FLUKE®

CUSTOMER SERVICE

9000A-6502
INTERFACE POD
TEST FIXTURE

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INTRODUCTION

The Fluke Customer Service 9000 series test fixtures will verify proper operation of 9000 interface pods. Accompanying test software will exercise the pod and identify faulty functions and lines. The 9000A-6502 and 9000A-6800 Interface Pods are both tested on one fixture. The fixture consists of test points for all UUT cable lines, a ROM to execute a 'RUN UUT' program, and a divider circuit to simulate power supply faults. Once the software has identified a faulty line, a technican familiar with the pod theory may use the 9010A's troubleshooting functions to locate the cause.

The test program utilizes the 9010A and probe to verify proper activity at all test test points in both a NORMAL and 'RUN UUT' mode. One hand operation is allowed with software that senses when the probe is in place, stimulates the test point, takes a reading, and compares the result with the expected result. Input lines are stimulated by jumpering a test point high or low. The software will optionally loop on a failure to allow probing back thru the pod circuitry. A complete pod test takes under ten minutes to complete.

OPERATION

Plug the test fixture into the pod self test socket and the UUT cable into the fixture socket. Place S2 in the 6502 position. Load the 6502 pod tape and execute program 0. A menu will appear allowing selection of either the 'NORMAL' or the 'RUN UUT' tests. Follow the displayed test instructions to probe or jumper the fixture test points. A pass is indicated with a single beep and a brief display message such as:

TP 17 LOGIC LVL HXL = HXL PASS

A failure is indicated with three beeps and a display message such as :

TP 17 LOGIC LVL HXL= H FAIL LOOP?

The operator may loop on the failure by pressing YES or LOOP. When looping on a failure a beep will indicate a pass condition, allowing intermittents to be traced without watching the 9010A display. Press CONT to exit the loop and continue to the next test. In addition to faults detected by the test program, the 9010A will interrupt and report any time that it's software detects a failure. Note however that the test program has disabled certain UUT system errors with the set up commands. Refer to the program listings for set up information.

NOTE

A 'POD TIMEOUT-ATTEMPTING RESET' error message indicates an inoperative pod and will not allow the program to run. Refer to section 5 of the pod manual to troubleshoot an inoperative pod.

NORMAL TEST

The 'NORMAL' test is divided into 13 sub tests. Upon selection of this test, the starting sub test number (1-13) must be entered. This allows branching to a specific routine during troubleshooting. The tests are sequenced to find major faults early. If the condition of the pod is unknown begin with sub test 1; the remaining tests will automatically follow in sequence.

SUB TEST 1 - POWER SUPPLY CHECK
The probe is used to check the presence of the +5 volt supply.

SUB TEST 2 - CLOCK CHECK
The probe is used to verify the phase 1 and 2 clock inputs are toggling.

SUB TEST 3 - STATUS CHECK
All status lines are probed for proper inactive levels.

SUB TEST 4 - READ STATUS TEST
The status lines are read by the pod for proper inactive levels. Each status line is then jumpered to the active state and read by the pod.

SUB TEST 5 - POWER SUPPLY STATUS TEST
Power supply status is read by the pod and checked for a no-fault condition. Divider switch S1 is then pressed and status is checked for a fault condition.

SUB TEST 6 - CONTROL CHECK
Each contol line is read by the probe for proper levels.

SUB TEST 7 - WRITE CONTROL TEST
User writable control lines are toggled in sequence and verified with the probe for proper levels.

SUB TEST 8 - ADDRESS TOGGLE TEST
Each address line is toggled in sequence and verified with the probe for proper levels.

SUB TEST 9 - DATA TOGGLE TEST
Each data line is toggled in sequence and verified with the probe for proper levels.

SUB TEST 10 - BUS TEST
A bus test is executed.

SUB TEST 11 - READ DATA TEST
Data is read at address 800 (starting address of ROM) and 801.

SUB TEST 12 - SIGNATURE STABILITY TEST
Data is ramped at FFFF and a signature is gathered at data line D0.
The test is repeated three times to verify a stable signature of 96EC.

SUB TEST 13 - TEST FIXTURE ROM TEST (6800 - 6502 FIXTURE ROM VER 1.1)
A ROM test is executed from 800 - FFF and signature 91CD verified.
At the completion of sub test 13 the test menu is displayed again.

RUN UUT TEST

The 'RUN UUT ' test executes a program in the fixture ROM that toggles a certain set of address lines. Both interrupt lines are asserted in sequence, causing an additional address line to toggle indicating the interrupt occured. Refer to the fixture theory of operation for a more detailed description of the ROM program.

The 'RUN UUT' test is divided into four sub tests. No provision is made to branch to a particular sub test because the outcome of some tests are dependent on previous test conditions.

SUB TEST 1 - CONTROL TESTS
The 9010A program places the pod in the 'RUN UUT' mode. A reset is performed and the fixture ROM executes the program at address 800. All control lines are probed for proper activity.

SUB TEST 2 - ADDRESS TESTS
All address lines are probed for proper activity as defined by the fixture ROM program.

SUB TEST 3 - DATA TESTS
All data lines are probed for activity.

SUB TEST 4 - INTERRUPT TESTS
The IRQ line is touched low. AD14 will toggle if the interrupt is accepted.
The NMI line is touched low. AD15 will toggle if the interrupt is accepted.

IMMEDIATE MODE TESTS

The programmed tests do not test the pod's ability to sense shorted or tied lines. These errors cannot be trapped by the software, therefore they must be tested in the immediate mode. Follow the procedure below after the pod has passed the programmed tests.

1. Perform a looping BUS TEST.

2. Short adjacent address lines a pair at a time (1 to 2, 2 to 3, ect.) and observe a failure on the 9010A display.

3. Tie each address line low, then high and observe a failure on the 9010A display for each case.

4. Repeat steps 2 and 3 for the data lines.

5. Tie each control line high, then low and observe a failure on the 9010A display for each case.

FIXTURE THEORY OF OPERATION

The test fixture receives power and clock signals from the pod self test socket. No other connections to the self test socket are made. A divider and switch on the supply allows low line fault testing. S1 reduces the + 5 volt supply to + 4.5 volts. TP 41 is tied to + 5 volts through a 20 ohm resistor to provide a logic high level for stimulus of other test points through a jumper. TP 37 is used to tie other test points low. S2 sets the ROM U1 address bit 10 high for 6502 testing.

Test points 1 - 40 allow access to all lines of the pod UUT cable for probing or stimulus as required. All status lines are tied to their inactive state with Z1. One of U2's NAND gates is wired to invert the 6502 R/W line to the ROM U1. A0 - A10 are used to address ROM U1. A11 must be high to select U1 through inverter U2.

ROM U1 contains a program to test the 'RUN UUT' function. A low on the RESET line will cause the program to execute at address location 800, enable the IRQ interrupt, and toggle AD12. A low on the IRQ line causes the interrupt service routine at location CA0 to toggle AD14. A low on the NMI line causes the interrupt service routine at location CE0 to toggle AD15.

SOFTWARE DESCRIPTION

The test software consists of 19 programs, 2 of which are the 'NORMAL' and 'RUN UUT' tests for a particular pod. The remaining 17 programs are subroutines common to all fixtures. The program functions are outlined below. Refer to the program listings for detailed descriptions.

PROGRAM 0 is a menu to select either the 'NORMAL' or 'RUN UUT' tests.

PROGRAM 1 performs a read probe.

PROGRAM 2 toggles the address bit specified in REG D four times and performs a read probe.

PROGRAM 3 toggles the data bit specified in REG D four times and performs a read probe.

PROGRAM 4 toggles the control bit specified in REG D four times and performs a read probe.

PROGRAM 5 performs a read probe after a 1/4 second delay.

PROGRAM 6 ramps data at FFFF and performs a read probe. The signature is compared to the expected (REG A). This is performed three times to verify stable signatures.

PROGRAM 7 gathers probe history while performing a write operation.

PROGRAM 90 performs a read operation at the location specified in REG 3. Expected data is specified in REG 2. Program exits if expected data equals the actual, else the operator may branch to a loop - on - fail routine.

PROGRAM 91 performs a read status and displays the actual (REG C) and expected (REG A) levels.

PROGRAM 92 performs a status read operation at the test point specified in REG 9. Operator is instructed to place jumpers or press buttons as specified in REG 8. Program exits if expected status equals the actual, else the operator may branch to a loop-on-fail routine.

PROGRAM 93 calls program 1 to perform a read probe, then decodes the the probe history in REG C into level, count, or signature information as specified in REG 8. The expected and decoded probe history is displayed.

PROGRAM 94 selects the sync mode specified in REG 8 and calls PROG 93 to perform a read probe and display the history at the test point specified in REG 9. The program exits if expected history equals the actual, else the operator may branch to a loop-on-fail routine.

PROGRAM 95 detects when the probe has been removed from the test point.

PROGRAM 96 detects when the probe has been placed on a test point. If a valid level is not detected within 4 seconds the program will timeout.

PROGRAM 97 provides a one second delay.

PROGRAM 98 provides a 1/4 second delay.

PROGRAM 64 is the 'NORMAL' test for the 6502 pod. The starting sub test is selected and the program branches to the appropriate label. REG 8 is encoded with the test information as outlined in the REGISTER DECODING charts shown in the next section. The appropriate subroutine (program 90, 92, or 94) is called for read data, read status, or read probe operations respectively. Refer to the program listings for test discriptions.

PROGRAM 65 is the 'RUN UUT' test for the 6502 pod. The pod is placed in the 'RUN UUT' mode and a reset is performed to run the ROM program. REG 8 is encoded with test information as outlined in the REGISTER 8 DECODING charts shown in the next section. The appropriate subroutine (program 90,92, or 94) is called for read data, read status, or read probe operations respectively. Refer to the program listings for test discriptions.

REGISTER 8 ENCODING

(1) REGISTER 8 ENCODING FOR DATA READS - PROGRAM 90

```
                READ ADDRESS          DATA
                bits  23 - 8          7 - 0
              \_______________/     \_______/
0000 0000 XXXX XXXX XXXX XXXX       XXXX XXXX
                ( 0 - FFFF )        ( 0 - FF )
```

EXAMPLE : REG 8 = 00FFFFFF, CALL PROGRAM 90

PERFORM READ @ FFFF
EXPECTED DATA = FF

(2) REGISTER 8 ENCODING FOR STATUS READS - PROGRAM 92

```
          STATUS BIT MASK   PASS      SWITCH        TIE  TP      TEST POINT
            bits 23-12       11       10 - 9         8 - 7        5 - 0
          \_____________/    \_/       \_/           \_/       \_________/
0000 0000 XXXX XXXX XXXX     X         XX            XX        0XX  XXXX
            ( 0 - 4095 )                                       ( 0 - 63 )
```

PASS	SWITCH	TIE TP
0 = LO	00 = NO PUSH	00 = DO NOT TIE TP
1 = HI	01 = PUSH S1	01 = TIE TP LOW
	10 = PUSH S2	11 = TIE TP HI
	11 = PUSH S3	

EXAMPLE: REG8 = 00010999 , CALL PROG 92

Test point = 25
Tie TP 25 high
Do not push button
Pass if status reads high
Status bit mask = 000000010000

(3) REGISTER 8 ENCODING FOR PROBE HISTORY - PROGRAM 94

```
     Expected signature, count,          Sync &     Stimulus          Test point
     or level history.                  read.      Program #

          bits  31 - 16                 15 - 12      11 - 6            5 - 0
     \_____________________/            \_/       \_________/       \_________/
SIG  XXXX  XXXX  XXXX  XXXX             XXXX       XXXX  XX          XX  XXXX
                                                    ( 0 - 63 )        ( 0 - 63 )
HIST 0000  0000  0000  01xh

CONT 0XXX  XXXX  0XXX  XXXX
       \_______/   \_______/
     MIN COUNT     MAX COUNT
     ( 0-127 )     ( 0-127 )
```

SYNC & READ
0001 = freerun - level
0010 = freerun - count
0100 = address - signature
0101 = address - level
0110 = address - count
1000 = data - signature
1001 = data - level
1010 = data - count

EXAMPLE: REG8 = 00051081 , CALL PROGRAM 94

Test point = 1
Stimulus program = 2
Sync = freerun
Read = level history
Expected level history = LH

```
*************************************************************
*************************************************************
***                                                       ***
***   TITLE:    FLUKE 9000A 6502 INTERFACE POD TESTS      ***
***   VERSION:  REV 1.0     SEP 15 1982                   ***
***   AUTHOR:   ED FERGUSON                               ***
***             CUSTOMER SERVICE ENGINEERING              ***
***             JOHN FLUKE MFG. CO., INC.                 ***
***                                                       ***
*************************************************************
*************************************************************
```


SET UP INFORMATION

```
   TRAP BAD PWR SUPPLY ? - NO          TRAP ILLEGAL ADDR ? - YES
   TRAP ACTIVE INTERRUPT ? - NO        TRAP ACTIVE FORCE LINE ? - NO
   TRAP CTL ERR ? - YES                TRAP ADDR ERR ? - YES
   TRAP DATA ERR ? - YES               ENABLE RDY ? - NO
   RUN UUT @ 0000                      BUS TEST @ 0000
   EXERCISE ERRORS ? - YES             BEEP ON ERR TRANSITION ? - YES
   STALL 13                            UNSTALL 11
   NEWLINE 00000D0A                    LINESIZE 79
   TIMEOUT 200
```

PROGRAM 0 MENU

```
   DPY *** 6502 POD TESTS
   DPY-+ REV 1.0 ***#
   EXECUTE PROGRAM 97
   DPY- *** FLUKE CUSTOMER
   DPY-+ SERVICE ***#
   EXECUTE PROGRAM 97
   DPY-SET SW2 TO 6502
   DPY-+ THEN PRESS CONT#
   STOP
0: LABEL 0
   DPY-TEST? 1-POD NORMAL
   DPY-+ 2-POD RUN UUT
1: LABEL 1
   DPY-+#
   REG1 = 40
   DPY-+%1
2: LABEL 2
   IF REG1 = 40 GOTO 2
   IF REG1 = 1 GOTO 3
   IF REG1 = 2 GOTO 4
   GOTO 1
3: LABEL 3
   EXECUTE PROGRAM 64
   GOTO 0
4: LABEL 4
   EXECUTE PROGRAM 65
```

PROGRAM 1 READ PROBE; NO DELAY

```
   READ PROBE                                    CLEAR PROBE
   READ PROBE                                    READ LOGIC HISTORY
   REGC = REG0                                   ASSIGN HISTORY TO GLOBAL REG C
```

PROGRAM 2 ADDRESS TOGGLE

```
   READ PROBE                                    CLEAR PROBE
   ATOG @ 0 BIT REGD REPT REPT REPT              TOGGLE ADDR BIT(REG D) 4 TIMES
   READ PROBE                                    READ LOGIC HISTORY
   REGC = REG0                                   ASSIGN HISTORY TO GLOBAL REG C
```

PROGRAM 3 DATA TOGGLE

```
   READ PROBE                                    CLEAR PROBE
   DTOG @ FFFF = FF BIT REGD REPT REPT REPT      TOGGLE DATA BIT(REG D) 4 TIMES
   READ PROBE                                    READ LOGIC HISTORY
   REGC = REG0                                   ASSIGN HISTORY TO GLOBAL REG C
```

PROGRAM 4 CONTROL TOGGLE

```
   SYNC ADDR
   READ PROBE                                    CLEAR PROBE
   DTOG @ CTL = 00000000 BIT REGD REPT REPT REPT TOGGLE CTL BIT(REG D) 4 TIMES
   READ PROBE                                    READ LOGIC HISTORY
   REGC = REG0                                   ASSIGN HISTORY TO GLOBAL REG C
```

PROGRAM 5 READ PROBE; 1/4 SECOND DELAY

```
   READ PROBE                                    CLEAR PROBE
   EXECUTE PROGRAM 98                            DELAY 1/4 SECOND
   READ PROBE                                    READ LOGIC HISTORY
   REGC = REG 0                                  ASSIGN HISTORY TO GLOBAL REG C
```

PROGRAM 6 SIGNATURE STABILITY

```
   REG1 = 3                                      INITIAIZE LOOP COUNTER
0: LABEL 0                                       BEGIN LOOP
   READ PROBE                                    CLEAR PROBE
   RAMP @ FFFF                                   RAMP DATA AT ADDRESS FFFF
   READ PROBE                                    READ PROBE HISTORY
   REGC = REG0                                   ASSIGN HISTORY TO GLOBAL REG C
   REG0 = REG0 SHR SHR SHR SHR
   REG0 = REG0 SHR SHR SHR SHR AND FFFF          ACTUAL SIGNATURE
   IF REGA = REG0 GOTO 1                         EXPECTED = ACTUAL; LOOP AGAIN
   GOTO 2                                        EXPECTED <> ACTUAL; EXIT
1: LABEL 1
   DEC REG 1                                     DECREMENT LOOP COUNTER
   IF REG1 > 0 GOTO 0                            3 LOOPS
2: LABEL 2                                       EXIT
```

PROGRAM 7 R/W LINE

```
   SYNC ADDRESS
   READ PROBE
   WRITE @ FFFF = FF
   READ PROBE
   REGC = REG0
```

PROGRAM 90 DATA TEST

```
   REG2 = REG8 AND FF                  EXPECTED DATA (REG 2)
   REG3 = REG8 SHR SHR SHR SHR
   REG3 = REG3 SHR SHR SHR SHR
   REG3 = REG3 AND FFFF                READ ADDRESS (REG 3)
   READ @ REG3                         READ DATA
   DPY-READ DATA $2=$E                 EXPECTED DATA = ACTUAL DATA
   IF REG2 = REGE GOTO 6               BRANCH PASS
   DPY-+ FAIL LOOP?#                   FAIL;LOOP?
   EXECUTE PROGRAM 98                  DELAY
   DPY-+#                              BEEP
   EXECUTE PROGRAM 98                  DELAY
0: LABEL 0
   DPY-+#                              BEEP
   REG1 = 40                           NO KEYS THIS VALUE
   DPY-+%1                             ENABLE INPUT
1: LABEL 1                             SELECT OPTION ENTRY
   IF REG1 = 40 GOTO 1                 LOOP UNTIL INPUT
   IF REG1 = 1C GOTO 2                 PRESSED 'YES'
   IF REG1 = 27 GOTO 2                 PRESSED 'LOOP'
   IF REG1 = 1D GOTO F                 PRESSED 'NO'
   IF REG1 = 25 GOTO F                 PRESSED 'CONTINUE'
   GOTO 0                              PRESSED INVALID KEY
2: LABEL 2                             LOOP ENTRY
   REGB = 40                           NO KEYS THIS VALUE
   DPY-+%B                             ENABLE INPUT
3: LABEL 3
   READ @ REG3                         READ DATA
   DPY-READ DATA $2=$E                 EXPECTED DATA = ACTUAL DATA
   IF REG2 = REGE GOTO 4               BRANCH PASS
   DPY-+ FAIL                          FAIL
   GOTO 5                              BRANCH CHECK KEY
4: LABEL 4                             PASS ENTRY
   DPY-+ PASS#                         PASS
5: LABEL 5                             CHECK KEY
   IF REGB = 40 GOTO 3                 LOOP UNTILL CONT PRESSED
   IF REGB = 25 GOTO F                 PRESSED CONT;BRANCH EXIT
   DPY-+#                              BEEP
   GOTO 2                              PRESSED INVALID KEY
6: LABEL 6                             PASS ENTRY
   DPY-+ PASS#                         PASS
   EXECUTE PROGRAM 98                  DELAY
F: LABEL F                             EXIT
```

PROGRAM 91 STATUS READER

```
   READ @ STS REPT                      READ STATUS
   REGC = REGC AND FFF                  ACTUAL STATUS 12 LINES (REG C)
   REGA = REG8 SHR SHR SHR SHR
   REGA = REGA SHR SHR SHR SHR
   REGA = REGA SHR SHR SHR SHR
   REGA = REGA AND FFF                  EXPECTED STATUS (REG A)
   IF REG9 > 0 GOTO 0                   BRANCH DISPLAY TEST POINT
   DPY-POWER                            POWER SUPPLY STATUS
   GOTO 1                               BRANCH DISPLAY STATUS
0: LABEL 0                              TEST POINT ENTRY
   DPY-TP@9                             DISPLAY TEST POINT (REG 9)
1: LABEL 1                              DISPLAY STATUS ENTRY
   IF REG8 AND 800 = 800 GOTO 2         EXPECTING HIGH STATUS
   CPL REGC                             EXPECTING LOW ;COMPLEMENT ACTUAL STATUS
   REGC = REGC AND FFF                  12 STATUS LINES (REG C)
   DPY-+ STATUS LOW=                    EXPECTING LOW STATUS
   GOTO 3                               BRANCH DISPLAY ACTUAL STATUS
2: LABEL 2                              EXPECTING HIGH STATUS ENTRY
   DPY-+ STATUS HIGH=                   EXPECTING HIGH STATUS
3: LABEL 3                              DISPLAY ACTUAL STATUS ENTRY
   IF REGA AND REGC = REGA GOTO 5       EXPECTED STATUS=ACTUAL; BRANCH PASS
   IF REG8 AND 800 = 800 GOTO 4         EXPECTED HIGH STATUS; BRANCH FAIL LOW
   DPY-+HIGH FAIL                       EXPECTED LOW STATUS; FAIL HIGH
   GOTO F                               BRANCH EXIT
4: LABEL 4                              FAIL LOW ENTRY
   DPY-+LOW FAIL                        FAIL LOW STATUS
   GOTO F                               BRANCH EXIT
5: LABEL 5                              PASS STATUS ENTRY
   IF REG8 AND 800 = 800 GOTO 6         BRANCH;EXPECTED A HIGH
   DPY-+LOW PASS#                       PASS LOW
   GOTO F                               BRANCH EXIT
6: LABEL 6                              PASS HIGH ENTRY
   DPY-+HIGH PASS#                      PASS HIGH
F: LABEL F                              EXIT
```

PROGRAM 92 STATUS TEST

```
   REG9 = REG8 AND 3F                  TEST POINT (REG 9)
   IF REG8 AND 80 = 0 GOTO 3           BRANCH PRESS SWITCH
0: LABEL 0                             TEST POINT ENTRY
   DPY-JUMPER TP@9                     JUMPER TEST POINT (REG 9)
   IF REG8 AND 100 = 100 GOTO 1        BRANCH JUMPER TEST POINT HIGH
   DPY-+ LOW                           JUMPER TEST POINT LOW
   GOTO 2                              BRANCH WAIT FOR CONTINUE
1: LABEL 1                             JUMPER TEST POINT HIGH ENTRY
   DPY-+ HIGH                          JUMPER TEST POINT HIGH
2: LABEL 2                             WAIT FOR CONTINUE ENTRY
   DPY-+ THEN PRESS CONT#              PRESS CONTINUE KEY
   STOP                                WAIT FOR CONTINUE
3: LABEL 3                             PRESS SWITCH ENTRY
   IF REG8 AND 600 = 0 GOTO 4          NO SWITCH; BRANCH READ STATUS
   REGD = REG8 SHR SHR SHR SHR
   REGD = REGD SHR SHR SHR SHR
   REGD = REGD SHR AND 3               SWITCH NUMBER (REG D)
   DPY-HOLD SWITCH                     HOLD SWITCH DOWN
   DPY-+@D THEN PRESS CONT#            PRESS CONTINUE KEY
   STOP                                WAIT FOR CONTINUE
4: LABEL 4                             READ STATUS ENTRY
   EXECUTE PROGRAM 91                  STATUS READER
   IF REGA AND REGC = REGA GOTO B      EXPECTED=ACTUAL; BRANCH PASS
   DPY-+ LOOP?#                        FAIL; LOOP?
   EXECUTE PROGRAM 98                  DELAY
   DPY-+#                              BEEP
   EXECUTE PROGRAM 98                  DELAY
5: LABEL 5                             ENABLE INPUT ENTRY
   DPY-+#                              BEEP
   REG1 = 40                           NO KEYS THIS VALUE
   DPY-+%1                             ENABLE INPUT
6: LABEL 6                             SELECT OPTION ENTRY
   IF REG1 = 40 GOTO 6                 LOOP UNTIL INPUT
   IF REG1 = 1C GOTO 7                 PRESSED 'YES'
   IF REG1 = 27 GOTO 7                 PRESSED 'LOOP'
   IF REG1 = 1D GOTO B                 PRESSED 'NO'
   IF REG1 = 25 GOTO B                 PRESSED 'CONTINUE'
   GOTO 5                              PRESSED INVALID KEY
7: LABEL 7                             LOOP ENTRY
   REGB = 40                           NO KEYS THIS VALUE
   DPY-+%B                             ENABLE INPUT
8: LABEL 8
   EXECUTE PROGRAM 91                  STATUS READER
   IF REGA AND REGC = REGA GOTO 9      EXPECTED=ACTUAL; BRANCH PASS
   GOTO A                              EXPECTED<>ACTUAL;BRANCH CHECK KEY
9: LABEL 9                             PASS ENTRY
   DPY-+#                              BEEP
A: LABEL A                             CHECK KEY ENTRY
   IF REGB = 40 GOTO 8                 LOOP UNTIL CONT PRESSED
   IF REGB = 25 GOTO B                 PRESSED CONT;BRANCH EXIT
   DPY-+#                              BEEP
   GOTO 7                              PRESSED INVALID KEY
B: LABEL B                             PASS ENTRY
   EXECUTE PROGRAM 98                  DELAY
C: LABEL C                             EXIT LOOP ENTRY
   IF REG8 AND 80 = 80 GOTO D          BRANCH REMOVE JUMPER
```

```
   IF REG8 AND 600 > 0 GOTO E          BRANCH RELEASE SWITCH
   GOTO F                              BRANCH EXIT
D: LABEL D                             REMOVE JUMPER ENTRY
   DPY-REMOVE JUMPER                   REMOVE JUMPER
   DPY-+ THEN PRESS CONT#              PRESS CONTINUE
   STOP                                WAIT FOR CONTINUE
   GOTO F                              BRANCH EXIT
E: LABEL E                             RELEASE SWITCH ENTRY
   DPY-RELEASE SW@D                    RELEASE SWITCH
   DPY-+ THEN PRESS CONT#              PRESS CONTINUE
   STOP                                WAIT FOR CONTINUE
F: LABEL F                             EXIT
```

PROGRAM 93 PROBE HISTORY READER

```
   IF REG8 AND 2000 = 2000 GOTO 1          BRANCH EVENTS
   IF REG8 AND 1000 = 1000 GOTO 5          BRANCH HISTORY
0: LABEL 0                                 SIGNATURE ENTRY
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR AND FFFF    ACTUAL SIGNATURE (REG C)
   DPY-TP@9 SIG $A=$C                      EXPECTED SIG = ACTUAL
   GOTO F                                  BRANCH EXIT
1: LABEL 1                                 EVENTS ENTRY
   REGC = REGC AND 7F                      ACTUAL COUNT
   REG2 = REGA AND 7F                      MAX COUNT EXPECTED
   REG1 = REGA SHR SHR SHR SHR SHR         MIN COUNT EXPECTED
   REGA = REGA SHR SHR SHR AND 7F
   IF REG1 > REG2 GOTO 2                   BRANCH COUNT WRAP
   IF REGC > REG2 GOTO 3                   BRANCH >MAX FAIL
   IF REG1 > REGC GOTO 3                   BRANCH < MIN FAIL
   GOTO 4                                  BRANCH PASS
2: LABEL 2                                 COUNT WRAP ENTRY
   IF REG2 >= REGC GOTO 4                  BRANCH PASS
   IF REGC >= REG1 GOTO 4                  BRANCH PASS
3: LABEL 3                                 FAIL COUNT ENTRY
   DPY-TP@9 COUNT @1-@2 =@C                MIN-MAX=ACTUAL
   GOTO F                                  BRANCH EXIT
4: LABEL 4                                 PASS ENTRY
   DPY-TP@9 COUNT @1-@2 =@C                MIN-MAX=ACTUAL
   REGC = REGA                             FORCE A PASS;COUNTS IN RANGE
   GOTO F                                  BRANCH EXIT
5: LABEL 5                                 HISTORY ENTRY
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR
   REGC = REGC SHR SHR SHR SHR             LOGIC LEVEL HISTORY (REG C)
   DPY-TP@9 LOGIC LVL                      TEST POINT (REG 9)
   IF REGA AND 1 = 0 GOTO 6                BRANCH NOT HIGH
   DPY-+H                                  EXPECTED HIGH
6: LABEL 6
   IF REGA AND 2 = 0 GOTO 7                BRANCH NOT TRI
   DPY-+X                                  EXPECTED TRISTATE
7: LABEL 7
   IF REGA AND 4 = 0 GOTO 8                BRANCH NOT LOW
   DPY-+L                                  EXPECTED LOW
8: LABEL 8
   DPY-+=                                  EQUALS
9: LABEL 9
   IF REGC AND 1 = 0 GOTO A                BRANCH NOT HIGH
   DPY-+H                                  READ HIGH
A: LABEL A
   IF REGC AND 2 = 0 GOTO B                BRANCH NOT TRISTATE
   DPY-+X                                  READ TRISTATE
B: LABEL B
   IF REGC AND 4 = 0 GOTO C                BRANCH NOT LOW
   DPY-+L                                  READ LOW
C: LABEL C
   IF REGC > 0 GOTO F                      BRANCH NOT TRISTATE
   DPY-+X                                  READ TRISTATE
F: LABEL F                                 EXIT
```

PROGRAM 94 PROBE HISTORY TEST

```
   REG9 = REG8 AND 3F                                  TEST POINT (REG 9)
   REGA = REG8 SHR SHR SHR SHR SHR SHR SHR SHR
   REGA = REGA SHR SHR SHR SHR SHR SHR SHR SHR         EXPECTED PROBE READING
   DPY-PROBE TP@9                                      TEST POINT (REG 9)
   EXECUTE PROGRAM 96                                  PLACE PROBE
   SYNC FREE-RUN
   IF REG8 AND C000 = 0 GOTO 0                         SYNC FREE RUN
   SYNC ADDRESS
   IF REG8 AND 4000 > 0 GOTO 0                         SYNC ADDRESS
   SYNC DATA                                           SYNC DATA
0: LABEL 0
   REG2 = REG8 SHR SHR SHR SHR SHR SHR AND 3F
   EXECUTE PROGRAM REG2                                TEST PROGRAM (REG 2)
   EXECUTE PROGRAM 93                                  PROBE HISTORY READER
   IF REGA = REGC GOTO 7                               EXPECTED=PROBE READING
   DPY-+ FAIL LOOP?#                                   FAIL; LOOP ?
   EXECUTE PROGRAM 98                                  DELAY
   DPY-+#                                              BEEP
   EXECUTE PROGRAM 98                                  DELAY
1: LABEL 1                                             ENABLE INPUT ENTRY
   DPY-+#                                              BEEP
   REG1 = 40                                           NO KEYS THIS VALUE
   DPY-+%1                                             ENABLE INPUT
2: LABEL 2                                             SELECT OPTION ENTRY
   IF REG1 = 40 GOTO 2                                 LOOP UNTIL INPUT
   IF REG1 = 1C GOTO 3                                 PRESSED 'YES'
   IF REG1 = 27 GOTO 3                                 PRESSED 'LOOP'
   IF REG1 = 1D GOTO 8                                 PRESSED 'NO'
   IF REG1 = 25 GOTO 8                                 PRESSED 'CONTINUE'
   GOTO 1                                              PRESSED INVALID KEY
3: LABEL 3                                             LOOP ENTRY
   REGB = 40                                           NO KEYS THIS VALUE
   DPY-+%B                                             ENABLE INPUT
4: LABEL 4
   REG2 = REG8 SHR SHR SHR SHR SHR SHR AND 3F
   EXECUTE PROGRAM REG2                                TEST PROGRAM (REG 2)
   EXECUTE PROGRAM 93                                  PROBE HISTORY READER
   IF REGA = REGC GOTO 5                               EXPECTED=ACTUAL;PASS
   DPY-+ FAIL                                          FAIL
   GOTO 6                                              BRANCH CHECK KEY
5: LABEL 5                                             PASS ENTRY
   DPY-+ PASS#                                         PASS
6: LABEL 6                                             CHECK KEY ENTRY
   IF REGB = 40 GOTO 4                                 LOOP UNTILL CONT PRESS
   IF REGB = 25 GOTO 8                                 PRESSED CONT;EXIT
   DPY-+#                                              BEEP
   GOTO 3                                              PRESSED INVALID KEY
7: LABEL 7                                             PASS ENTRY
   DPY-+ PASS#                                         PASS
   EXECUTE PROGRAM 98                                  DELAY
8: LABEL 8                                             EXIT LOOP ENTRY
   EXECUTE PROGRAM 95                                  REMOVE PROBE
```

PROGRAM 95 REMOVE PROBE

```
   SYNC FREE-RUN                          FREE RUN PROBE
0: LABEL 0                                BEGIN PASS COUNT ENTRY
   REG1 = 4                               INITIALIZE PASS COUNTER
1: LABEL 1                                BEGIN HISTORY LOOP
   READ PROBE                             READ PROBE HISTORY
   IF REG0 AND 5000000 = 0 GOTO 2         BRANCH; NOT HIGH OR LOW
   DPY-REMOVE PROBE                       HIGH OR LOW DETECTED
   GOTO 0                                 START OVER
2: LABEL 2                                TRI-STATE ENTRY
   DEC REG1                               DECREMENT PASS COUNTER
   IF REG1 > 0 GOTO 1                     LOOP 4 TIMES
F: LABEL F                                EXIT WHEN 4 CONSECITIVE
                                          READS ARE TRISTATE.
```

PROGRAM 96 PLACE PROBE

```
   SYNC FREE-RUN                          FREE RUN PROBE
   REG1 = 6F                              INITIALIZE TIME OUT COUNTER
0: LABEL 0                                BEGIN PASS COUNT ENTRY
   DEC REG1                               DECREMENT TIME OUT COUNTER
   IF REG1 = 0 GOTO F                     BRANCH TIME OUT
   REG2 = 4                               INITIALIZE PASS COUNTER
1: LABEL 1                                BEGIN HISTORY LOOP
   READ PROBE                             READ PROBE HISTORY
   IF REG0 AND 5000000 = 0 GOTO 0         BRANCH NOT HIGH OR LOW
   DEC REG2                               DECREMENT PASS COUNTER
   IF REG2 > 0 GOTO 1                     BRANCH READ AGAIN
F: LABEL F                                EXIT WHEN 4 CONSECITIVE READS
                                          ARE NON-TRISTATE, OR AFTER A
                                          4 SECOND TIMEOUT.
```

PROGRAM 97 1 SECOND DELAY

```
0: LABEL 0
   INC REG 1
   IF 4F > REG1 GOTO 0
```

PROGRAM 98 1/4 SECOND DELAY

```
0: LABEL 0
   INC REG1
   IF F > REG1 GOTO 0
```

```
PROGRAM 64  6502 POD TESTS

0: LABEL 0
   DPY-ENTER STARTING TEST 1-13 ?
   DPY-+\1
   IF REG1 = 1 GOTO 1                    POWER SUPPLY CHECK
   IF REG1 = 2 GOTO 2                    CLOCK CHECK
   IF REG1 = 3 GOTO 3                    STATUS CHECK
   IF REG1 = 4 GOTO 4                    READ STATUS TEST
   IF REG1 = 5 GOTO 5                    POWER SUPPLY STATUS TEST
   IF REG1 = 6 GOTO 6                    CONTROL CHECK
   IF REG1 = 7 GOTO 7                    WRITE CONTROL TEST
   IF REG1 = 8 GOTO 8                    ADDRESS TOGGLE TEST
   IF REG1 = 9 GOTO A                    DATA TOGGLE TEST
   IF REG1 = A GOTO C                    BUS TEST
   IF REG1 = B GOTO D                    READ DATA TEST
   IF REG1 = C GOTO E                    SIGNATURE STABILITY TEST
   IF REG1 = D GOTO F                    FIXTURE ROM TEST
   GOTO 0
1: LABEL 1                               *** POWER SUPPLY CHECK ***
   DPY-POWER SUPPLY CHECK#
   EXECUTE PROGRAM 97
   REG8 = 00041065                       GROUND
   EXECUTE PROGRAM 94
   REG8 = 00011063                       +5 VOLT
   EXECUTE PROGRAM 94
2: LABEL 2                               *** CLOCK CHECK ***
   DPY-CLOCK CHECK#
   EXECUTE PROGRAM 97
   REG8 = 00051067                       PHASE 1
   EXECUTE PROGRAM 94
   REG8 = 00051068                       PHASE 2
   EXECUTE PROGRAM 94
   REG8 = 0005105F                       PHASE 2 OUT
   EXECUTE PROGRAM 94
3: LABEL 3                               *** STATUS CHECK ***
   DPY-STATUS CHECK#
   EXECUTE PROGRAM 97
   REG8 = 00011059                       RESET
   EXECUTE PROGRAM 94
   REG8 = 0001105A                       IRQ
   EXECUTE PROGRAM 94
   REG8 = 0001105B                       NMI
   EXECUTE PROGRAM 94
   REG8 = 0001105C                       READY
   EXECUTE PROGRAM 94
4: LABEL 4                               *** READ STATUS TEST ***
   DPY-READ STATUS TEST-WAIT#
   EXECUTE PROGRAM 97
   REG8 = 00010819                       RESET
   EXECUTE PROGRAM 92
   REG8 = 0000881A                       IRQ
   EXECUTE PROGRAM 92
   REG8 = 0000481B                       NMI
   EXECUTE PROGRAM 92
   REG8 = 0000181C                       READY
```

```
   EXECUTE PROGRAM 92
   REG8 = 00010099                    JUMPER RESET LOW
   EXECUTE PROGRAM 92
   REG8 = 0000809A                    JUMPER IRQ LOW
   EXECUTE PROGRAM 92
   REG8 = 0000409B                    JUMPER NMI LOW
   EXECUTE PROGRAM 92
   REG8 = 0000109C                    JUMPER READY LOW
   EXECUTE PROGRAM 92
5: LABEL 5                            *** POWER SUPPLY STATUS TEST ***
   DPY-POWER SUPPLY STATUS TEST#
   EXECUTE PROGRAM 97
   REG8 = 00080000                    NO FAULT
   EXECUTE PROGRAM 92
   REG8 = 00080A00                    + 5  VOLT FAULT
   EXECUTE PROGRAM 92
6: LABEL 6                            *** CONTROL CHECK ***
   DPY-CONTROL CHECK#
   EXECUTE PROGRAM 97
   REG8 = 00051060                    SYNC
   EXECUTE PROGRAM 94
   REG8 = 00011062                    R/W
   EXECUTE PROGRAM 94
7: LABEL 7                            *** WRITE CONTROL TEST ***
   DPY-WRITE CONTROL TEST#
   EXECUTE PROGRAM 97
   REGD = 0
   REG8 = 00051120                    TOGGLE SYNC
   EXECUTE PROGRAM 94
   REG8 = 000411E2                    R/W LOW
   EXECUTE PROGRAM 94
8: LABEL 8                            *** ADDRESS TOGGLE TEST ***
   DPY-ADDRESS TOGGLE TEST#           TOGGLE AD0 - AD15
   EXECUTE PROGRAM 97
   REGD = 0
   REG8 = 00055081
9: LABEL 9
   EXECUTE PROGRAM 94
   INC REGD
   INC REG8
   IF 10 > REGD GOTO 9
A: LABEL A                            *** DATA TOGGLE TEST ***
   DPY-DATA TOGGLE TEST#              TOGGLE D0 - D7
   EXECUTE PROGRAM 97
   REGD = 0
   REG8 = 00590D1
B: LABEL B
   EXECUTE PROGRAM 94
```

```
   INC REGD
   INC REG8
   IF 8 > REGD GOTO B
C: LABEL C                          *** BUS TEST ***
   DPY-BUS TEST#
   EXECUTE PROGRAM 97
   DPY-+-WAIT
   BUS TEST
D: LABEL D                          *** READ DATA TEST ***
   DPY-READ DATA TEST-WAIT#
   EXECUTE PROGRAM 97
   REG8 = 0800A2                    READ @ 800 = A2
   EXECUTE PROGRAM 90
   REG8 = 0801FF                    READ @ 801 = FF
   EXECUTE PROGRAM 90
E: LABEL E                          *** SIGNATURE STABILITY TEST ***
   DPY-SIGNATURE STABILITY TEST#
   EXECUTE PROGRAM 97
   REG8 = 96EC8191                  RAMP @ FFFF; SIG @ A0 = 96EC
   EXECUTE PROGRAM 94
F: LABEL F                          *** FIXTURE ROM SIGNATURE TEST ***
   DPY-FIXTURE ROM TEST#
   EXECUTE PROGRAM 97
   DPY-+-WAIT
   ROM TEST @ 800 - FFF SIG 91CD
   DPY-*** NORMAL TEST
   DPY-+ COMPLETE ***#
   EXECUTE PROGRAM 97
```

PROGRAM 65 6502 POD "RUN UUT" TEST

```
   DPY-*** 6502 POD 'RUN UUT'
   DPY-+ TESTS ***#
   EXECUTE PROGRAM 97
0: LABEL 0                          *** 'RUN UUT' CONTROL TESTS ***
   DPY-'RUN UUT' CONTROL TESTS#
   EXECUTE PROGRAM 97
   RUN UUT @ 0
   DPY-TOUCH TP25 LOW               RESET
   DPY-+ THEN PRESS CONT#
   STOP
   REG8 = 00051060                  SYNC
   EXECUTE PROGRAM 94
   REG8 = 00011062                  R/W
   EXECUTE PROGRAM 94
1: LABEL 1                          *** 'RUN UUT' ADDRESS TESTS ***
   DPY-'RUN UUT' ADDRESS TESTS#          ---------------
   EXECUTE PROGRAM 97                    | AD0  TOGGLE |
   REG8 = 00051041                       | AD1  TOGGLE |
2: LABEL 2                               | AD2  TOGGLE |
   EXECUTE PROGRAM 94                    | AD3  TOGGLE |
   INC REG8                              | AD4  LOW    |
   IF 00051045 > REG8 GOTO 2             | AD5  LOW    |
```

```
   REG8 = 00041045
3: LABEL 3
   EXECUTE PROGRAM 94
   INC REG8
   IF 0004104B > REG8 GOTO 3
   REG8 = 0005104B
   EXECUTE PROGRAM 94
   REG8 = 0005104C
   EXECUTE PROGRAM 94
   REG8 = 0005104D
   EXECUTE PROGRAM 94
   REG8 = 0004104E
   EXECUTE PROGRAM 94
   REG8 = 0004104F
   EXECUTE PROGRAM 94
   REG8 = 00041050
   EXECUTE PROGRAM 94
4: LABEL 4
   DPY-'RUN UUT' DATA TESTS#
   EXECUTE PROGRAM 97
   REG8 = 00051051
5: LABEL 5
   EXECUTE PROGRAM 94
   INC REG 8
   IF 00051059 > REG8 GOTO 5
6: LABEL 6
7: LABEL 7
   DPY-'RUN UUT' IRQ TEST#
   EXECUTE PROGRAM 97
   DPY-TOUCH TP26 LOW
   DPY-+ THEN PRESS CONT#
   STOP
   REG8 = 0005104F
   EXECUTE PROGRAM 94
8: LABEL 8
   DPY-'RUN UUT' NMI TEST#
   EXECUTE PROGRAM 97
   DPY-TOUCH TP27 LOW
   DPY-+ THEN PRESS CONT#
   STOP
   REG8 = 00051050
   EXECUTE PROGRAM 94
   DPY-*** RUN UUT TEST
   DPY-+ COMPLETE ***#
   EXECUTE PROGRAM 97
```

AD6 LOW
AD7 LOW
AD8 LOW
AD9 LOW
AD10 TOGGLE
AD11 TOGGLE
AD12 TOGGLE
AD13 LOW
AD14 LOW
AD15 LOW

*** 'RUN UUT' DATA TESTS ***

D0 - D7 = L-H

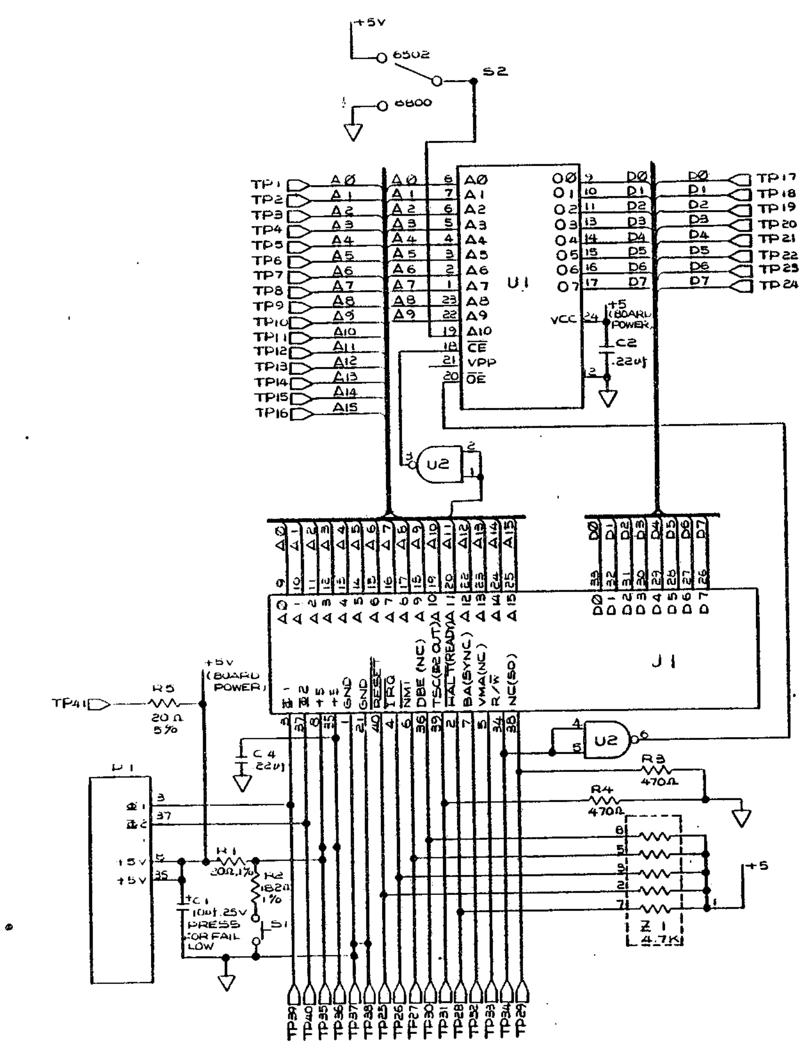
PERFORM INTERRUPT (IRQ LOW)

AD14 = TOGGLE

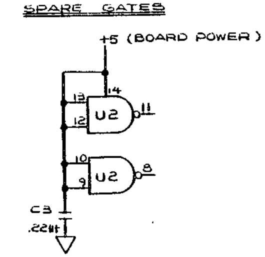
PERFORM NONMASKABLE INTERRUPT (NMI LOW)

AD15 TOGGLE

REVISIONS						
LTR	DESCRIPTION	EFF	APPROVAL / DATE DWN	CHK	PROJ ENGR	MFG ENGR
—	RELEASED TO PRODUCTION	8-25-82	EC	[illegible]	[illegible]	[illegible]



SPARE GATES



REFERENCE DESIGNATIONS	
HIGHEST	NOT USED
U2	
R5	
C4	
J1	
P1	
S2	
TP 41	
Z1	

SIGNAL	VERIFIED NORMAL MODE	VERIFIED WITH RUN UUT
DØ – D7	PROBED	BY ROM
AØ – A7	PROBED	AØ-A11 BY ROM A12-A15 PROBED
NMI	PULLED LOW STATUS READ	PULLED LOW-A12-A15 READ
IRQ	PULLED LOW STATUS READ	PULLED LOW-A12-A15 READ
TSC (Φ2 OUT)	PULLED HIGH STATUS READ	JUMPERED TO +5V VERIFY-A12-A15 NOT ACTIVE
RESET	PULLED LOW STATUS READ	PULLED LOW-A12-A15 READ
DBE (NC)	PULLED LOW STATUS READ	JUMPERED TO GND VERIFY-A12-A15 NOT ACTIVE
HALT (READY)		
BA (SYNC)	WRITTEN TO FROM WRITE CTRL	
R/WR	PROBED	PROBED
VMA (NC)	PROBED	PROBED
(SO)		
Φ1	PROBED	
Φ2	PROBED	
VCC	PUSH BUTTON TO FAIL	

DES	DEVICE	+5V	GND	+12V	-5V	QTY
U1	2716	24	12			1
U2	74LS00	14	7			1
Z1	NETWORK 4.7K	1				1

QTY	ITEM	PART NO.	DRAWING NO	DESCRIPTION	REF DES

PARTS LIST

BASIC DWG NO SUFFIX	DRAWING NO	PART NO
	1000A-[illegible]-3074	540195

FIRST USED ON
APPLICATION

PROPRIETARY NOTICE

JOHN FLUKE MFG. CO., INC. P.O. BOX 43210 MOUNTLAKE TERRACE, WA 98043

89536

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

TOLERANCE

DIMENSIONS IN INCHES

DWN MICHIANA CAMPBELL [illegible]
CHK [illegible]
PROJ ENGR [illegible]
MFG ENGR [illegible]
FINISH

SCHEMATIC CUSTOMER SERVICE TEST FIXTURE

SIZE D DRAWING NO 1000A-6800/6502-1073

SCALE NONE SH 1 OF 1 REV —