 228X and Agilent Technologies 307X.) Test Program Specifications will be used as a guide line unless otherwise specified.
9. Full cell ROM memory tests will use a CRC type test. Full cell ROM memory tests will use DRIVE TABLE techniques.
10. AFTM or ASRU will be used to measure Oscillator frequency.
11. 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. The guided probe will be used to diagnose faults in these areas only when so stated in the Statement of Work.
12. If special circuitry is added to the fixture, a wire list showing D/S numbers and a schematic of the interface circuit involved will be supplied.
13. 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.)
14. 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.

Test Program Standard and Conditions for

Teradyne TestStation/GR228X or Keysight Technologies 307X In-Circuit Programs

Item 3. (cont'd)

2. Final acceptance of the test program and device adapter will be at the customer's facility on their TestStation/GR228X or 3070 test system or at a facility agreed upon by both TTCI and the customer. Test programs can be accepted by customer on TTCI's GenRad 2287 or Agilent Technologies 3070 Tester.
3. The final acceptance of all these test programs will be performed on TTCI's customer's TestStation/GR228X or 3070 tester using two or more known good CCAs. 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 CCAs 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 \$150/hr.
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.

Test Program Standard and Conditions for

Teradyne TestStation/GR228X or Keysight Technologies 307X In-Circuit Programs

Item 5 (cont'd)

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.*
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 five (5) years 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 TestStation/GR228X

Rev. 2.1
Date 5/21/99

Component Type	UUT Value	Component Tolerance	GenRad Tested Tolerance	Comments	
Resistors	10 -100 ohms	1%	+/- 10%	No High, Low limit only	
	101 to 1 M	1%	+/- 10%		
	1 M to 10 M	1%	+/- 15%		
	>10 Meg	1%			
	<100 ohms	5%	+/- 15%	Or greater % No High, Low limit only	
	101 to 1 M	5%	+/- 15%		
	1 M to 10 M	5%	+/- 20%		
	>10 Meg	5%			
	< 100 Ohms	10%	+/- 20%	Or greater % No High, Low limit only	
	>101 to 1 M	10%	+/- 20%		
	1 to 10 M	10%	+/- 20%		
	> 10 M	10%			
Capacitors	< 20 pf	1%		Will not be tested	
	21 - 40 pf	1%	+/- 25%		
	41 - 100 pf	1%	+/- 20%		
	101 - 1000 pf	1%	+/- 15%		
	101 uf	1%	+/- 10%		
	<20 pf	5%		Will not be tested	
	<40 pf	5%	+/- 25%		
	<100 pf	5%	+/- 20%		
	>101 pf	5%	+/- 20%		
	>100 uf	5%	+/- 20%		
	<20 pf	10%		Will not be tested	
	<40 pf	10%	+/- 25%		
	<100 pf	10%	+/- 25%		
	>101 pf	10%	+/- 20%		
	>.01 uf	10%	+/- 20%		
	>10 uf	>10%	+40% -20%		
	Inductors (coil, transformers, relays,)	<20 uh	10%	+/-	Will be tested as short Or greater Varies as function of freq.
		>20.1 uh	10%	+/-50%	
>10 mh		all %	+/-30%		

No High Guard test for resistors.