

SHOOTER

INITIAL TESTING

- 1) Inspect board for solder shorts and component placement.
- 2) At this time no RAMS or CPU should be mounted on the P.C. board Mount bench regulator and mark connector on side facing up.
- 3) Ground (-) meter lead to negative side of C3.
- 4) Place (+) meter lead on trace marked TPI and set meter to 20v range.
- 5) Apply power and observe meter for 5v +/- .5v. Red and green LED should be lit.
- 6) Place positive lead of meter on (+) side of C3.
- 7) Measure 15v to 17v.
- 8) Place (+) meter lead on positive side of C4.
- 9) Measure 35v to 40v.
- 10) Place (+) meter lead on trace labeled TP2.
- 11) Measure 25.6v to 26v.
- 12) Insert 2732A CNF into CNF socket.
- 13) Measure trace TP2 for 21.6v to 22v.
- 14) Remove 2732A CNF and replace with 2764A CNF.
- 15) Measure trace TP2 for 12.8v to 13.2v.
- 16) Measure TP3 for -11.0v to -12.7v.
- 17) Measure TP4 for + 11.0v to +12.7v.
- 18) Measure TP5 for the next 5 steps.
- 19) All dip switches off TP5 should measure 0v.
- 20) Dip switch #1 on TP5 measure = 5v.
- 21) Dip switch #1 off and #2 on TP5 measure =5v.
- 22) Dip switch #2 off and #3 on TP5 = 5v.
- 23) Dip switch #3 off and #4 on TP5 = 5v.
- 24) All dip switches off, TP5 = 0v.
- 25) Remove power + remove CNF 2764A.
- 26) Install bench CPU and RAM.
- 27) Install RAM size jumper on J1.
- 28) Connect RS232 to terminal.
- 29) Apply power.
- 30) Observe menu on terminal, if garbage or nothing, check dip switches, [all off].
- 31) Do checksum, observe E000.
- 32) Type F00 on terminal (fill RAM w/o's).
- 33) Yellow led should light for a few moments then the green should light.
- 34) Type C (checksum).
- 35) Observe checksum of 0000.
- 36) Type X0000
- 37) Examine location 0 and put a 01 in there.
In 4K units only*
- 38) * Put the 2732 CNF in the socket, then type C
(Checksum).
- 39) Sum = 0001.
- 40) Insert 2716 CNF.
- 41) Insert load block. Test Jig.
- 42) Press program.
- 43) Use scope to check signals for proper programming.
VPP, VCC, CHIP ENABLE, OUTPUT ENABLE.
- 44) Reset Shooter.

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- 45) Remove 2716 CNF replace with 2732A CNF.
 - 46) Fill RAM with 00's. See step 32.
 - 47) Press program.
 - 48) Scope test for proper signals. VPP, VCC, CHIP ENABLE.
 - 49) Reset Shooter.
 - 50) Replace 2732A CNF with 2764A CNF.
 - 51) Install 64A simulator. Test Jig.
 - 52) Press "R" on the terminal (read Eprom).
 - 53) Do Checksum.
 - 54) Sum = 0000.
 - 55) Press program.
 - 56) Measure Pin 1 of 64A simulator with scope.
 - 57) Observe proper 2764A signals. VCC = 5.0v VPP = 12.5v.
 - 58) Press reset.
 - 59) Set dip switch #3 to on position, press program and observe pin 28 for 5.5v.
 - 60) Remove 64A simulator.
 - 61) Set dip switch #3 to off position.
 - 62) Replace 2764A CNF with 27256 CNF.
 - 63) Install address line tester in zif socket.
 - 64) Press reset.
 - 65) Observe proper addressing from 0000 to 3FFF.
 - 66) Switch dip switch #4 to on position.
 - 67) Press reset.
 - 68) Observe proper addressing from 4000 to 7FFF.
 - 69) Replace 27256 CNF with 2732A CNF.
 - 70) Remove address line tester.
 - 70a) Insert master see note 1.
 - 70b) Switch F-y off.
 - 71) Press "R" on terminal (read Eprom).
 - 72) Press verify.
 - 73) Observe proper verification. Yellow - Green.
 - 74) Do Checksum.
 - 75) Observe proper checksum, see note 1.
 - 76) Press " N " on terminal (blank check).
 - 77) Observe " NB ERROR " and Red and Green LED'S light.
 - 78) Press space bar on terminal.
 - 79) Observe red LED extinguished.
 - 80) Remove master.
 - 81) Insert blank EPROM.
 - 82) Blank check.
 - 83) Observe *EOJ*, and no red LED.
 - 84) Press program.
 - 85) Observe yellow LED for short time then the green LED.
 - 86) Read Eprom ("R" on terminal).
 - 87) Do checksum.
 - 88) Observe proper checksum. (repeat steps 70A-88 for all applicable Eproms).
 - 89) Remove all Eproms and CNF and all interconnecting cables.
 - 90) Remove power.
 - 91) Remove bench regulator and replace with original regulator.
 - 92) Make sure socket is marked for up position on regulator.

Procedure for final testing of shooters (16k)

- 1) Inspect case and Zif socket for flaws.
- 2) Open case insure 5 volt regulator connector is installed correctly. (There should be a mark on the regulator connector signifying which way is up. This mark is put on during intial test.
- 3) Set all switches on back of the shooter to the off position.
- 4) Plug shooter in.
Observe the menu displayed on terminal.
- 5) Type "C" (checksum) on terminal. (no configurator installed)
Observe checksum of E000 for both 4k and 16k models.
- 6) Type "F00" (fill memory with 00) on terminal.
- 7) Type "C" (checksum) on terminal. (no configurator installed)
Observe checksum of 0000 for both 4k and 16k models.
- 8) Type "N" (blank check of eprom) on terminal.
(no configurator installed , no eprom in ZIF socket).
Observe "*EDJ*" on terminal. (normal operation).
- 9) Install 28 pin test jig into ZIF socket.
Observe LED's on test are all off.
- 10) Connect - lead of DVM to pin 14 of test jig.
- 11) Connect + lead of DVM to pin 22 of test jig.
Set DVM to 200v scale.

Note: use a micro chip to connect this lead, to prevent shorting and blowing the 8749 uP.

- 12) Install "2732" configurator into ZIF socket.
Note: all configurators used in final test, should be the configurators that are shipped with the unit under final test.

- 13) Depress "PROG" button on shooter.
Observe Vpp pin 22 [25.0v, +.5v, -.5v.]
Observe that LED's on pins 1, 28, and 26 are on.
- 14) Remove "2732" configurator, install "2732A" configurator while still in programming mode.
Observe Vpp pin 22 @21.0v,+.5v,-.5v
- 15) Depress "RESET" button on shooter.
Observe that Error LED is on while "RESET" button is depressed.
Observe that busy LED is on the Ready LED off for Approx. 1 sec. after releasing the "RESET" button.
- 16) Place + lead of DVM on pin 28 of test jig.
- 17) Remove "2732A" configurator and replace with "2764A" configurator.
- 18) Set DVM to 20v scale.
- 19) Depress "PROG" switch on shooter.
Observe Vcc pin 28 @5.00v +.15v, -.10v
Observe Programming cycle should only last 4 seconds max.
- 20) Turn SW3 (on back of shooter) to the on position (down).
- 21) Depress "PROG" switch on shooter.

Observe Vcc pin 28 @ 5.50v, +.15v, -.10v.

- 22) Remove "2764A" configurator. Insert "27256" configurator.
Depress reset.
- 23) Place + lead of DVM on pin 28 of test jig.
- 24) Depress "PROG" switch on shooter.
Observe Vcc pin 28 @ 5.50v, +.15v, -.10v.
- 25) Place + lead of DVM on pin 1 of test jig
- 26) Depress "PROG" switch on shooter.
Observe Vpp pin 1 @ 12.45v, +.20v, -.10v for approx. 2 secs.
Observe Vpp pin 1 @ 5.00v, +.2v, -.2v for approx 6 secs.
- 27) Place + lead of DVM on pin 27 of test jig.
- 28) Depress "VER" switch on shooter.
Observe A13 pin 27 @ 0.00v, +.80v, -.00v.
- 29) Turn SW4 (on back of shooter) to the ON position. (down)
- 30) Depress "VER" switch on shooter.
Observe A13 pin 27 @ 5.00v, +.25v, -.25v.
- 31) Remove "27256" configurator.
Remove 28 pin test jig from ZIF socket. Switch 3 on only.
- 32) Insert "27128" configurator. Insert "27128" test pattern chip with cksum = 66A6.
- 33) Type "R" (read eprom) on terminal.
- 34) Type "C" (checksum) on terminal.
Observe checksum display = 66A6.
- 35) Remove "27128" test pattern chip. Insert blank "27128" test chip.
- 36) Type "N" (blank check) on terminal.
Observe proper blank check operation.
- 37) Type "P" (program) on terminal.
Observe proper programming operation.
- 38) Remove "27128" configurator. Install "27128A" configurator.
- 39) Type "R" (read eprom) on terminal).
- 40) Type "C" (checksum) on terminal.
Observe checksum = 66A6.
- 41) Remove "27128" test chip. Remove "27128A" configurator.
- 42) Insert "2764" configurator. Insert blank "2764" test chip.
- 43) Type "C" (checksum) on terminal.
Observe checksum display = A1C8.
- 44) Type "N" (blank check) on terminal.
Observe proper blank check operation.
- 45) Type "P" (program) on terminal.
Observe proper programming operation.
- 46) Remove "2764" configurator. Install " 2764A" configurator.
- 47) Type "R" (read eprom) on terminal.
- 48) Type "C" (checksum) on terminal.
Observe checksum = A1C8.
- 49) Remove "2764" test chip.
Remove "2764A" configurator.
- 50) Insert "2732A" configurator.
- 51) Type "C" (checksum) on terminal.
Observe checksum is BF01.
- 52) Insert blank 2732A test chip into ZIF socket. Insert blank 2732A test chip.
- 53) Type "N" (blank check) on terminal.

Observe normal blank check operation.

- 54) Type "P" (program eprom) on terminal).
Observe normal programming operation.
- 55) Type "R" (reac eprom) on terminal).
Observe normal read operation.
- 56) Type "C" (checkssum) on terminal).
Observe checksum is EF01.
- 57) Type "N" (blank check) on terminal).
Observe "NS ERROR" on terminal and error LED is on.
- 58) Remove "2732A" test chip. Remove "2732A" configurator.
- 59) Install "2732" configurator. Install "2732" blank test chip.
- 60) Repeat steps 55 thru 59.
- 61) Remove "2732" test chip.
Remove "2732" configurator. Insert 2532 config.
Insert blank 2532. Type "P" (program BF01)
Read checksum.
- 62) Insert "2716" configurator.
- 63) Type "C" (checksum) on terminal.
Observe checksum is D442.
- 64) Insert blank "2716" test chip.
- 65) Type "N" (blank check) on terminal.
Observe normal blank check operation.)
- 66) Depress "PROG switch on shooter.
Observe normal programming operation.
- 67) Depress "VER" switch on shooter.
Observe normal verify operation.
- 68) Depress "RESET" switch on shooter.
Observe normal reset operation.
- 69) Type "C" (checksum) on terminal.
Observe checksum is D442.
- 70) Type "N" (blank check) on terminal.
Observe "NB" ERROR on terminal and error LED is on.
- 71) Remove "2716" test chip.
Remove "2716" configurator.
- 72) Type "G" (hex dump) on terminal).
Observe hex dump on terminal after 2 second delay.
- 73) Connect CTS wire (red) on shooter RS-232 cable to the ground wire (green) on shooter. RS-232 cable during HEX dump started in step 54.

Observe that the transmission is interrupted every time CTS is grounded and that transmission resumes after CTS is no longer grounded.

- 74) Depress "RESET" on shooter to terminate hex dump.
- 75) Disconnect RS- 232 test clips.
Disconnect RS-232 cable from shooter.
Clip stripped end of shooter cable off, (done in step 4)
Unplug shooter.
- 76) Fold power cable and RS232 cable, and secure them with rubber bands for shipping.
- 77) Place final tested configurators, in a neat row, on anti-static foam for shipping.

78) Remove all tags on exterior of unit.

79) Place final test on ZIF socket.
The final test lable should look something like
the following:

80) Turn shooter in for stock or shipping.