



MAINE ARMY NATIONAL
GUARD'S
MULTI-PURPOSE
ARCADE
COMBAT
SIMULATOR
TRAINER
BY

SUPER NINTENDO.[®]
ENTERTAINMENT SYSTEM



SECTION 1

MACS SYSTEM ASSEMBLY INSTRUCTIONS

PLEASE READ ALL INSTRUCTIONS BEFORE ATTEMPTING TO ASSEMBLE THE MACS SYSTEM.

- Make sure all equipment is turned off before assembly or damage to components could result.

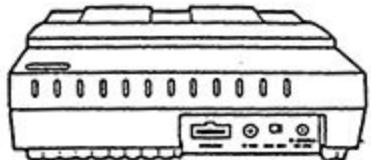
NOTE:

Particular care must be taken to NEVER remove the program cartridge while the control deck power is on. The cartridge must only be removed by using the eject button located on the top of the control deck between the power and reset switches.

STEP 1 - UNPACK EQUIPMENT

- Unpack the equipment carefully.
- Each system should have the following components.

SUPER NINTENDO ENTERTAINMENT SYSTEM
(SNES)



SNES CONTROL DECK
CONTROL

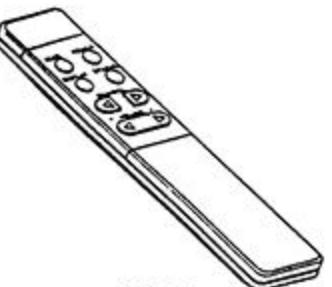


GAME CONTROLLER

13" COLOR TELEVISION



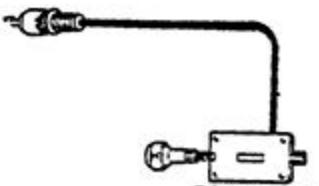
TELEVISION



REMOTE
(OPTIONAL)

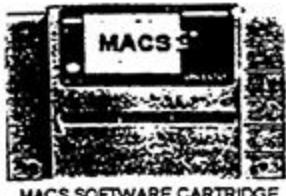


AC POWER ADAPTER

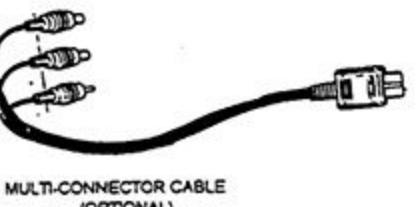


RF SWITCH

MACS SYSTEM DOCUMENTATION



MACS SOFTWARE CARTRIDGE



MULTI-CONNECTOR CABLE
(OPTIONAL)

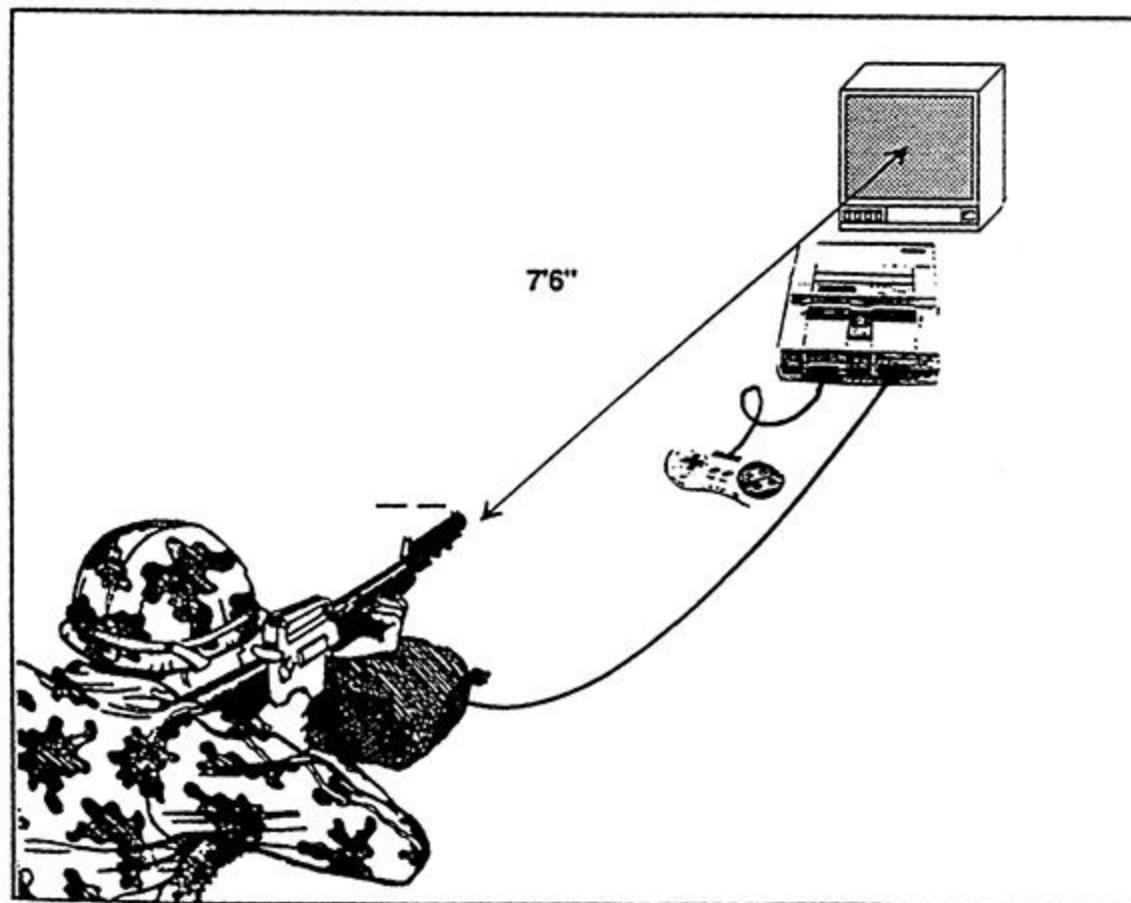


M16 MACS REPLICA RIFLE
W/LIGHT PEN AND WIRING HARNESS

STEP 2 - EQUIPMENT PLACEMENT

- All equipment should be placed on firm, steady surfaces.
- Sandbags (or suitable replacement) are required for supported position.
- The SNES Control Deck and Color Television should be located near a 120 Volt wall outlet.
- Aim the MACS M16 replica rifle at the television.
- Television screen should be 7.6' from the front of the light pen for optimum performance.

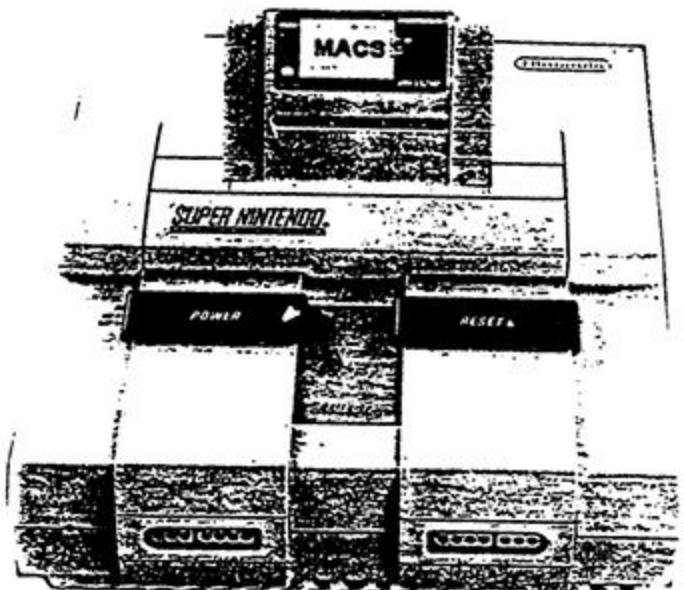
HINT: Mark the 7.6' on the wiring harness with two pieces of tape.



STEP 3 - MACS SOFTWARE CARTRIDGE

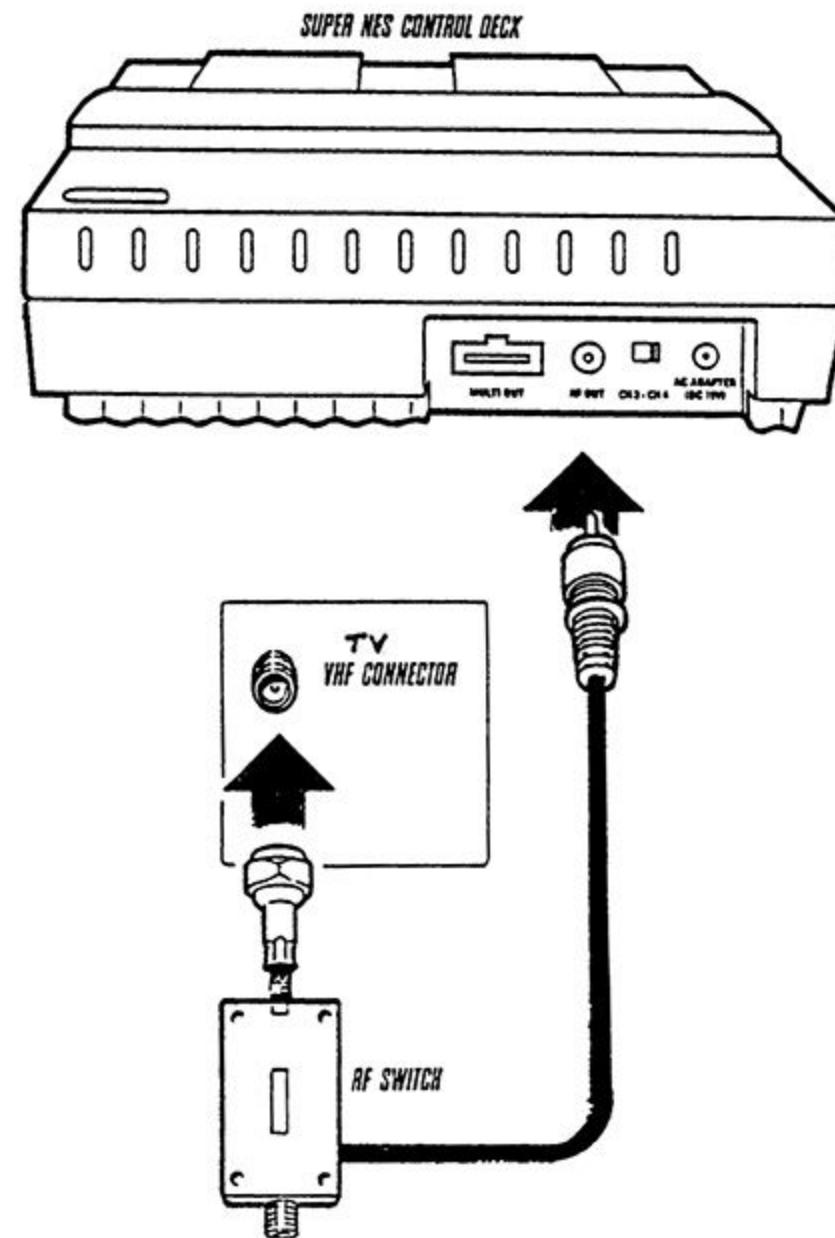
CAUTION:

- Make sure that the SNES control deck is turned off before inserting or ejecting the MACS software cartridge and when plugging in and unplugging the wiring harness to the SNES control deck. Make sure that the cartridge label is facing the front.



STEP 4 - CONNECT THE SNES RF SWITCH.

- Screw the short cable of the RF switch into the television VHF input jack located in rear.
- Insert the long cable of the RF switch into the outlet marked "RF Switch" on the back of the SNES control deck.
- Set the RF switch on the rear of the SNES to Ch 3 or Ch 4 depending on the station least used in your area. Use that same channel on the TV for the MACS program.

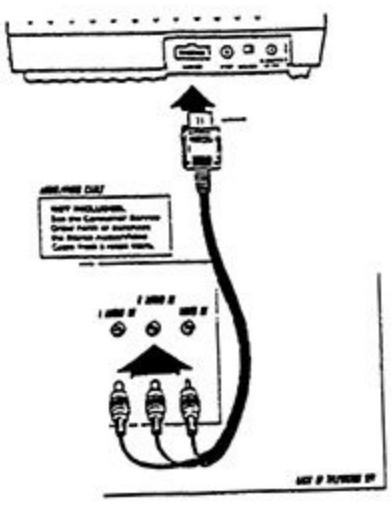


STEP 4 (ALTERNATE) - CONNECT MULTI-CONNECTOR CABLE.

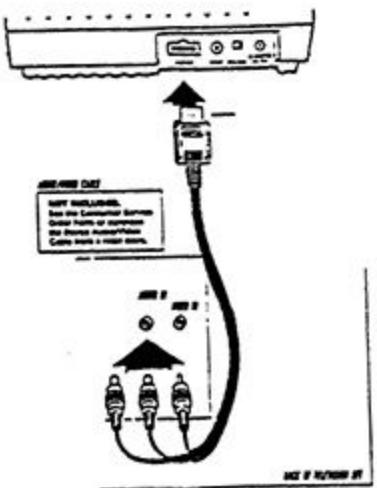
NOTE:

If your television has direct audio/video input jacks, you may want to use a Super Nintendo multi-connector cable. This cable is provided when the television delivered with the MACS system has direct stereo audio/video input capability. If you connect the MACS system to another television that has direct mono audio/video capability, you may want to purchase a Super Nintendo multi-connector cable and a standard "Y" adapter. The cable and "Y" adapter may be purchased from most electronics stores that sell

- Plug the multi-connector plug into the Multi Out port of the SNES located in the middle of the rear panel. Insure that the notch of the plug is up so that it will fit into the slot of the Multi Out port.
- For a television equipped with stereo audio/video inputs, plug the multi-connector ends into the corresponding inputs of the television (RED = Right Audio In; WHITE = Left Audio In; YELLOW = Video In.)
- For a television equipped with mono audio/video inputs, insert the video (YELLOW) plug into the corresponding input of the TV and connect the RED and WHITE plugs to a "Y" adapter which is inserted into the remaining TV mono input.



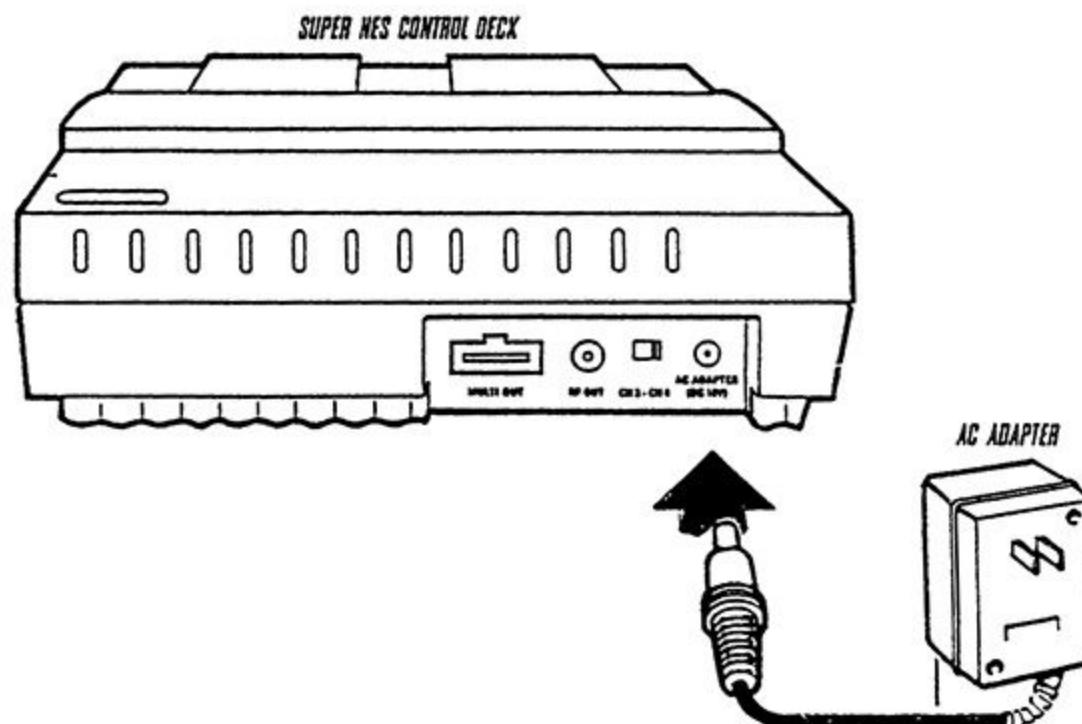
STEREO



MONO

STEP 5 - CONNECT SNES AC POWER ADAPTER

- Plug the AC power adapter into the SNES AC Adapter port located on the right rear of the SNES control deck.

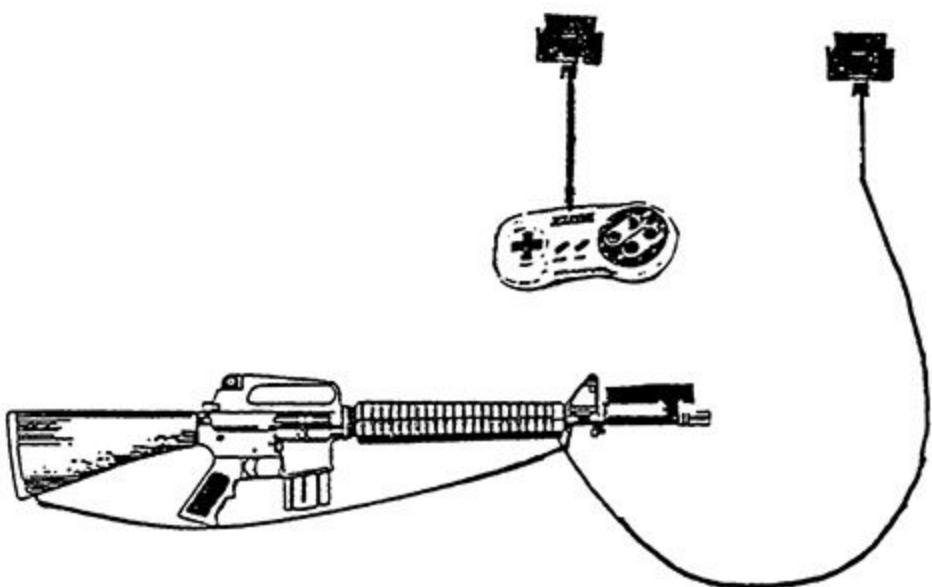
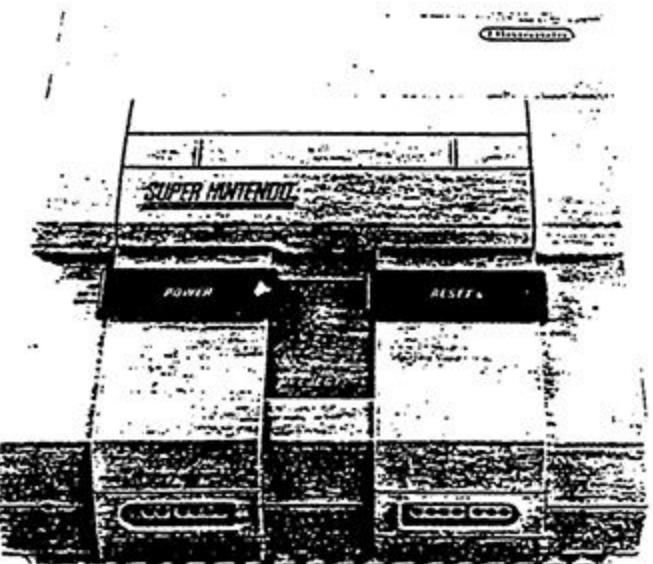


STEP 6 - CONNECT M16 MACS RIFLE AND SNES GAME CONTROLLER

- Plug the SNES game controller into the left control port of the SNES control deck.
- Plug the M16 MACS rifle and light pen wiring harness into the right control port of the SNES control deck.

CAUTION:

PLUGS ONLY FIT ONE WAY! DO NOT FORCE.

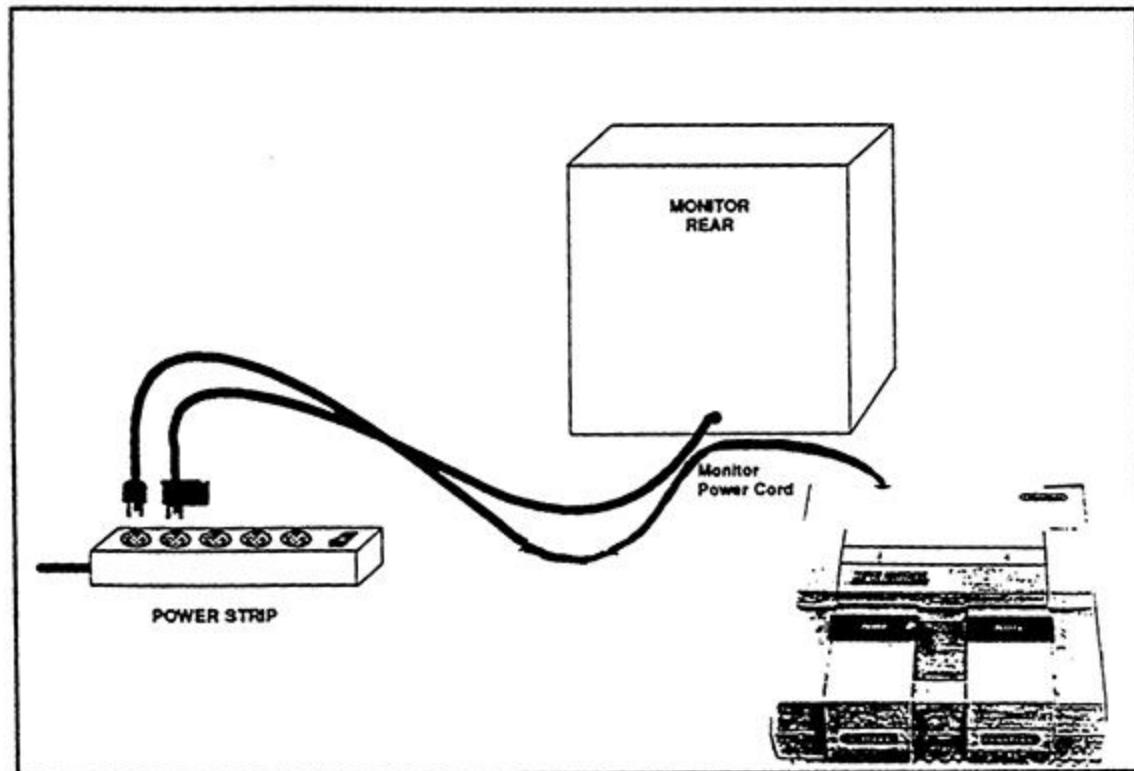


STEP 7 - PLUG POWER CORDS INTO POWER OUTLET

CAUTION:

THIS SYSTEM REQUIRES 110-120 AC VOLTAGE.

- Plug SNES AC Adapter into wall or strip outlet.
- Plug television into wall or strip outlet.



STEP 8 - TURN ON THE SYSTEM

- Turn on system components in the following order.

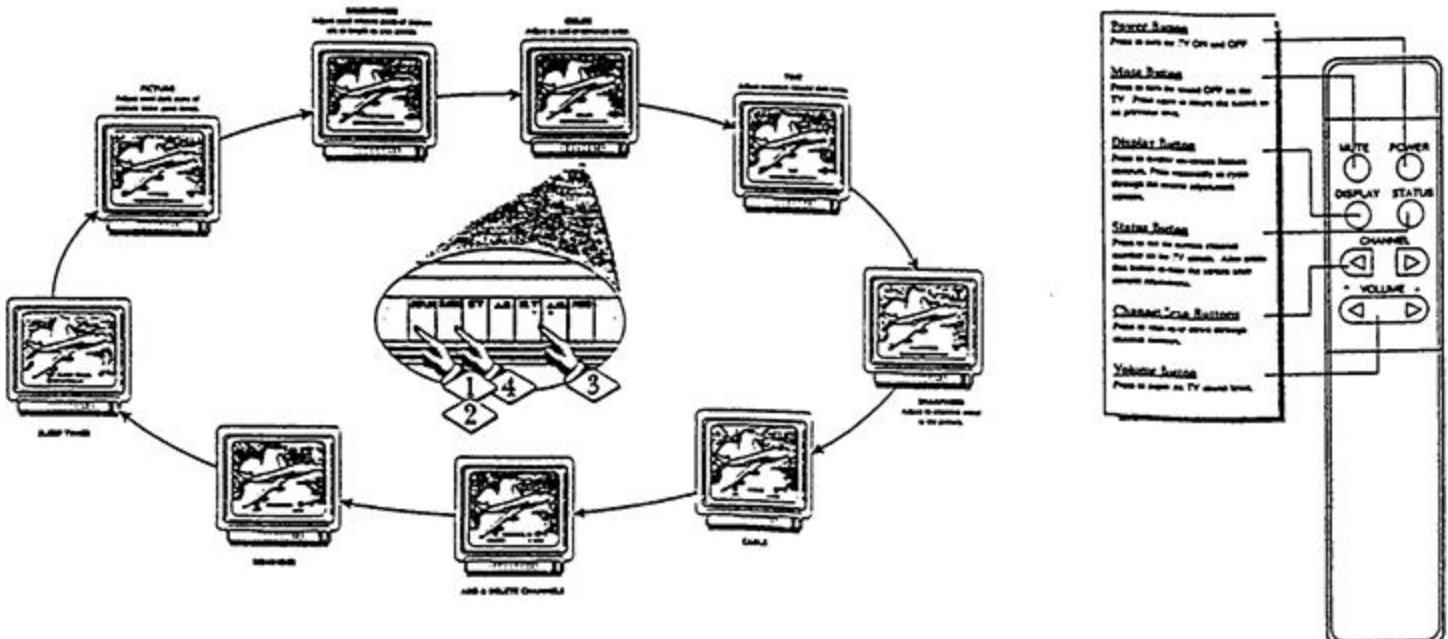
1. SNES: Power slide switch located on top left of control deck.
2. Television: Located on front of television.

NOTE: All television instructions can be carried out with its remote control if it was provided with the system.

- Adjust volume to comfortable, but audible, level.

- Adjust picture, brightness, color, tint, and sharpness of the Magnavox 13" Color Television. These adjustments may be made by pressing the display button on the TV or by the remote control. Repeated pressing of the display button will present the various TV characteristics that require adjustment. Each characteristic can be adjusted up or down when displayed at the bottom of the TV screen by pressing the +/- button (volume). The portion of the scale which is filled in represents the degree that the trait has been applied. The system has been pre-set for maximum performance with its MACS rifle and light pen prior to shipment. The optimum settings for using MACS on this television are:

<u>CHARACTERISTIC</u>	<u>DEGREE OF APPLICATION</u>
PICTURE	5/8 or 10 blocks filled in
BRIGHTNESS	1/2 or 8 blocks filled in
COLOR	Full or all blocks filled in
TINT	Detent or Middle two block filled in
SHARPNESS	1/2 or 8 blocks filled in



SECTION 2

LIGHT PEN ALIGNMENT

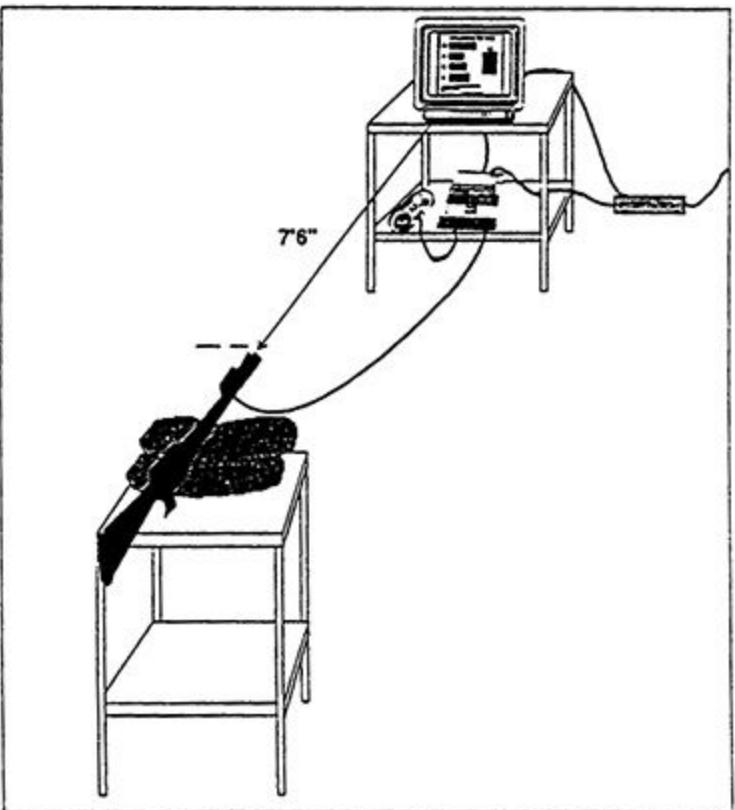
NOTE:

The MACS system light pen may occasionally need to be aligned. The tools required for alignment are a flat tip screwdriver and a flat tip jewelers screwdriver.

A. LIGHT PEN ALIGNMENT - SUPER NINTENDO MACS

**BEFORE PROCEEDING WITH ALIGNMENT OF THE
LIGHT PEN, DO THE FOLLOWING:**

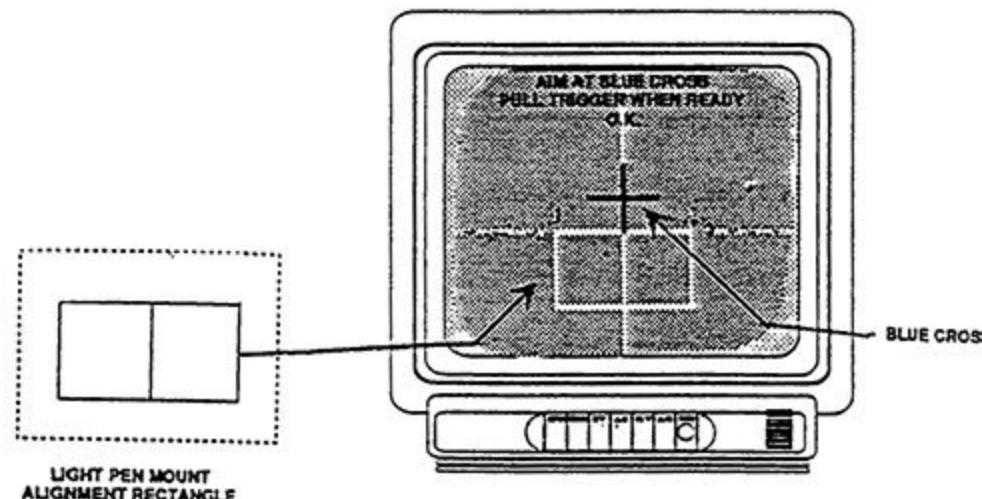
- Place rifle 7.5 feet from screen. **HINT: USE A VICE IF ONE IS AVAILABLE.**
- Turn the system on.
- The MACS Welcome Screen will appear.



STEP 1 - CHECK ALIGNMENT OF THE LIGHT PEN

NOTE:

Insure the TV has been adjusted in accordance with Step 8, Section 1.



- Push the "A" button on the game controller.
- Push the Select button on the game controller.
- Read instructions on screen and pull trigger on MACS rifle.
- Aim at center of the Blue Cross and pull trigger.
- Observe the small cross and dot indicating the location of the light pen read.
 - If the light pen alignment is correct, the crosses will coincide and the dot will be located in the double box below the aiming cross. The fine adjustment box in the lower right corner of the screen will read Center/Center. If this condition exist, Go To Step 3.
 - If the light pen alignment conditions above do not exist, then Go To Step 2.

STEP 2 - LIGHT PEN MOUNT ADJUSTMENT

NOTE:

1. This alignment is for a light pen mounted on an Adler AP 74 MACS rifle manufactured by Omega Training Group, Inc. Alignment instructions for rifles and light pens manufactured by other companies can be obtained from Fort Benning TASC, 706-545-6162.
2. If a vice is not available, it recommended that two people be used to align the light pen.

- To adjust the horizontal reading (windage) of the light pen (LP), turn the screw on the light pen front mount. If the screw slot is not on the left side of the mount, then reverse the procedures described below.
 - To move the LP cross and dot to the right, turn the screw counterclockwise until the LP cross is aligned with the vertical line of the blue aiming cross. The fine adjustment horizontal reading should read "Center" when properly adjusted.
 - To move the LP cross and dot to the left, turn the screw clockwise until the LP cross is aligned with the vertical line of the blue aiming cross. The fine adjustment horizontal reading should read "Center" when properly adjusted.
- To adjust the vertical reading (elevation) of the light pen (LP), turn the screw at the rear of the light pen that runs through the spring.
 - To raise the LP cross and dot, turn the screw clockwise until the LP cross is aligned with the horizontal line of the blue aiming cross. The fine adjustment vertical reading should read "Center" when properly adjusted.
 - To lower the LP cross and dot, turn the screw counterclockwise until the LP cross is aligned with the horizontal line of the blue aiming cross. The fine adjustment vertical reading should read "Center" when properly adjusted.
- If there is too much jitter in the light pen cross and dot to achieve proper alignment, see Section 2B, Light Pen Calibration to adjust the pulse train in the Light Pen. Insure that the television is adjusted according to the procedures in Step 8, Section 1.

STEP 3 - PERFORM LIGHT PEN TRACKING TEST

- Aim rifle at the light pen alignment screen and slowly move the rifle aim point to the right. The LP cross and dot should move to the right screen margin without stopping. Reverse the direction of the aim point by slowly moving the rifle to the left. The LP cross and dot should move all the way to the left screen margin. Next, move the rifle aim point to the lower left corner of the green colored screen. The LP dot should move smoothly in all tracking movement. If the LP cross and dot tracked smoothly, then the light pen alignment program is complete. Pull trigger to return to the MACS Welcome Screen.
- If the light pen did not perform as described above, check the TV to insure that it is adjusted in accordance with Step 8, Section 1. If the adjustments are correct, then Go To Section 2B, Light Pen Calibration to adjust the pulse train in the Light Pen. Upon completion of the light pen calibration, return to this step to align the light pen.

B. LIGHT PEN CALIBRATION

- Enter Light Pen Alignment program as described in Section 2A, Light Pen Alignment.
- With oscilloscope:
 - Set the oscilloscope up as follows:

1) Sweep	0.2ms/div
2) Voltage (DC)	1v/div
3) Coupling	DC
4) Mode	TV-H
5) Source	CH-1
6) Probe	CH-1
 - Turn on oscilloscope.
 - Connect probe to light pen as follows:
 - 1) Remove upper handguard from rifle.
 - 2) Attach probe ground to screw holding light pen front mount to barrel.
 - 3) Insert probe in plastic container with green wire. Insure good contact with green wire contact.
 - Aim rifle at blue cross. **HINT: This is best done using a vice.**
 - Observe and count number of pulses on oscilloscope screen. The optimum number is 22. Pulses could vary from 20-24.
 - If count is not 22 pulses, then potentiometer adjustment is required. Insert small flat tip jewelers screwdriver into opening located in light pen backplate (top right corner). To increase pulses, turn the potentiometer **clockwise**. To decrease pulses, turn the potentiometer **counter-clockwise**. Major adjustments should not be required.
- Without oscilloscope:
 - Adjust the windage on the light pen until the light pen mounting lug is centered in the U-shape of front mount. Adjust elevation until the rear of light pen is just above parallel to the rifle barrel.

- Aim at the blue cross and observe location of the light pen cross. If it is above the aiming cross, then increase pulses. If it is below, then decrease pulses. At the same observe the fine adjustment box in the lower right corner of the screen. The readings should be "Center" and "Center" and turn green when pulses and alignment are correct. When properly calibrated, there should be very little or no jitter in the Light Pen cross.
 - To double check, track the light pen across the screen as described in Section 2A, Light Pen alignment. If it tracks to the screen margins and to the lower left corner, proper calibration has been achieved.
- Pull trigger to leave the Light Pen alignment program and return to the MACS Welcome Screen.



SECTION 3

**OPERATING THE MACS
BASIC RIFLE MARKSMANSHIP PROGRAM**

OVERVIEW OF MACS BRM PROGRAM

The MACS system is a low-cost, part-task trainer that has been validated as a teaching device with entry-level soldiers. The system may be used for basic, preparatory, sustainment, and remedial training.

The MACS has six components.

1. An M16 replica rifle.
2. A light pen (attaches to the rifle).
3. A Super Nintendo Entertainment System (SNES)
4. A wiring harness (connects rifle, light pen, and SNES.)
5. A 13" color television.
6. A BRM software cartridge.

MACS allows soldiers to practice Basic Rifle Marksmanship (BRM) skills by firing at targets at scaled ranges displayed on a computer screen. Diagnostic, real-time display feedback is provided on the screen. This feedback varies depending on the firer's level of achievement. MACS has nine increasingly more difficult levels of training.

Stationary targets from 50 - 300 meters are presented at varying time intervals and are engaged from supported and unsupported positions. Specific standards are set for each level and are incorporated into the program. Upon completion of a level, the shooter's performance is evaluated against these standards

Depending of performance, the shooter may:

1. Advance to the next level;
2. Stay at the same level; or
3. Be sent back one level.

The MACS BRM program is specifically designed to help the average and below average shooter. It does this in two, primary ways:

1. It provides the shooter with more feedback than can be obtained on a live fire range.
2. Because the MACS rifle has no flash, recoil, or cartridge ejection system, it allows the soldier to develop the proper psycho-motor skills needed to achieve steady position, correct aiming, breath control, and trigger squeeze, without having to overcome the instinct to flinch or blink when a weapon is fired.

MACS is a flexible program that will the shooter to begin or end at any level. In addition, the program contains OTHER OPTIONS that allow the incorporation of "Wind Effects" at 10 and 20 MPH from eight different directions as well as a "Call Your Shot"

SECTION 4

DESCRIPTION OF THE MACS MENU



The MACS Welcome Screen should appear in color and with sound.

IF NOT, REFER TO TROUBLESHOOTING TIPS IN SECTION 5.



DESCRIPTION OF THE MACS MENU

- The MACS system is designed with flexibility so that an instructor can achieve a variety of training objectives efficiently and with a minimum amount of resources.
- To access the MACS Main Menu, press the "A" button on the SNES game controller. Pressing the "A" button at any screen will access the main menu except when tracking feedback is being played and at the "Yes/No" screen after zeroing. As soon as the feedback is at a screen that says "Pull Trigger To Continue," the "A" button can be pushed to gain access to the main menu.
- At the main menu, pressing the "Start" button will return the system to the beginning of the level designated as the "Start" level in the main menu. If the shooter has not yet zeroed, the program will make him or her zero.
- Push the Reset switch on the SNES control deck when a new shooter is to begin. This will make the shooter zero to insure that the system is calibrated for him or her.

CHANGING THE MAIN MENU OPTIONS

- At the main menu, the menu options can be changed by using the four-directional button on the game controller. Pressing the up and down directional buttons will permit the user to move to the option to be selected for change. The left and right directional buttons change the selected options. The start and ending levels for the shooter may be changed to match the training objectives of the firing period. All targets in Level 1 can be set at 250 meters with the EZ Group option. The "Call Your Shot" option can be changed to allow shooter 5 seconds to call his bullet strike location in Levels 1 and 2. Wind effects can be added at 10 and 20 MPH and can have any of eight different directions.
- After all options have been modified that are to be changed, press the "Start" button to return to the program. All changes made will now be in effect.

NOTE: The MACS program will not permit the ending level to a lower number than the start level. They can be the same number.

option. When both or either are selected, they are integrated into all nine levels. There is an "EZ Shot Group" program that when selected will present all targets in Level 1 at 250 meters. A more detailed discussion of menu options is found in Section 4.

The MACS system software is primarily self-explanatory, but assumes the presence of an instructor. It is designed to enable a supervisor to monitor the progress of several shooters at one time. The real-time display feedback not only helps the shooter, but it also helps an instructor identify problem shooters. For those shooters not achieving the standards at certain ranges or levels, a small colored rifle is displayed in the upper left corner of the screen.

- **RED** - Refiring some targets at a particular range or part of a level.
- **BLUE** - Refiring an entire level.
- **YELLOW** - Shooter has been sent back one level.
- **PURPLE** - Aiming off the screen or light pen is not reading.

On-screen information identifies the level being fired, and if the shooter is refiring, a number will appear below the colored rifle to indicate the number of times the shooter has refired.

Before using the MACS system as a teaching device, personnel to be used as an instructor with MACS should shoot through the whole program several times as well as read and become familiar with contents of this system manual.



MACS WELCOME SCREEN

- First screen of MACS BRM program .
- Adjust volume.
- Pull trigger to begin program.
- Push the "A" button of the SNES game controller to reach the MACS Main Menu. At the Main Menu, various options can be set as described on the next page. (OPTIONAL)



ESTABLISH SHOT GROUP

- It is very important to get a good shot group.
- Zero targets are at 250 meters.

Note: Adjustment of TV/monitor controls after establishing a shot group changes the system calibration. The shooter will have to rezero.



SHOOTING INSTRUCTIONS

- It takes three shots to establish a shot group.

Note: Pulling the trigger sends an electronic signal to the SNES control deck.



FIRE SHOT GROUP

- Soldier fires one shot at each of three targets.

Note: A purple border appears when the light pen is not aimed at the screen.



SHOT GROUP SUMMARY SHEET

- Shot locations pictured on target.
- Feedback summarized for three shots.
- Good shot group calibrates system.

IF SHOT GROUP IS INVALID:

- An invalid shot group is one in which one or more shots hit outside a rectangular area (not seen by the shooter) which is the same size as the light pen alignment rectangle. Refire three round zero.

IF SECOND SHOT GROUP IS INVALID:



If second shot group is invalid:

- Press "A" button on the game controller, then the Select button.

Note: See Section 2A or 2B for light pen alignment procedures.

- Follow directions for alignment.
- Following alignment, the program will return to the Welcome Screen.



IF SHOT GROUP IS VALID:



- Aim rifle at "Yes" or "No". When aiming at one or the other, the active response will be in color. Pull trigger when the response you want is active.
- If response is "Yes", the program will direct you to refire the three round zero.
- If the response is "No", the program will direct you to the initial skills test if your shot group was rated "Good or better" and you have at least two Good and two Excellent ratings in your shot group summary screen in aiming, trigger squeeze, steady position, and shot location

INITIAL SKILL TEST CRITERIA

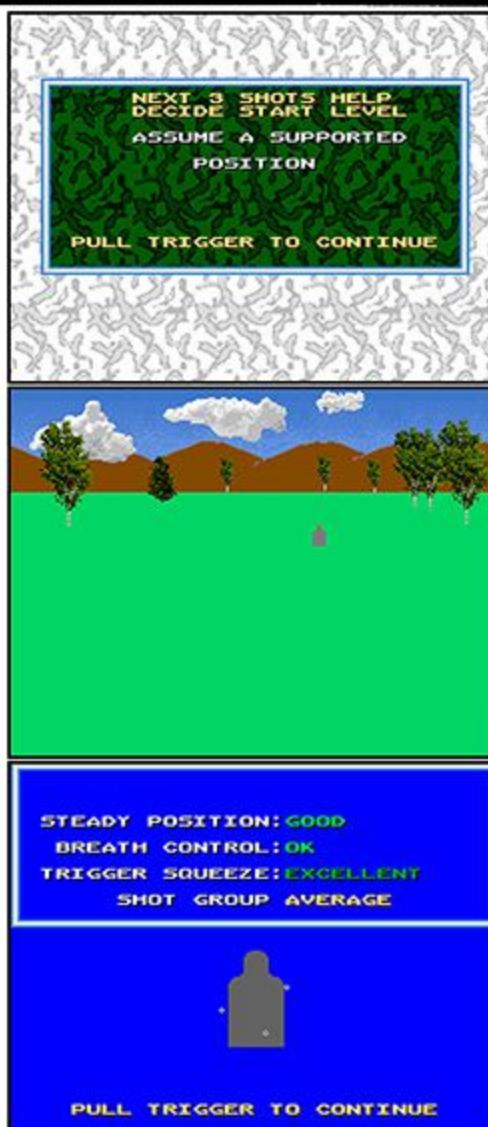
To pass each skill test, at least two **GOOD** ratings and two **EXCELLENT** ratings must be achieved on measures of shot location, steady position, aiming, and trigger squeeze.

IF CRITERIA ARE NOT MET:



- Program starts at Level 1 unless the start level in the Main Menu has been changed to another level. If this is the case, then the program will start at that level.

IF CRITERIA ARE MET:



- Skill test is continued.
- Shooter fires one shot from an unsupported position at each of three targets as each is presented.

IF CRITERIA ARE NOT MET:

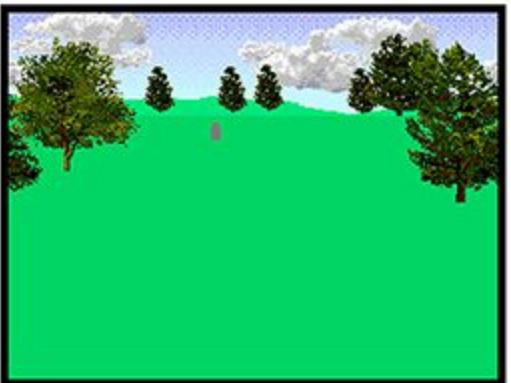


- Program starts at Level 2.

IF CRITERIA ARE MET:



- Skill test is continued.
- Shooter fires one shot from an supported position at each of three timed targets as each is presented.
- Timed targets at 100, 250, and 300 meters are presented.



IF CRITERIA ARE NOT MET:



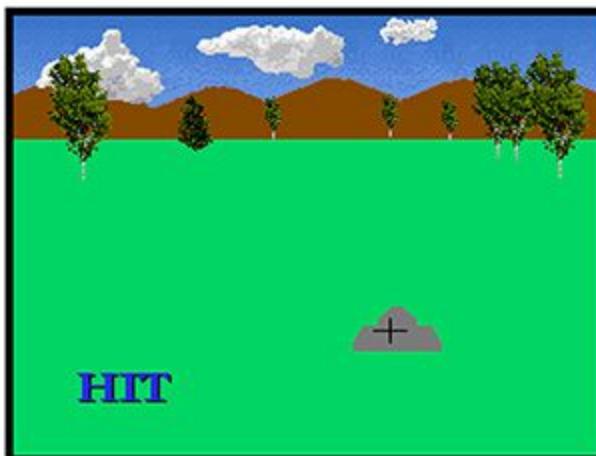
- Program starts at Level 3.

NOTE: If criteria are met, three shots are then fired from the unsupported position. Program can begin at Level 4 or Level 5 depending on the results of this skill test.



SHOOTING INSTRUCTIONS

- Untimed targets.
- Hit 2 of 3 at each distance.
- Supported position.
- First three targets are at 50 meters.



TARGET SCREENS

- Three target screens are presented.
 - Feedback screens follow each target presentation.
-  indicates bullet strike.
- HIT or MISS appears in lower left corner of screen.



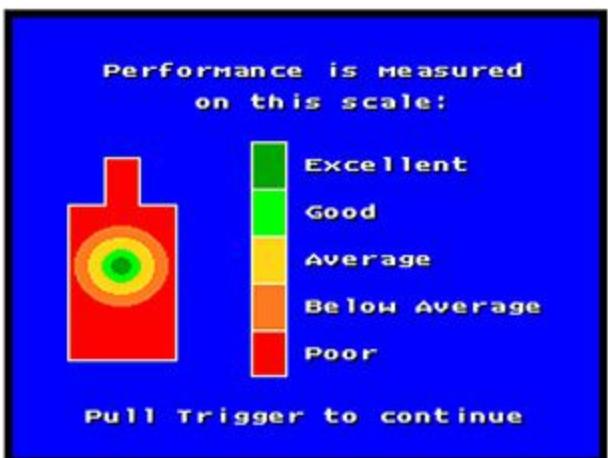
LEVEL 1

- First firing level in BRM program.



TARGET RANGES

- Targets at each range are illustrated.



SHOT LOCATION STANDARDS

- The shooter must hit center of mass for shot location to be graded excellent.

FEEDBACK SCREEN SEQUENCE

 correct sight placement (black).

 your sight placement (white).



- Each shot is followed by a replay of the sight placement of the shooter compared to the correct sight placement and bullet strike.

- Shooter's sight placement in moments before bullet strike (white) is superimposed over correct sight placement (black).
- The shot can be replayed as many times as desired.

- PULL TRIGGER TO CONTINUE to next target screen.
- Bullet strike is displayed on target.



3 ROUND SHOT GROUP

- Target and feedback screens repeated for 100, 150, 200, 250, and 300 meter targets.
- Shot group displayed on target at each range.
- These screens can be analyzed as if shots were fired at a known distance (KD) range.
- Must hit 2 of 3 targets to meet standard.

TRAINER'S TIP

Instructor should assist the shooter by performing a shot group analysis and giving corrective action.

EXAMPLE: The shooter's shot group at 100 meters is centered horizontally, but is too high. **Corrective action:** Explain adjusted aiming point.

FAILURE TO MEET STANDARD



- Repeats presentation of target and feedback screens for each of the three shots.
- 3 round shot group is displayed for the range.

NOTE: Red rifle appears during refire of a range.

- The screen at left appears following a successful refire for a specified range.
- The colored rifle will disappear and the program continues.



- If standard is met, the shooter goes on to Level 2.

STANDARD FOR LEVEL 1 NOT MET

This section contains two screenshots. The top screenshot shows a message: "You are being sent back to LEVEL 1 because your SUMMARY scores were poor or below average. PULL TRIGGER TO CONTINUE". The bottom screenshot shows a list titled "4 FUNDAMENTALS OF RIFLE MARKSMANSHIP" with four items: "Steady Position", "Aiming", "Breath Control", and "Trigger Squeeze". Both screenshots include the instruction "PULL TRIGGER TO CONTINUE" at the bottom.

- Blue rifle will appear during refire of a level.
- Yellow rifle will appear if shooter has regressed from a higher level.

SUMMARY DESCRIPTION OF LEVELS

LEVEL 1. INTRODUCTION TO SUPPORTED POSITION.

Summary Description

- No time limit.
- Supported position.
- Single-target presentations.
- Eighteen targets presented, three targets at each of six ranges.
- Targets engaged in order of range: 50, 100, 150, 200, 250, and 300 m.

Feedback

- Words HIT or MISS appear on screen for each shot.
- Cross hair appears on screen to show bullet strike.
- Diagnostics and replay are shown after each shot.
- Screen shows 3 rounds on single target after each range has been fired.
- Summary screen at end of level shows average diagnostic scores.

Standards

- Two hits out of three shots at each range within level. Failure to meet standard at a given range results in immediate refire of 3 more targets at that range. Refires continue until the standard is met.
- Refire of level is required if any score on summary screen is **BELOW AVERAGE** or **POOR**.
- Breath control is rated **OK** or **CHECK**. Ratings are related to Steady Position score.

LEVEL 2. INTRODUCTION TO UNSUPPORTED POSITION

Identical to Level 1 with the following exceptions:

- It is fired from the unsupported position.
- Shooter is regressed a level if any Level 2 scores on the summary screen are **POOR**.

LEVEL 3. TIMED TARGETS IN SUPPORTED POSITION.

Summary Description

- Time limit approximately 1 1/3 times that of record fire.
- Supported position.
- Single-target presentations.
- Twenty-four targets in random sequence (four target presentations at each range).

Feedback

- Cross hair appears on screen to show bullet strike.
- For a hit, target disappears immediately after bullet strike is shown.
- Diagnostics and replay are shown after **bad shots** only. Criteria for **bad shot** is a **POOR** for any score or a **BELOW AVERAGE** for shot location.
- Audible tone when target exposure time limit has expired.
- Summary Screens showing 4 shots at each range on single targets.
- Summary screen at end of level shows average diagnostic scores.

Standards

- Three hits out of four shots at each range within level. For each range at which this standard is not met, a refire of the four targets at each of those ranges is required. Refires continue until the standard is met.
- Refire of level is required if any score on summary screen is **BELOW AVERAGE** or **POOR**.
- Shooter is regressed a level if any two scores on summary screen are **POOR**.

LEVEL 4. TIMED TARGETS IN UNSUPPORTED POSITION

Identical to Level 3 with the following exceptions:

- It is fired from the unsupported position.
- Standard is lower. Three hits out of four shots at 50, 100, 150, and 200 meters, and two hits out of four shots at 250 and 300 meters.

LEVEL 5. PRACTICE RECORD FIRE I

Summary Description

- Time limit same as for record fire.
- Supported and unsupported positions.
- Single or double target presentations in random sequence.
- 20 targets fired supported, then 20 targets fired unsupported.

Feedback

- Cross hair appears on screen to show bullet strike.
- For a hit, target disappears immediately after bullet strike is shown.
- Audible tone when target exposure time limit has expired.
- OUT OF AMMO appears on screen when 20 shots have been fired.
- Interim summary of performance (hits, misses, and no fires) and shot location score given at end of each position, and a final summary at end of course of fire.
- Summary Screens showing shots at each range on a single target at end of supported and unsupported positions.
- Overall performance is graded Expert (36-40), Sharpshooter (30-35), Marksman (23-29), or Unqualified (0-22).

Standards

- Fifteen hits out of 20 shots in both the supported and unsupported positions. Refire of position if standard is not met. Refires continue until standard is met.
- On double target exposures, a penalty is recorded if furthest target is engaged first (a penalty indicates a tactical error, but does not reduce the total number of hits).
- Shooter is regressed a level for shot location score of POOR. Shooter is kept at the same level for mean shot location score of BELOW AVERAGE. Otherwise, the shooter is progressed to the next level.

LEVEL 6. PRACTICE RECORD FIRE II

- Identical to Level 5 with the exception that the cross hair showing bullet strike appears only after misses. Targets disappear when hit.

LEVEL 7. RECORD FIRE

Summary Description

- Time limit same as US Army live-fire qualification course.
- Supported and unsupported positions.
- Single or double target presentations in random sequence.
- 20 targets fired supported, then 20 targets fired unsupported.

Feedback

- Cross hair appears on screen to show bullet strike for misses on refires only.
- Target disappears when hit.
- Audible tone when target exposure time limit has expired.
- OUT OF AMMO appears on screen when 20 shots have been fired.
- Interim summary of performance (hits, misses, and no fires) and shot location score given at end of each position, and a final summary at end of course of fire.
- Summary Screens showing shots at each range on a single target at end of supported and unsupported positions.
- Overall performance is graded Expert (36-40), Sharpshooter (30-35), Marksman (23-29), or Unqualified (0-22).

Standards

- Fifteen hits out of 20 shots in both the supported and unsupported positions.
- Refire of position if standard is not met. Refires continue until standard is met.
- On double target exposures, a penalty is recorded if furthest target is engaged first (a penalty indicates a tactical error, but does not reduce the total number of hits).

LEVEL 8. RAPID RECORD FIRE

- Shooter is regressed a level for shot location score of POOR. Shooter is kept at the same level for mean shot location score of BELOW AVERAGE. Otherwise, the shooter is progressed to the next level.

LEVEL 9. COMBAT FIRE

Summary Description

- Time limit vary depending on the number of targets presented.
- Supported and unsupported positions.
- Single and multiple target presentations.
- Eighty targets in two attack/retreat scenarios each of forty targets. First scenario is fired supported, and second is fired unsupported.

Feedback

- Cross hair appears on screen to show bullet strike for misses or refires only.
- Target disappears when hit.
- Audible tone when target exposure time limit has expired.
- OUT OF AMMO appears on screen when 40 shots have been fired.
- Interim summary of performance (hits, misses, and no fires) and shot location score given at end of each position, and a final summary at end of course of fire.
- Summary Screens showing shots at each range on a single target at end of supported and unsupported positions.
- Overall performance is graded Expert (36-40), Sharpshooter (30-35), Marksman (23-29), or Unqualified (0-22).

Standards

- Twenty-three hits out of 40 shots in both the supported and unsupported positions.
- Refire of position if standard is not met. Refires continue until standard is met.

NOTE: If the shooter is the high scorer at this level, he will be given the opportunity to record his initials along with his score at the end of this level. Simply aim the Light Pen cross hair at up to three letters or numbers pulling the trigger after each one. After selecting the initials, the shooter then places the cross hair on the group of three initials and pulls the trigger.

CHANGING THE STARTING AND ENDING LEVEL OPTIONS

■ At the main menu, set the highlight on the "Start" level and use the four-directional key on the game controller to increase the number of the start level. The right directional button increases the numbers and the left decreases them. Next, set the ending level by highlighting "Ending" level and change the numbers as above. The program levels and their names are given below. If no other menu changes are to made, press the game controller "Start" button.

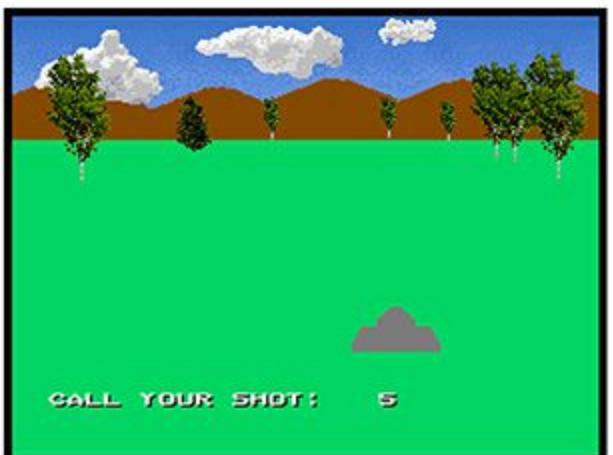
- Level 1 - Introduction to Supported Position
- Level 2 - Introduction to Unsupported Position
- Level 3 - Timed Targets In Supported Position
- Level 4 - Timed Targets In Unsupported Position
- Level 5 - Practice Record Fire I
- Level 6 - Practice Record Fire II
- Level 7 - Record Fire
- Level 8 - Rapid Record Fire
- Level 9 - Combat Fire

CHANGING THE EZ SHOT GROUP OPTION

■ Highlight the **EZ Shot Group** option and press the right directional button for "Yes" or the left directional button for "No." When the EZ Shot Group option is "Yes," the targets in Level 1 will all be at 250 meters. The shooter will be presented three targets six different times with feedback after each shot and summary feedback after each group of three shots. There will be summary feedback that evaluates the four marksmanship fundamentals at the end of 18 shots (not counting any refires).

CHANGING THE "CALL YOUR SHOT" OPTION

- Highlight the Call Your Shot option and press the right directional button for "Yes" or the left directional button for "No." This option only works with Levels 1 and 2.



CALL YOUR SHOT

- Shooter has 5 seconds to call out shot location after the trigger is pulled.
- CALL YOUR SHOT appears at the bottom of the screen and has a visible timer.



- When time has expired, the crosshair appears on the target showing shot location.

CHANGING THE WIND SPEED OPTION

SELECT WIND SPEED



- Highlight the Wind Speed option and use the right and left directional buttons to select the speed. There are three wind speeds: 0, 10 and 20 MPH. At 0 MPH wind speed, there are no wind effects.

Number Direction Relative to Shooter

- 1 Behind
- 2 Left rear
- 3 Left flank
- 4 Left front
- 5 Head on
- 6 Right Front
- 7 Right Flank
- 8 Right Rear

SELECT WIND DIRECTION

- Highlight the Wind Direction option and use the right and left directional buttons to select the desired direction. There are eight wind directions as shown in the adjacent picture. Remember, at 0 MPH wind speed, there are no wind effects. After selecting wind direction, press "Start" to return to the program.

WIND

- Upon returning to the program, the system will have a screen that shows the proper offset for the sight picture at three ranges for the speed and direction selected.

NOTE: The wind speed and direction will remain in effect until it is changed or the SNES is turned off and on. Pushing the reset button for a new firer will not reset the options to default.



TARGET SCREEN

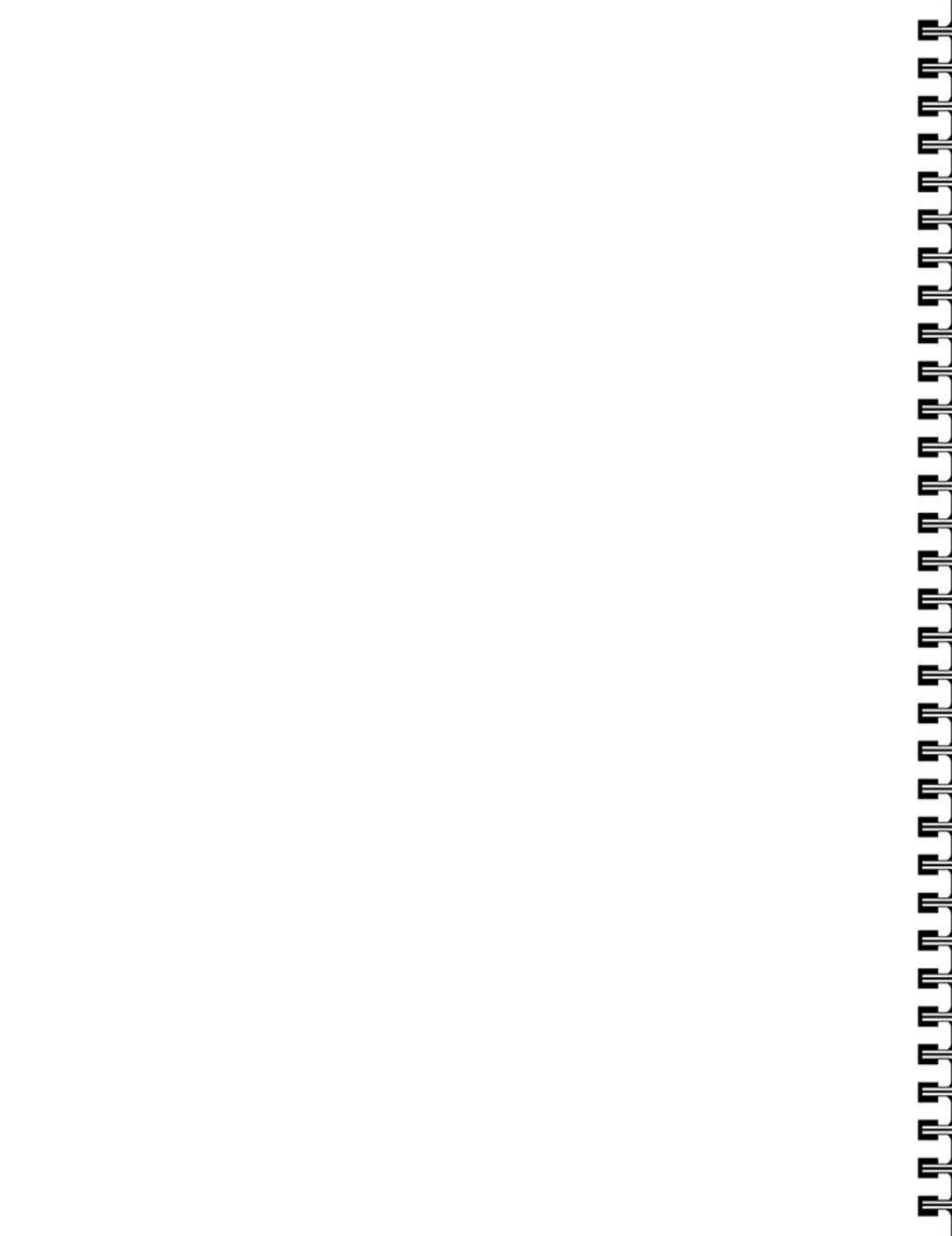
- Wind speed and direction are shown in the upper right-hand corner of the target screens.

TROUBLESHOOTING TIPS

PROBLEM	CORRECTIVE ACTION
SNES will not power up.	1) Plug power cord in. 2) Turn SNES power switch on. 3) Try new wall outlet or power strip.
Program does not start.	1) Turn off all power switches. Remove and reinsert software cartridge. 2) Turn on all power switches. 3) Insure RF switch is connected to TV and the SNES.
No sound.	1) Adjust volume control on television. 2) Recheck all cable connections.
Light pen does not work (purple border appears or light pen fails tracking test as described in Section 2A.)	1) Insure MACS wiring harness is plugged into right port of SNES control deck. 2) Check all wiring harness connections. 3) Check distance from screen to light pen. 4) Check television adjustment against pre-set standards. 5) Check light pen alignment. 6) Calibrate light pen. 7) Turn system off and on. 8) Let television warm up
No picture	1) Adjust television characteristics using display and +/- buttons. 2) Turn off all switches. Recheck all cable connections.
Bullet strike is not at aim point on target.	1) Adjust television to pre-set standards. 2) Check light pen alignment. 3) Calibrate light pen.
Program continues to run without stopping.	1) Check wiring harness and other electrical components for short. 2) Check trigger switch (momentary on) in rifle bolt housing in rifle to insure it functioning properly (use voltmeter if available.)

MACS BM CARTRIDGE

LEVEL	TIME	TIME LIMIT	POSITION	TARGET PRESENTATION	TARGET SEQUENCE	NUMBER OF TARGETS	STANDARDS
1	INTRODUCTION TO SUPPORTED POSITION	NONE	SUPPORTED	SINGLE	IN ORDER 50-100-150-200-250-300	18 (3 PER RANGE)	HIT 2 OF 3 TARGETS AT EACH DISTANCE
2	INTRODUCTION TO UNSUPPORTED POSITION	NONE	UNSUPPORTED	SINGLE	IN ORDER 50-100-150-200-250-300	18 (3 PER RANGE)	HIT 2 OF 3 TARGETS AT EACH DISTANCE
3	TIMED TARGETS IN SUPPORTED POSITION	SUPPORTED	SINGLE	RANDOM	24 (3 PER RANGE)	HIT 3 OF 4 TARGETS AT EACH DISTANCE	
4	TIMED TARGETS IN UNSUPPORTED POSITION	UNSUPPORTED	SINGLE	RANDOM	24 (3 PER RANGE)	HIT 3 OF 4 TARGETS AT EACH DISTANCE	
5	PRACTICE RECORD FIRE I	SAME AS RECORD FIRE	SUPPORTED/ UNSUPPORTED	SINGLE OR DOUBLE	RANDOM	40	HIT 15 OF 20 TARGETS IN EACH POSITION
6	PRACTICE RECORD FIRE II	SAME AS RECORD FIRE	SUPPORTED/ UNSUPPORTED	SINGLE OR DOUBLE	RANDOM	40	HIT 15 OF 20 TARGETS IN EACH POSITION
7	RECORD FIRE	SAME AS ACTUAL LIVE-FIRE QUALIFICATION COURSE	SUPPORTED/ UNSUPPORTED	SINGLE OR DOUBLE	RANDOM	40	HIT 15 OF 20 TARGETS IN EACH POSITION
8	RAPID RECORD FIRE	1/3 LESS THAN TIME ALLOWED FOR RECORD FIRE	SUPPORTED/ UNSUPPORTED	SINGLE OR DOUBLE	RANDOM	40	HIT 15 OF 20 TARGETS IN EACH POSITION
9	COMBAT FIRE	VARIABLE	SUPPORTED/ UNSUPPORTED	MULTIPLE	ATTACK/RETREAT	80	HIT 23 OF 40 TARGETS IN EACH POSITION



MACS FEEDBACK FOR 8MM CARTRIDGE

	LEVEL								
	1	2	3	4	5	6	7	8	9
SHOT BY SHOT DIAGNOSTIC FEEDBACK	Diagnostic feedback and replay of each shot.	X	X						
	Diagnostic feedback of poor shots only.			X	X				
	Hit or miss in lower left corner of screen	X	X						
ON-SCREEN FEEDBACK DURING SHOOTING	Cross hairs showing bullet strike.	X	X	X	X	X*	X**	X**	X**
	Whistle signals target not hit within time limit.			X	X	X	X	X	X
	Target disappears when hit.			X	X	X	X	X	X
	Out of ammo in lower right corner of screen.				X	X	X	X	X
	Penalty for not hitting closest target first.				X	X	X	X	X
SUMMARY FOLLOWING SHOOTING SEQUENCE	Shot group displayed on target at each range.	X	X	X	X	X	X	X	X
	Average diagnostic scores at end of each level.	X	X	X	X				
	Summary of hits, misses, and no fires.				X	X	X	X	X
	Qualification ratings.				X	X	X	X	X

* For misses only

**For misses on refires only

MACS
Multipurpose Arcade Combat Simulator
version 1.1e
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