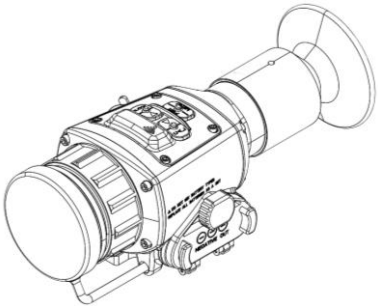
OPERATOR MANUAL
FOR
AN/PAS-35
FAMILY OF WEAPON SIGHTS - INDIVIDUAL (FWS-I)
(NSN: 5855-01-656-6330) (EIC: N/A)



HEADQUARTERS, DEPARTMENT OF THE ARMY
01 JULY 2020

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Seek medical attention as required.

FIRST AID

For First Aid or artificial respiration, see TC 4-02.1, First Aid.

WARNING

Isopropyl alcohol is flammable and toxic. To avoid injury, keep away from open fire and use in well ventilated area.

WARNING

If FWS-I is operated with eyecup/Shroud missing, light emitting from the eyepiece may be visible to the enemy and could result in personal injury.

WARNING

When depressing the eyecup, and maintaining a good sight picture, ensure there is sufficient space between the eye and the FWS-I so that normal recoil of the weapon will not harm the operator.

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

WARNING

Unit deliberate DECON SOP must be followed, since the following procedures are not for total decontamination. Protective mask and gloves should be worn when handling until total decontamination is completed by the DECON site.

WARNING

Do not touch, ingest, or inhale particles or fragments of a broken objective lens. Lens contains Germanium that may cause irritation to eyes, skin, upper and lower respiratory tracts, or gastrointestinal tract. If contacted, flush eyes or skin with large amounts of water. If ingested, DO NOT induce vomiting. Rinse mouth with water and give victim 2-4 cupfuls of milk or water. Fragments of lens may be sharp enough to cut personnel if touched.

WARNING

Do not attempt to recharge non-rechargeable batteries as fire or explosion may occur causing death and/or serious injury to personnel.

WARNING

Do not open battery, dispose of in fire, heat above 212°F (100°C), expose to water, recharge, put in backwards, or mix with used or other battery types. Battery may explode or leak and cause injury to personnel.

WARNING

Using AA batteries other than 1.5V will cause damage to the sight and may explode causing serious injury to the user. DO NOT USE BATTERIES OTHER THAN 1.5V.

**HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.,
01 JULY 2020**

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Communications-Electronics Command, 6565 Surveillance Loop, Building 6001, Aberdeen Proving Ground, MD 21005-1846. You may also send in your recommended changes via electronic mail or by fax. Our fax number is 443-861-5498, DSN 848-5498. Our e-mail address is usarmy.APG.cecom.mbx.amsel-lc-leo-pubs-chg@mail.mil. Our online web address for entering and submitting DA Form 2028s is https://cecom.aep.army.mil/cecom/LRC/WebPages/DAForm2028.aspx.

A reply will be furnished to you.

TABLE OF CONTENTS

CHAPTER 1
GENERAL INFORMATION

SCOPE

Type of Manual

This manual contains a system description, operating procedures, and troubleshooting procedures for the FWS-I. It also contains Operator Level PMCS procedures and Operator Level maintenance procedures.

Model Number

AN/PAS-35

Purpose of Equipment

The FWS-I is a lightweight, modular, self-contained, battery operated, thermal imaging system for reconnaissance, surveillance and target acquisition for individual weapons during daylight, darkness, adverse weather and obscured battlefield conditions.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 750-8, The Army Maintenance Management System (TAMMS) User's Manual; AR 700-138, Army Logistics Readiness and Sustainability.

CORROSION PREVENTION AND CONTROL (CPC)

CPC of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron.

Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking.

Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

The US Army has defined the following nine (9) forms of corrosion used to evaluate the deterioration of metals. These shall be used when evaluating and documenting corrosion.

UNIFORM (or general attack): Affects a large area of exposed metal surface, like rust on steel or tarnish on silver. It gradually reduces the thickness of the metal until it fails.

CREVICE: Occurs in crevices created by rubber seals, gaskets, bolt heads, lap joints, dirt or other surface deposits. It will develop anywhere moisture or other corrosive agents are trapped and unable to drain or evaporate.

SELECTIVE LEACHING: One element, usually the anodic element of an alloy, corrodes away, leaving the cathodic element. This can create holes in metal.

INTERGRANULAR: Metal deterioration caused by corrosion on the bonds between or across the grain boundaries of the metal. The metal will appear to be peeling off in sheets, flaking, or being pushed apart by layers. A particular type of intergranular corrosion is exfoliation.

PITTING: This can result from conditions similar to those for crevice corrosion. Pits can develop on various materials due to their composition. Rifle boxes are big victims of pitting.

EROSION: Results when a moving fluid (liquid or gas) flows across metal surface, particularly when solid particles are present in the fluid. Corrosion actually occurs on the surface of the metal, but the moving fluid washes away the corrosion and exposes a new metal surface, which also corrodes.

FRETTING: Occurs as a result of small, repetitive movements (e.g., vibration) between two surfaces in contact with each other. It is usually identified by a black powder corrosion product or pits on the surface.

GALVANIC: Occurs when two different types of metal come in contact with each other, like steel bolts on aluminum, for example. This is a common problem on aircraft because of their mix of metals.

STRESS: Term used to describe corrosion cracking and corrosion fatigue.

Where an item is not ready/available due to one of these forms of corrosion, it shall be recorded as a corrosion failure in the inspection record and the appropriate code (170) for corrosion shall be used when requesting/performing maintenance.

SF 368, Product Quality Deficiency Report should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) User's Manual.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Destruction of Army materiel to prevent enemy use shall be in accordance with TM 750-244-2 (Procedures for Destruction of Electronic Materiel to Prevent Enemy Use).

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATION (EIR)

If your FWS-I needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance.

ALL CECOM (B16) Aviation and Non-Aviation Warranties. EIRs and PQDRs must be submitted through the Product Data Reporting and Evaluation Program (PDREP) Web site. The PDREP site is: https://www.pdrep.csd.disa.mil/.

If you do not have internet access, you may submit your information using an SF 368 (Product Quality Deficiency Report). You can submit your SF 368 using e-mail (usarmy.apg.cecom.mbx.lrc-leo-b16-pqdr-support-team@mail.mil), regular mail (Commander, U.S. Army Communications-Electronics Command, 6565 Surveillance Loop, Building 6001, Room C3322, Aberdeen Proving Ground, MD 21005-1846), or fax (443-861-5498). We will send you a reply.

EQUIPMENT RETURN PROCEDURES

If, after completing the PMCS, troubleshooting procedures, and repair actions contained in this manual, the AN/PAS-35 is still damaged, the operator shall annotate the fault on DA Form 2404/5988E and turn the AN/PAS-35 into next higher level of maintenance.

NOMENCLATURE CROSS-REFERENCE LIST

Official Nomenclature	Common Name
AN/PAS-35	Family of Weapon Sights - Individual (FWS-I)

LIST OF ABBREVIATIONS/ACRONYMS

Abbreviation/Acronym	Name
-	Negative
+	Positive
±	Plus or Minus
>	Greater Than
<	Less Than
≥	Greater Than or equal to
≤	Less Than or equal to
^{0}	Degree(s)
AAL	Additional Authorization List
AGC	Automatic Gain Control
ALGN	Align
AON	Auto Cal On

Abbreviation/Acronym	Name
AR	Augmented Reality
ARC	Automatic Reticle Color
ATAK	Android Tactical Assault Kit
AUX	Auxiliary
BD	Bundle
BH	Black Hot
BII	Basic Issue Item
BIT	Built-In-Test
BP	Battery Pack
BRT	Bright
BT	Bottle
BX	Box
C	Celsius
CAL	Calibration
CCA	Circuit Card Assembly
CCO	Close Combat Optic (M68)
CCW	Counter Clockwise
CECOM	Communication Electronics Command
CLP	Cleaner, Lubricant, and Preservative
cm	Centimeters
COEI	Component of End Item
CPC	Corrosion Prevention and Control
CW	Clockwise
DECON	Decontamination
DIS	Display (Clip-On mode)
DISA	Disable
DISP	Display (Standalone mode)
DoD	Department of Defense
DSP	Digital Signal Processor
DVI	Direct Video Input
EA	Each
EIR	Equipment Improvement Recommendation
EL	Elevation
ENAB	Enable
ENVG	Enhanced Night Vision Goggle
ENVG-B	Enhanced Night Vision Goggle - Binocular

Abbreviation/Acronym	Name
EUD	End User Device
EWLA	End User Device (EUD) Wireless Link Assembly
EX	Exit (Clip-On mode)
F	Fahrenheit
FOV	Field of View
FPA	Focal Plane Array
FPGA	Field Programmable Gate Array
ft.	Feet
FWS	Full Weapon Sight
FWS-I	Family of Weapon Sights – Individual
HD	Hundred
HMA	Helmet Mount Assembly
hr.	Hour
HTH	High Test Hypochlorite
IAW	In Accordance With
ID	Identification
In	Inch
Ind	Indicator
INV	Invert
I/O	Input/Output (Standalone mode)
IO	Input/Output (Clip-On mode)
IR	Infrared
ISPDS	Integrated Soldier Power and Data Distribution System
ISW	Intra-Soldier Wireless
KBM	Keyboard Backup Mode
LBI	Low Battery Indicator
LL	Lower Left (PIP position)
LNK	Link
LR	Lower Right (PIP position)
LVL	Level
M or m	Meter
MD	Mode (Clip-On mode)
MIL	Milliradian
MISC	Miscellaneous

Abbreviation/Acronym	Name
MOPP	Mission Oriented Protective Posture
MSP	Mixed Signal Processor
MTOE	Modified Table of Organization and Equipment
NFOV	Narrow Field of View
NUC	Non-Uniformity Correction
OLED	Organic Light Emitting Diode
OPT	Option
PAN	Personal Area Network
PBIT	Power-On Built In Test
PIP	Picture-in-Picture
PK	Pack
PMCS	Preventive Maintenance Checks and Services
POL	Polarity
PQDR	Product Quality Deficiency Report
QRC	Quick Reference Card
RCO	Rifle Combat Optic (M150)
RET	Reticle
Rev	Revision
RO	Roll
RQD	Required
AR/RTA-BPA	Augmented Reality/Rapid Target Acquisition Battery Pack Assembly
SA	Sight Alignment
S/N	Serial Number
SOP	Standard Operating Procedure
STBY	Standby
STD	Standalone
TAMMS	The Army Maintenance Management System
TDR	Transportation Discrepancy Report
TIM	Thermal Imaging Module
TL	Top Left (PIP position)
TM	Technical Manual
TOE	Table of Equipment
TR	Top Right (PIP position)
U/I	Unit of Issue

Abbreviation/Acronym	Name
UV	Ultra Violet
Vdc	Volts Direct Current
WFOV	Wide Field of View
WH	White Hot
WND	Windage
WP	Work Package

GLOSSARY

WARNING – Conditions, practices or procedures that must be observed to avoid personnel injury or loss of life.
CAUTION – Conditions, practices or procedures that must be observed to avoid damage to equipment or destruction of equipment.
NOTE – Essential information of special importance, interest or aid in job performance.
DISPLAY – A defined area containing a projected image and all indicators.

END OF WORK PACKAGE

EQUIPMENT DESCRIPTION AND DATA
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The FWS-I is an uncooled, high-resolution infrared imaging device used on individual weapons for reconnaissance, surveillance and target acquisition during daylight, darkness, adverse weather and obscured battlefield conditions. The FWS-I, when used in conjunction with the ENVG-B provides a wireless Augmented Reality/Rapid Target Acquisition (AR/RTA) capability. The FWS-I, when used in conjunction with a day optic, allows the displayed output scene imagery to serve as the input for the day optic.

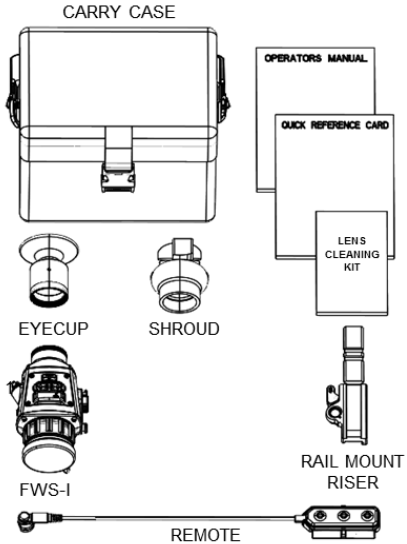


Figure 1. FWS-I Kit.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Table 1. Major Components.

Component	Description
FWS-I	The FWS-I is an uncooled, high-resolution infrared imaging device used on individual weapons for reconnaissance, surveillance and target acquisition during daylight, darkness, adverse weather and obscured battlefield conditions.
Shroud	Connects FWS-I to M68 (CCO)/M150 (RCO) day optic.
Carry Case	Soft Case used to store and transport FWS-I and components.
Rail Mount Riser	Used on M4/M16A4, M249 to raise FWS-I to clear backup iron sight in Standalone Mode.
Remote	The Remote is designed to be compatible with standard issue battle-grip and forward handgrip. Connects to I/O port of FWS-I providing functional control of FWS-I and AR/RTA feature with the non-firing hand.
Eyecup	Used on the FWS-I to cover the eyepiece to maintain light security.
Quick Reference Card	Reference guide for quick operations.
Operator Manual	Operator manual for the FWS-I system.
Lens Cleaning Kit	Kit to clean FWS-I lenses.

FWS-I EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The FWS-I is a lightweight, modular self-contained, battery operated, thermal imaging system designed for operation in battlefield environments. See Theory of Operation FWS-I for details.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

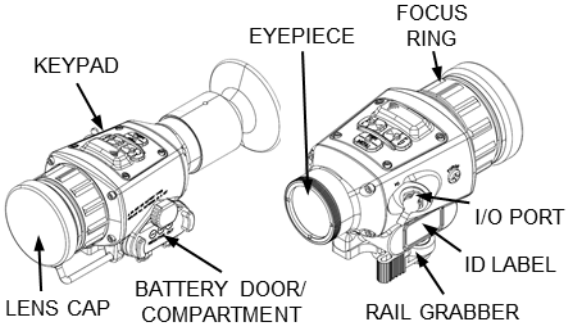


Figure 2. FWS-I System.

Table 2. FWS-I Features.

Component	Description
Keypad	Located on the top of the FWS-I and is used for making adjustments.
Focus Ring	Located on the front of the FWS-I and is an adjustable optic ring used to focus the thermal image.
Lens Cap	Located on the front of the objective lens, protects the lens from damage when not in use.
ID Label	Located on the right side of the FWS-I, provides identification and technical data about the unit.
Rail Grabber	Located on the bottom of the FWS-I, provides an interface to the 1913 Picatinny rail system.
I/O Port	Located on the right side of the FWS-I, provides an interface point for the Remote or allows for connection to external devices.
Battery Door	Seals the battery compartment.
Battery Compartment	Located on the left side of the FWS-I, is capable of holding three (3) L91 AA batteries used to power the unit.
Eyepiece	Located on the rear of the FWS-I, is used to view the sight picture.

EQUIPMENT DATA

NOTE

Use of alkaline or rechargeable batteries causes severe degradation of performance.

Table 3. FWS-I Specifications.

WEIGHT AND DIMENSIONS			
Weight (with batteries and Rail Grabber, without Rail Mount Riser)	x.xx pounds		
Length (without Eyecup installed)	x.xx in.		
Width	x.xx in.		
Height	x.xx in.		
BATTERY LIFE WIRELESS OFF*			
Lithium AA L91	-40°F -40°C	77°F 25°C	120°F 49°C
INDICATOR BARS	**HOURS REMAINING**		
5 bars (New batteries)	x.xx	x.xx	x.xx
4 bars (**while flashing)	x.xx	x.xx	x.xx
3 bars (**while flashing)	x.xx	x.xx	x.xx
2 bars (**while flashing)	x.xx	x.xx	x.xx
1 bar (**while flashing)	x.xx	x.xx	x.xx
No bars (**LBI flashing)	x.xx	x.xx	x.xx
BATTERY LIFE WIRELESS ON*			
Lithium AA L91	-40°F -40°C	77°F 25°C	120°F 49°C
INDICATOR BARS	**HOURS REMAINING**		
5 bars (New batteries)	x.xx	x.xx	x.xx
4 bars (**while flashing)	x.xx	x.xx	x.xx
3 bars (**while flashing)	x.xx	x.xx	x.xx
2 bars (**while flashing)	x.xx	x.xx	x.xx
1 bar (**while flashing)	x.xx	x.xx	x.xx
No bars (**LBI flashing)	x.xx	x.xx	x.xx
* Performance will vary depending on actual environmental conditions. ** Indicator bars flash five (5) times after changing to lower battery bar.			

Table 3. FWS-I Specifications-Continued.

GENERAL	
Video Output	Integrated Micro-display
Wireless	x.xx
Controls	Menu-based 3 button control
Operating Temperature	x.xx
Storage Temperature	x.xx
Field of View (FOV)	x.xx
Immersion	x.xx
PROBABILITY OF DETECTION (MOVING PERSONNEL)	
Clear Battlefield	x.xx
Obscured Battlefield	x.xx

END OF WORK PACKAGE

THEORY OF OPERATION

INTRODUCTION

This work package contains functional descriptions of the FWS-I and explains how the major components interact with the system.

FWS-I

The FWS-I, when used in conjunction with a day optic, allows the FWS-I displayed output scene imagery to serve as the input for the day optic. The FWS-I, when used in conjunction with the ENVG-B, provides rapid target acquisition capability by displaying the FWS-I imagery into the ENVG-B display. There are multiple RTA modes:

- PIP - Simultaneous display of full weapon sight imagery with weapon sight reticle, Picture in Picture (PIP), and ENVG-B imagery.
- FWS - Full Weapon Sight (FWS) imagery with weapon sight reticle displayed in the ENVG-B.
- RTA - Partial weapon sight imagery with reticle spatially aligned (bubble) with the thermal imagery of the ENVG-B.

SYSTEM BATTERY INDICATOR

NOTE

Primary battery is the 1.5V Lithium AA L91. Use of any other type of AA batteries will significantly impact the operational performance.

FWS-I has a Battery Charge Indicator that indicates the charge/discharge state of the batteries. When linked together, FWS-I and ENVG-B battery states are displayed in the ENVG-B eyepiece.

- Batteries should always be replaced as a set. Never intermix with partially used batteries or other battery types. Battery door has visual indicators on the outside of the door to identify correct orientation of the batteries for installation.

AUGMENTED REALITY/RAPID TARGET ACQUISITION BATTERY PACK ASSEMBLY (AR/RTA-BPA)

The AR/RTA-BPA provides rapid target acquisition capability to view the boresighted/zeroed FWS-I weapon sight reticle in the ENVG-B display, enabling the user to accurately engage targets without the use of active lasers. The AR/RTA-BPA transfers data and power between the AR/RTA-BPA through the HMA to the ENVG-B goggle and also transmits data wirelessly between the AR/RTA-BPA and FWS-I.

REMOTE

The Remote allows for easy operation of the FWS-I or AR/RTA-BPA during operation of the weapon. The three-button keypad allows for easy operation by the non-shooting hand.

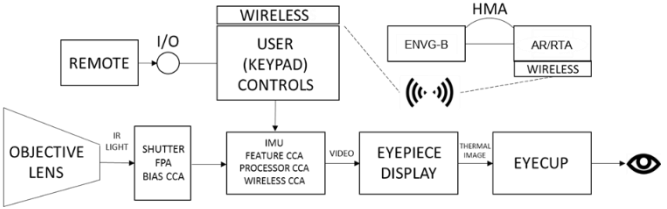


Figure 1. FWS-I Functional Block Diagram.

END OF WORK PACKAGE

CHAPTER 2
OPERATOR INSTRUCTIONS
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

FWS-I CONTROLS AND INDICATORS

The FWS-I utilizes a push button control menu system. The buttons located at the top of the FWS-I allow users to select desired functions and activate them. The </> symbols are referred to as the left and right buttons and are used to navigate menu functions. See Figure 1 for location and function of push button controls. See Table 1 for FWS-I controls and buttons.

BUTTON OPERATION. (Figure 1 and Table 1)

- Press and Release: Function is activated only after button is pressed and released. This takes less than 1 second to perform.
- Press and Hold: Function is activated only after button is pressed and held for more than 1 second.
- Scroll: Repeated Press and Release of the Left and Right buttons will scroll in increments. Press and Hold will auto-scroll in multiple increments.

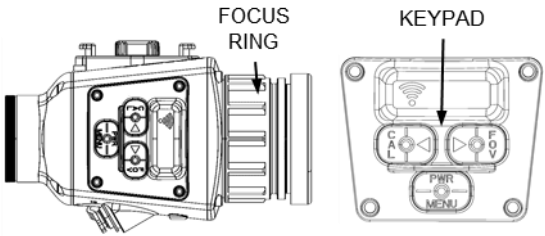


Figure 1. FWS-I Controls and Buttons.

Table 1. FWS-I Controls and Buttons.

Component	Description
Focus Ring	Adjusts the focus of the thermal scene from 5m to infinity
LEFT Button	Press and Hold when MENU is OFF: Toggles AGC ON and OFF Press and Release: Calibration Press and Release when MENU is ON: Selects menu item Left/Up Navigation
RIGHT Button	Press and Hold: Change Polarity Press and Release when MENU is OFF: Toggles FOV (WFOV, NFOV) Press and Release MENU is ON: Selects menu item Right/Down Navigation
PWR/MENU Button	System OFF→ON: Press and Hold turns system ON Press and Release: Activate Menu Menu ON: Press and Release: Menu Select System ON →OFF: Press and Hold until “POWERING OFF”
Standby	Press and Hold PWR/MENU until “RELEASE TO STBY” and release
Wireless ON/OFF	Press and Release LEFT and RIGHT buttons
Reset	Press and Hold all three buttons

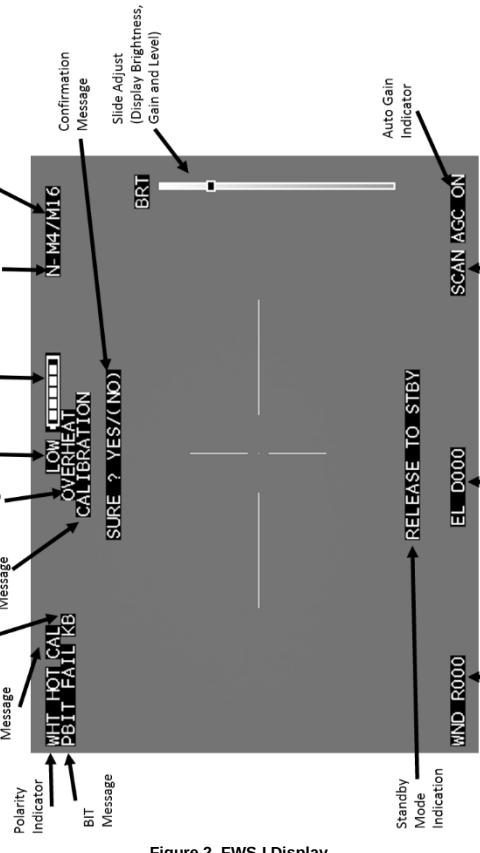


Figure 2. FWS-I Display.

Display Symbology. (Figure 2)
Shows location of indicators to be displayed during operation.

Menu Activation. (Figure 1 and Table 1).
To enter the menu system, Press and Release the PWR/MENU button.

Reset Mode. (Figure 1)
To enter Reset mode, Press and Hold PWR/MENU, LEFT, and RIGHT buttons. The user does not need to release the buttons to see the reset occur. The following occurs during Reset Mode activation:

- Automatic Gain Control (AGC) set to AGC ON
- Polarity is set to White Hot (WHT HOT)
- Sensor Gain (GAIN) is set to middle value
- Display brightness (BRT) set to upper end value
- Sensor Level (LVL) is set to middle value
- Reticle mode is set to Automatic Reticle Control (ARC)

MENUS AND MENU FUNCTIONS

FWS-I menus and menu functions are layered into various levels. With the FWS-I turned ON; access the Main Menu by Press and Release of the PWR/MENU button. Menu items are then selected (highlighted) by scrolling with the LEFT or RIGHT buttons. Activation of the selected menu item is accomplished by Press and Release of the PWR/MENU button.

In most cases, activation of a Main Menu item will result in the display of a sub-menu. Sub-menu functions are selected (highlighted) by scrolling with the LEFT or RIGHT buttons. Activation of the selected function is accomplished by Press and Release of the PWR/MENU button.

Menu settings and adjustments will be saved during any one of the below actions:

- Selecting the EXIT menu function by scrolling to the EXIT MENU function and Press and Release of the PWR/MENU button.
- Entering Standby mode by Press and Hold of the PWR/MENU button for approximately 2 seconds stating “RELEASE TO STBY”.
- Normal shutdown of the FWS-I by holding the PWR/MENU button for approximately 4 seconds.
- Automatic shutdown performed by the FWS-I just prior to complete drain of battery power.

NOTE

Figures 3 through 18 show the FWS-I Menu System in STANDALONE mode.

NOTE

Menu settings and adjustments WILL NOT be saved if the batteries are removed prior to any one of the four actions above occurring. Be advised that the Main Menu appears differently in Clip-On mode.

Main Menu

Press and Release the PWR/MENU button calls up the Main Menu shown in Figure 3.

Figure 3. Main Menu.

CAL	Displays an option list for AUTO ON or AUTO OFF.
SETUP	Opens the WIZARD or MANUAL sub-menus to allow users to select personal preference of the FWS-I and functionality.
ADMIN	Opens the Display (DISP), Statistics (STAT) and Current Configuration (CONFIG) sub-menus.
EXIT	Closes the Main Menu and saves any changes made.

CAL Sub-Menu

NOTE

On the CAL sub-menu, activating the PWR/MENU function will return the display to the Main Menu.

Selecting and activating the CAL menu function calls up the CAL Select Screen shown in Figure 4. System will automatically calibrate every 5 minutes unless AUTO OFF is selected. Allows operator to turn automatic shuttered calibrations on (AUTO ON) or off (AUTO OFF).

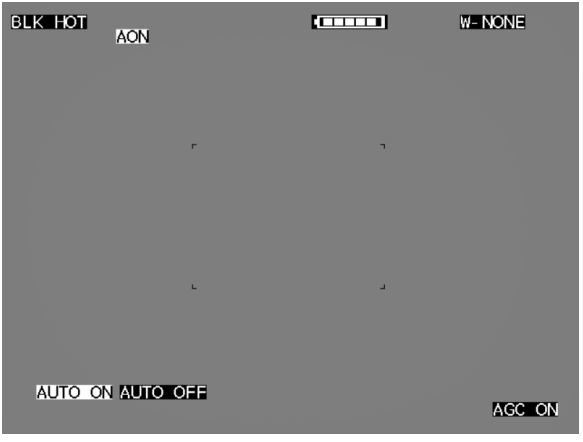


Figure 4. CAL Select Screen.

An indicator (AON) will be displayed in the top left of the display to identify the ON status of the auto calibration mode in Figure 4. No indicator will be displayed when AUTO OFF is selected.

Setup Sub-Menu
Selecting and activating the SETUP menu function calls up the WIZARD sub-menu or the MANUAL sub-menu as shown in Figure 5.

Figure 5. Setup Sub-Menu.

WIZARD Setup Sub-Menu

Selecting and activating the WIZARD Setup will begin the process for the user to select personal parameters to include weapon, day optic and RTA capabilities. Once all personal parameters are selected, the user will not need to go back and re-select unless a new user is assigned the equipment or the user has changed personal preferences.

NOTE

Menu auto-exit timer will be disabled once the setup wizard is selected.

a. Select Weapon – User selects M4/M16, M249, M136 (AT4CS), M141 (BDM) or GoBack to begin again as shown in Figure 6.

Figure 6. Select Weapon Sub-Menu.

b. Select Day Optic – User selects M68, M150, NONE or GoBack to go back to the Weapon Selection screen. M68 corresponds to CCO 1X sight display mode, M150 corresponds to RCO 4X sight display mode, NONE corresponds to STANDALONE sight display mode as shown in Figure 7.

Figure 7. Select Day Optic Sub-Menu.

c. Select RTA Operation – User selects RTA, NON-RTA or GoBack. Select “RTA” if the user is going to use the system with the ENVG-B or “NON-RTA” if the system will be used without the ENVG-B as shown in Figure 8. If “NONE” for Day Optic and “NON-RTA” is selected the user will be forwarded to Step h. “Ready to Zero Sight” (Figure 12).

Figure 8. Select RTA Operation.

d. Select RTA Reticle – User selects Crosshair, Circle Dot or GoBack as shown in Figure 9.

Figure 9. Select RTA Reticle.

e. Select Reticle Color – User selects RED, GREEN reticle colors or GoBack as shown in Figure 10.

Figure 10. Select Reticle Color.

f. Select RTA Modes – This is a multi-selection menu. User has the ability to pick one or multiple RTA modes per their user preference as shown in Figure 11. A "+" in front of the mode indicates the option is selected.

NOTE

When selecting RTA mode(s), display must always have at least one mode selected at all times.

Once preferred RTA modes are selected, the user can select DONE to proceed to the next step of the setup wizard or GoBack to the previous screen.

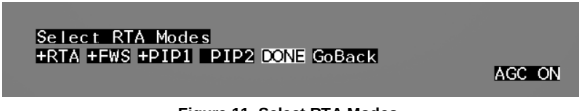


Figure 11. Select RTA Modes.

g. Ready to Align RTA Reticle – This allows the operator to align the RTA reticle to the Day Optic reticle (Figure 12). Selecting YES, activates the RTA Reticle Alignment screen (Figure 13).
   1. Back - Returns to the previous screen.

2. WND – Allows the user to adjust the Windage. User may press or hold LEFT or RIGHT buttons to adjust Windage. Press and Release of the PWR/MENU button will save changes and take the user back to the Windage and Elevation Selection Screen (refer to Figures 12 and 13).
3. EL – Allows the user to adjust the Elevation. User may press or hold LEFT or RIGHT buttons to adjust Elevation. Press and Release of the PWR/MENU button will save changes and take the user back to the Windage and Elevation Selection Screen (refer to Figures 12 and 13).
4. Done with Zero Sight Operation – If the operator is ready and has completed zero operations, select “DONE” and the user preference will be saved. The operator will then be taken to the “WIZARD COMPLETE” menu. Selecting “OK” will exit the Setup Wizard menu as shown in (Figure 18).

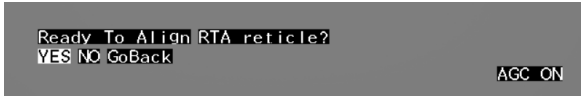


Figure 12. Ready to Align RTA Reticle.

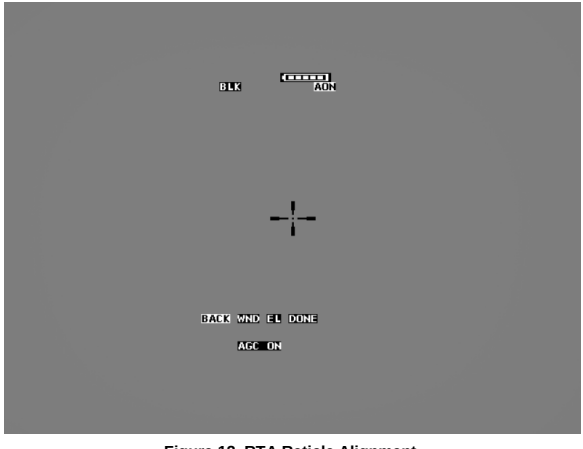


Figure 13. RTA Reticle Alignment.

h. Ready to Zero Sight – If the operator is ready to zero their weapon, selecting "YES" will save all previous selections and the operator will be presented Windage and Elevation adjustments for their chosen weapon reticle shown in Figures 14 -17. If a Day Optic was selected in the previous selection, proceed to Step j. "Zero Weapon" (Figure 19). Allows operator to move the reticle in windage and elevation using the LEFT and RIGHT buttons on the menu keypad.
   - Initiated by Press and Release of the PWR/MENU button.
   - A reticle adjustment in WFOV equals an indicated change of three (3) units in WND or EL on the display.
   - A reticle adjustment in NFOV equals an indicated change of one (1) unit in WND or EL on the display.
   - One reticle adjustment equals the following at 25 meters:

WFOV	NFOV
1.26 cm	0.42 cm

   - Adjustments made in one FOV are also reflected in the opposite FOV.

NOTE

The "YES" will not be selectable if the user has selected "NON-RTA" during the wizard configuration.

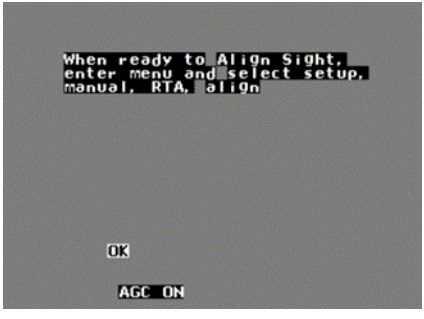


Figure 14. Ready to Zero Sight.

Figure 15. Windage and Elevation Selection.

1. Windage Adjustment – Select Windage and the Windage Adjustment screen (Figure 16) will appear. (< - ADJUST) denotes Windage Adjustment is selected. User may press or hold LEFT or RIGHT buttons to adjust Windage. Press and Release of the PWR/MENU button will save changes and take the user back to the Windage and Elevation Selection Screen (Figure 15).

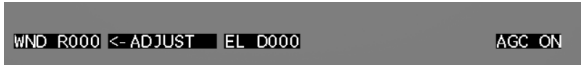


Figure 16. Windage Adjustment Screen.

2. Elevation Adjustment – Select Elevation and the Elevation Adjustment screen (Figure 17) will appear. (ADJUST - >) denotes Elevation is selected. User may press or hold LEFT or RIGHT buttons to adjust Elevation. Press and Release of the PWR/MENU button will save changes and take the user back to the Windage and Elevation Selection Screen (Figure 15).

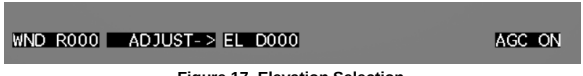


Figure 17. Elevation Selection.

i. Done with Zero Sight Operation – If the operator is ready and has completed zero operations, select “DONE” and the user preference will be saved. The operator will then be taken to the “WIZARD COMPLETE” menu. Selecting “OK” will exit the Setup Wizard menu as shown in Figure 18.

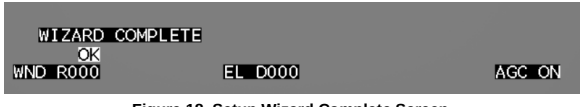


Figure 18. Setup Wizard Complete Screen.

j. Zero Weapon: NO – Before zeroing operations when “NO” is selected all accumulated settings will be saved and the user will be directed to exit the Setup Wizard by selecting “OK” as shown in Figure 18. The user will then be directed to Zero Sight, and enter menu and select setup, manual, reticle as shown in Figure 19.

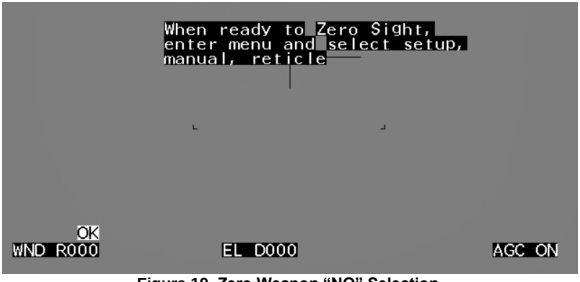


Figure 19. Zero Weapon “NO” Selection.

k. Manual Alignment CCO and RCO: NO – will prompt the user to align sight, enter MENU, select setup, manual, RTA, align (Figure 20) and follow the procedures in WP 0007, ALIGN (RTA).

Figure 20. Manual Align CCO and RCO.

Manual Setup Sub-Menu

Selecting and activating the Manual Setup Sub-Menu will allow the operator to make changes outside of the Setup Wizard. Operator will be able to adjust Reticle, Mode and RTA capabilities.

1. RETICLE SUB-MENU: Operator is able to manually adjust Windage, Elevation, Color or Weapon Reticle as shown in Figure 21.

Figure 21. Reticle Sub-Menu.

   a. Windage Adjustment – Select WINDAGE and the Windage Adjustment screen (Figure 22) will appear. (< - ADJUST) denotes Windage Adjustment is selected. User may press or hold LEFT or RIGHT buttons to adjust Windage. Press and Release of the PWR/MENU button will save changes and take the user back to the Reticle Sub-Menu screen (Figure 21).

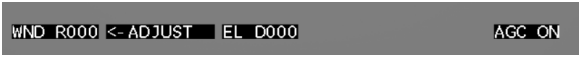


Figure 22. Windage Adjustment Screen.

   b. Elevation Adjustment – Select ELEVATION and the Elevation Adjustment screen (Figure 23) will appear. User may press or hold LEFT or RIGHT buttons to adjust Elevation. Press and Release of the PWR/MENU button will save changes and take the user back to the Reticle Sub-Menu screen (Figure 21).

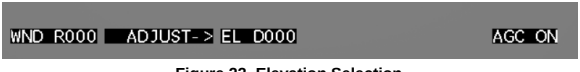


Figure 23. Elevation Selection.

c. Color Adjustments– User can select ARC, INVERSE, WHITE, or BLACK polarity options as shown in (Figure 24).

Figure 24. Color Adjustment Screen.

d. Select Weapon – User selects M4/M16, M249, M240L M136 (AT4CS), M141 (BDM), 10 MIL or NONE as shown in (Figure 25).

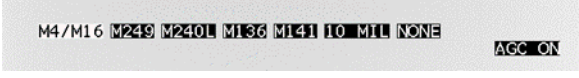


Figure 25. Select Weapon.

2. MODE SUB-MENU: Operator will be able to manually select the below options as shown in (Figure 27). Allows the operator to select STD FULL, STANDALONE, CCO (1X) or RCO (4X) mode of operation for the FWS-I. Once highlighted, Press and Release the PWR/MENU button to select the desired choice.

NOTE

STD FULL and STANDALONE will appear identical. The difference is that STD FULL uses a different set of AGC Row/Column weighting tables.

a. STD FULL or STANDALONE – Select when the FWS-I is being used as a handheld device or when mounted to a weapon in a standalone configuration.
   1. STANDALONE (Primary) - AGC applies more emphasis to center region of display.
   2. STD FULL - AGC applied equally to the full display.

NOTE

When using the FWS-I in-line with a day optic (e.g., CCO, RCO), normal procedure is to place the FWS-I in Clip-On mode. If using STANDALONE mode while in a Clip-On configuration, use only WFOV. Using NFOV in this instance will induce an error in the aiming function of the day optic, and display symbology (including the Main Menu) will not be visible to the operator.

b. CCO (1X) or RCO (4X) – Select when the FWS-I is mounted to a weapon in-line with a day optic. Selecting the CCO(1X) or RCO(4X) modes automatically accomplishes the following:
   1) Selects the NONE reticle. When in CCO (1X) or RCO (4X) modes, no other reticle can be selected and the RET Sub-Menu option is not available.
   2) FOV disabled when in CCO (1X) or RCO (4X) modes, pressing the RIGHT button has no effect on the FOV setting.
   3) Brings all display symbology toward the center of the display so that it is visible when viewed through the In-line day optic.

With CCO (1X) or RCO (4X) modes selected, only the centermost portion of the display will be visible when viewed through the in-line day optic, as shown in (Figure 26).

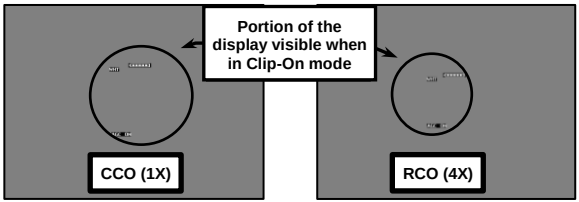


Figure 26. Display in Clip-On Modes.

Figure 27. Mode Sub-Menu.

3. RTA SUB-MENU: Operator will be able to manually select ON, OFF, NETWRK CONFIGURATION and KBM as shown in (Figure 28).

   - ON: Turn on wireless and enable RTA function.
   - OFF: Turn off wireless and disable RTA function.
   - NETWORK CONFIG: Start wireless pairing process to join a new intra-soldier wireless network or add devices to a network.
     - NEW NETORK: Initiates the pairing action.
     - NEW DEVICE: Starts the pairing process to add a new device to an already established intra-soldier wireless network.

   When selecting NEW NETWORK, a user confirmation will be displayed to prevent erroneous operation.

   SURE ? YES/(NO) This indicates “NO”

   SURE ? (YES)/NO This indicates “YES”

   Use LEFT or RIGHT to change selection.

   Click PWR/MENU to invoke active selection. If “YES” is selected, pairing processing will begin immediately. If “No” is selected, no pairing process will occur.

- KBM – Activates RTA Keyboard Backup Mode (KBM).

Once highlighted, Press and Release the PWR/MENU button to select the desired choice. If selection is undesired, wait 10-15 seconds for system to time out back to the main menu.

NOTE

KBM selection is only available when wireless is ON and PAIRED. If the wireless is disabled while in KBM mode, the KBM mode will automatically exit.

Figure 28. RTA Sub-Menu.

ADMIN Sub-Menu

Selecting and activating the ADMIN Sub-Menu will allow Operator to adjust Display settings, view the Statistic's Sub-Menu and Current Configuration as shown in (Figure 29).

NOTE

Once a selection is made user will be returned back to the Admin sub-menu.

Figure 29. ADMIN Sub-Menu.

1. DISP SUB-MENU: Operator will be able to manually adjust Brightness, AGC LEVEL and AGC GAIN as shown in (Figure 30).

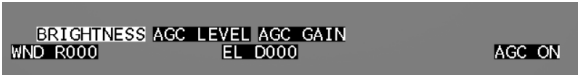


Figure 30. DISP Sub-Menu.

a. BRIGHTNESS. Selecting and activating the BRIGHTNESS (Figure 30) function calls up the BRIGHTNESS Adjustment Screen shown in (Figure 31).

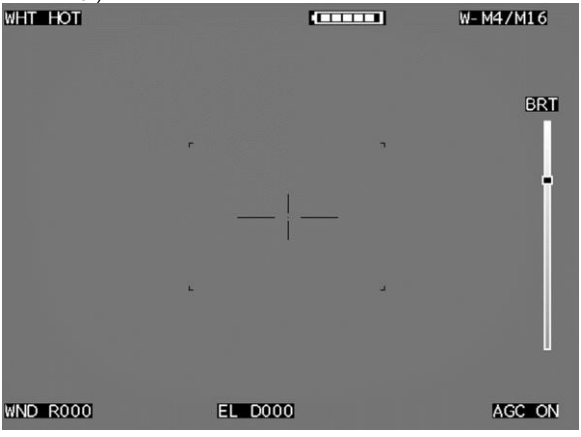


Figure 31. BRIGHTNESS Adjustment Screen.

b. AGC LEVEL. Selecting and activating the AGC LEVEL (Figure 30) function calls up the AGC LEVEL Adjustment Screen shown in (Figure 32).

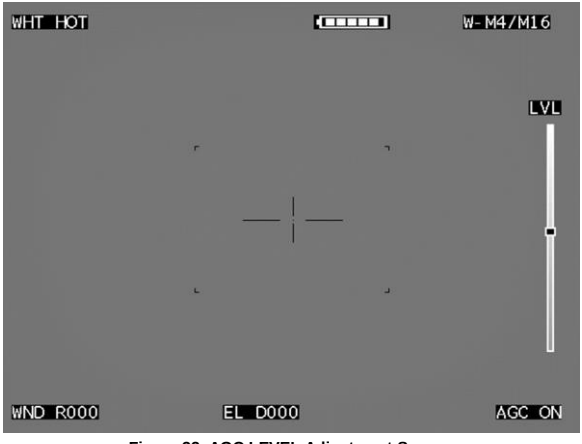


Figure 32. AGC LEVEL Adjustment Screen.

c. AGC GAIN. Selecting and activating the AGC GAIN (Figure 30) function calls up the AGC GAIN Adjustment Screen shown in (Figure 33).

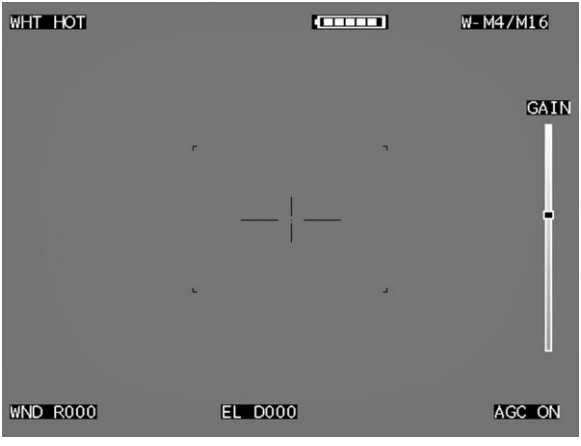


Figure 33. AGC GAIN Adjustment Screen.

2. STAT SUB-MENU: Operator will be able to view system PBIT and MISC as seen in (Figure 34).

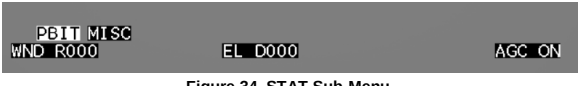


Figure 34. STAT Sub-Menu.

a. PBIT: Operator will be able to view system PBIT. Displays PASS/FAIL status for internal systems as seen in (Figure 35).

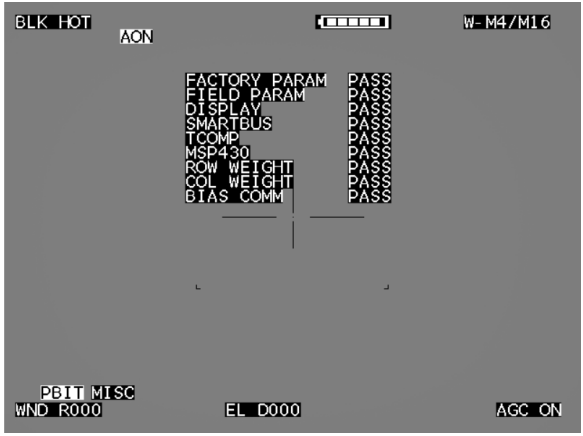


Figure 35. PBIT Screen.

b. MISC: Selecting and activating the MISC function calls up the MISC Screen shown in (Figure 36). Press and Release of the PWR/MENU button brings the menu back up.

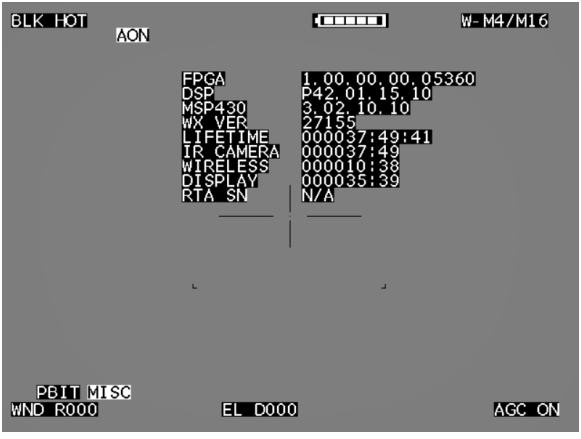


Figure 36. MISC Screen.

- Displays miscellaneous information about the unit:
  FPGA - Field Programmable Gate Array firmware version number.
  DSP - Digital Signal Processor software version number.
  MSP430 - Mixed Signal Processor (AUX) firmware version.
  WX VER - Wireless Version
  LIFETIME - Total unit lifetime from inception.
  IR CAMERA - Total ON time of IR (TIM) module.
  WIRELESS - Total ON time of wireless.
  DISPLAY - Total ON time of internal display.
  RTA SN – AR/RTA-BPA serial number.

3. CONFIG: Operator will be able to view all current configurations saved by the user as seen in (Figure 37).

NOTE

Once selection is made, user will be prompted back to the Main Menu.

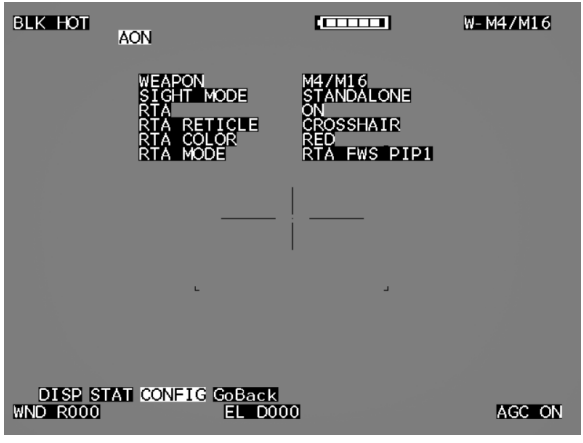


Figure 37. CONFIG Screen.

FWS-I RETICLE INDICATORS

Common Reticle Indicators

The longest horizontal lines to the left and right of the ZEROING AIM point are referred to as the ZEROING AIM LINE. The ZEROING AIM LINES serve two purposes: 1) For reticles with multiple AIM POINTS, indicate which AIM POINT to use when zeroing the FWS-I; 2) Serve as a means of measuring angles for combat preparations, directing fire or range estimation. For the WFOV or NFOV angular measurements, this can be determined from the ZEROING AIM LINE and AIM POINT (Figure 38). The NFOV indicator (Figure 39) is used on all FWS-I WFOV reticles. The portion of the WFOV image bounded by the four corners of the NFOV Indicator represents the area of the thermal scene that will be displayed when changing from WFOV to NFOV.

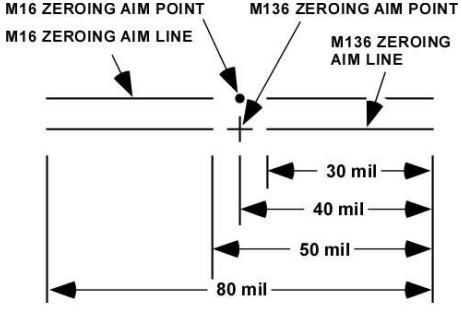


Figure 38. WFOV and NFOV Angular Measurements Using Zeroing Aim Lines and Aim Points.

NONE Reticle

In the Weapon Sub-Menu, NONE may be selected. This selection is used for observation purposes only. No reticle or WND/EL values are displayed. FOV can be selected for wide (WFOV) or narrow (NFOV). NFOV Indicator will appear in WFOV. See (Figures 39 and 40).

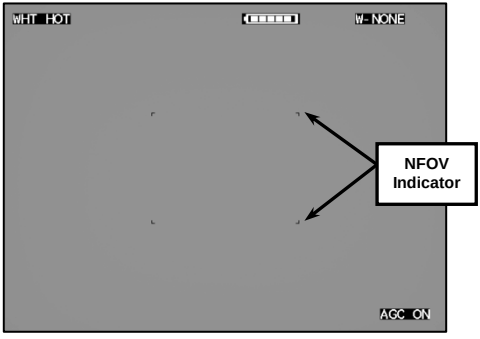


Figure 39. NONE Reticle (WFOV).

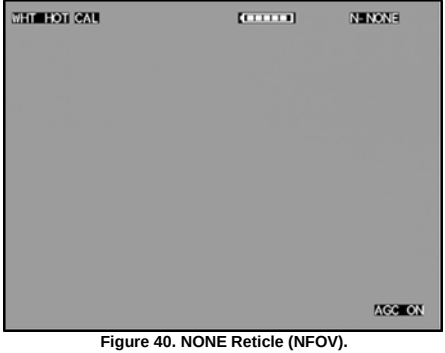


Figure 40. NONE Reticle (NFOV).

Reticles

The FWS-I provides reticles for use by the M4/M16A4, M249, M240L M136 and M141 and 10 MIL. For the FWS-I reticles with respect to the weapon applications. (Figures 41 through 52).

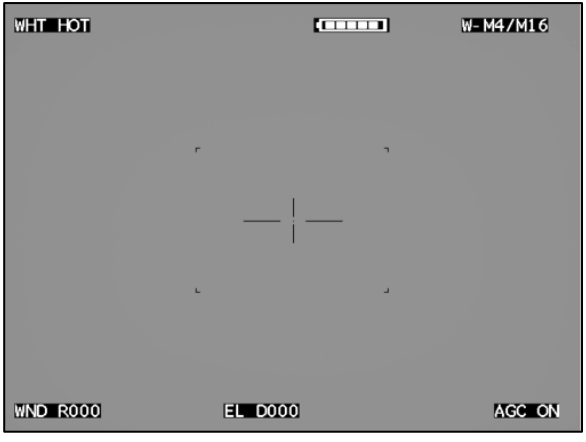


Figure 41. M4/M16A4 WFOV Reticle.

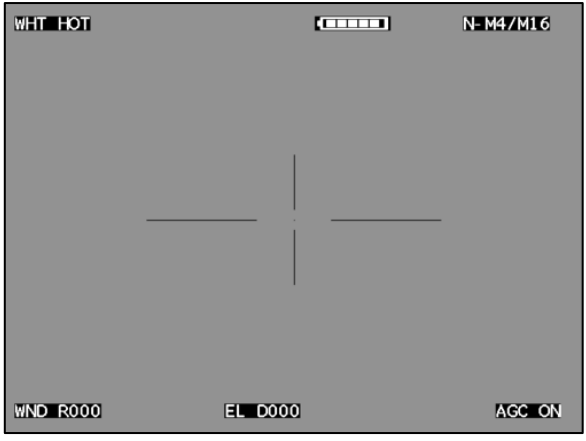


Figure 42. M4/M16A4 NFOV Reticle.

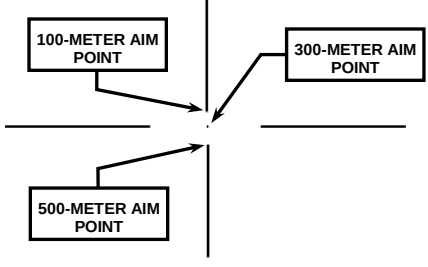


Figure 43. Range Estimation - M4/M16A4 Reticle.

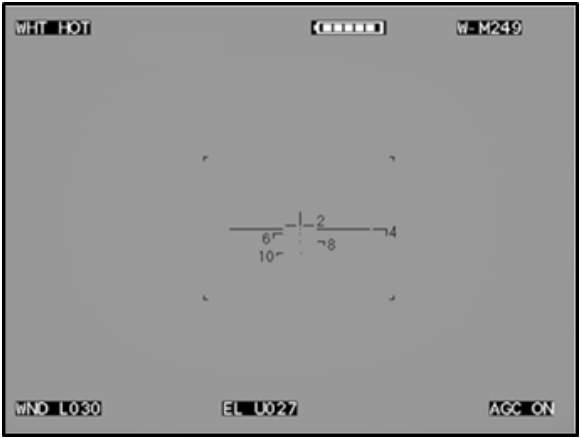


Figure 44. M249 WFOV Reticle.

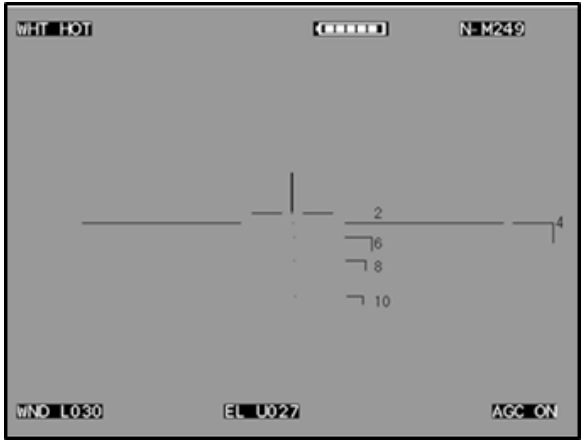


Figure 45. M249 NFOV Reticle.

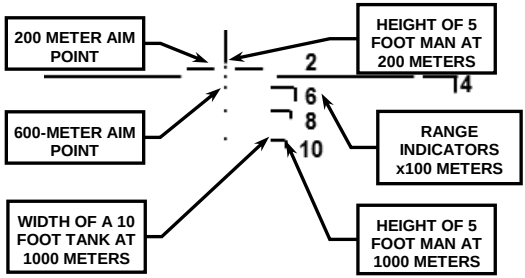


Figure 46. Range Estimation – M249 Reticle.

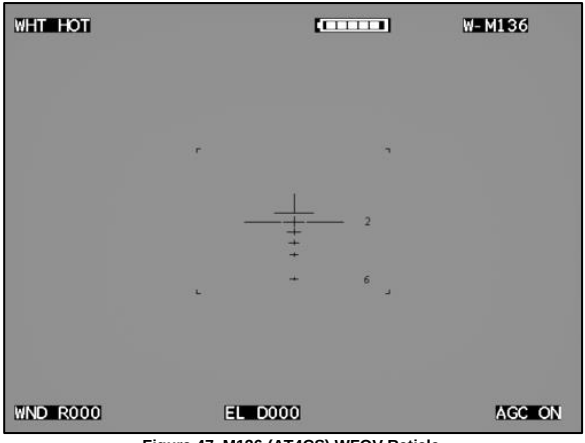


Figure 47. M136 (AT4CS) WFOV Reticle.

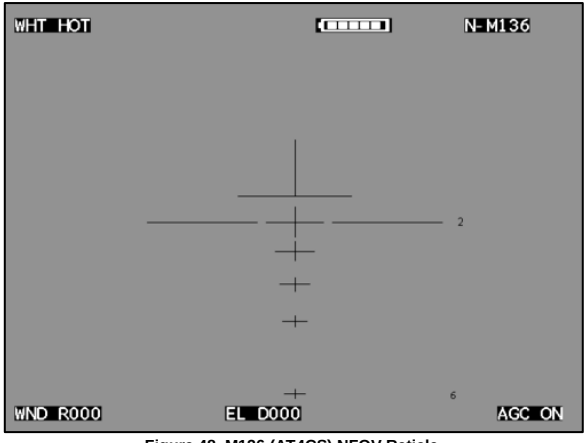


Figure 48. M136 (AT4CS) NFOV Reticle.

NOTE

These reticles will be displayed upright when viewed from the firing position on the M141.

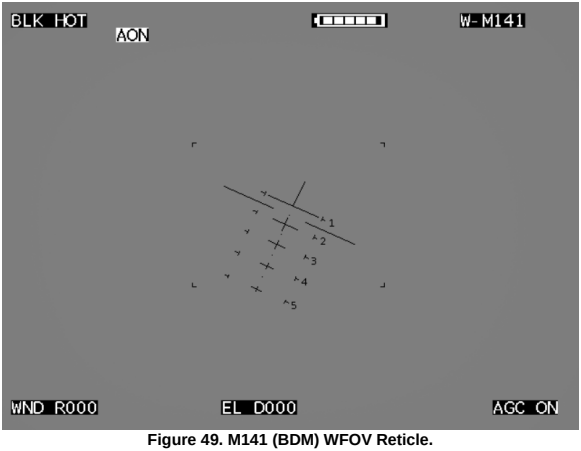


Figure 49. M141 (BDM) WFOV Reticle.

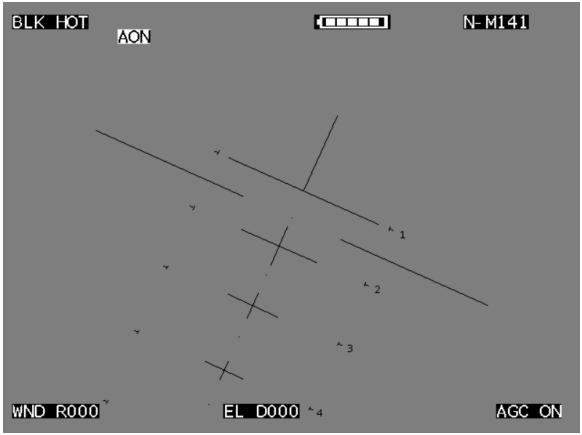


Figure 50. M141 (BDM) NFOV Reticle.

Range Estimation
The FWS-I provides the 10 MIL reticle for range estimation only. (Figures 51 and 52).

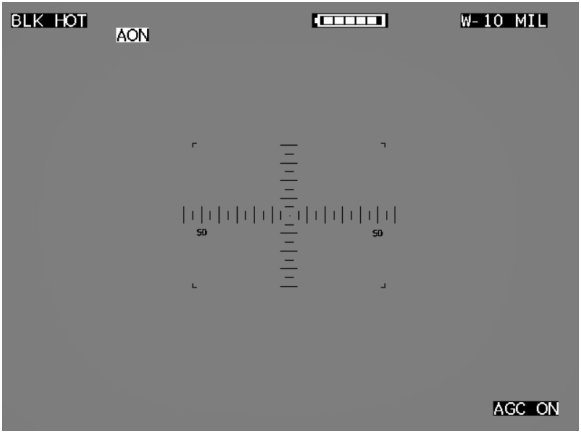


Figure 51. 10 MIL WFOV Reticle.

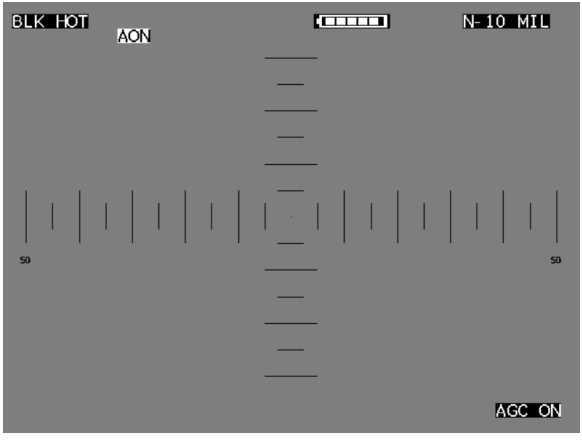


Figure 52. 10 MIL NFOV Reticle.

STANDBY

Enter STANDBY Mode by Press and Hold of the PWR/MENU button for approximately 2 seconds until display states “RELEASE TO STBY”. The purpose of STANDBY is to shut down the FWS-I display to conserve battery power when not in use, but allows for a Press and Release of the PWR/MENU button to turn the system back on to its original state.

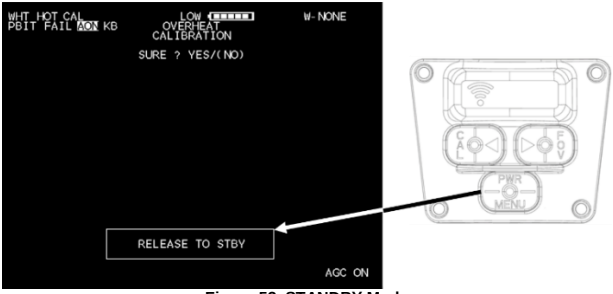


Figure 53. STANDBY Mode.

REMOTE AND KEYBOARD BACKUP MODE

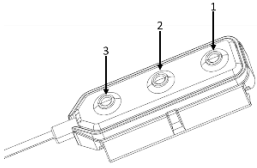
The FWS-I Kit is equipped with a Remote for easy operation of the FWS-I and RTA menu functions during operation. It provides different functionalities based on the mode it is operating in (FWS-I Only or Linked). In the event the Remote becomes damaged or non-operational, the FWS-I while linked can be set to KBM allowing the FWS-I Keypad to mimic the Remote button functions.

CAUTION

Do Not plug in Remote while the FWS-I is powered on. This may cause damage to the FWS-I.

Button Operation. See Table 2
The Remote uses the same (Press and Release) and (Press and Hold) operation as the FWS-I keypad.

Table 2. Remote Buttonology and KBM.



Using Remote Using KBM

Non-RTA	RTA*	Function
1		Press & Hold: Calibration
	1	Press & Release: RTA Manual Realignment Press & Hold: RTA Bubble On/Off Toggle
2	2	Press & Release: FOV Toggle Press & Hold: Polarity Toggle
	3	Press & Release: RTA Mode Toggle
1+2	1+2	Press & Hold: Turns ON/Off RTA functionality in the FWS-I
2+3	2+3	Press & Hold: Turns FWS-I display On/Off

*****FWS-I must be PAIRed with ENVG-B.

END OF WORK PACKAGE

OPERATION UNDER USUAL CONDITIONS
ASSEMBLY AND PREPARATION FOR USE

INITIAL SETUP:

Tools
None

Materials/Parts
None

References
TM 9-1240-416-13&P
TM 9-1240-413-13&P

Equipment Condition
Stowed

Unpacking the Carry Case (Figure 1)

CAUTION
Avoid handling or carrying FWS-I by the lens cap. This item may detach from the system, causing it to drop.

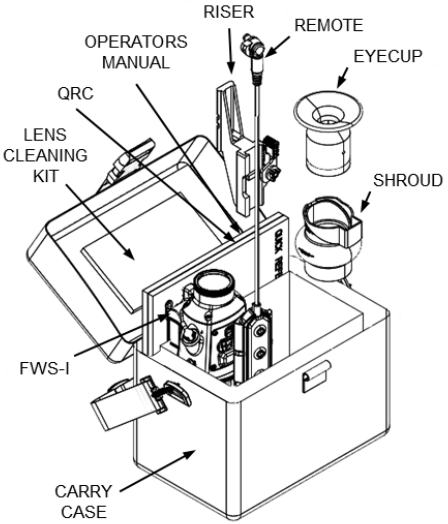


Figure 1. Packing/Unpacking the Carry Case.

1. Open lid of Carry Case and check to see that Rail Mount Riser is present and undamaged.
2. Remove the FWS-I and examine for damage. Remove the Eyecup, Shroud, and the Remote and examine for damage.
3. From the inside compartment (against the back) of the Carry Case, remove the Operators Manual and Quick Reference Card (QRC).
4. From the small pouch under the top lid of the Carry Case, ensure that a pack of lens cleaning towelettes is present.

Installation/Removal of Batteries

The following sub-paragraphs cover the installation of batteries. The primary battery is the Lithium 1.5V AA L91. Rechargeable and alkaline batteries can be used for training, however the Low Battery Indicator will not function accurately and battery life will be reduced significantly.

WARNING

Do not attempt to recharge non-rechargeable batteries as fire or explosion may occur causing death and/or serious injury to personnel.

WARNING

Do not open battery, dispose of in fire, heat above 212°F (100°C), expose to water, recharge, put in backwards, or mix with used or other battery types. Battery may explode or leak and cause injury to personnel.

WARNING

Using AA batteries other than 1.5V will cause damage to the sight and may explode causing serious injury to the user. DO NOT USE BATTERIES OTHER THAN 1.5V.

CAUTION

Do not mix new and used batteries; a used battery mixed with new batteries may cause system to shut down. Venting of battery could occur causing damage to system.

CAUTION

Use of batteries greater than 1.75V can damage the equipment.

NOTE

During cold temperatures while in non-use, batteries should be kept close to the body to keep warm. Batteries will last longer and system will warm up faster if batteries are warm.

NOTE

Ensure all batteries and battery compartment are clean before installing batteries.

NOTE

Batteries contain materials that are potentially hazardous and harmful to the environment. Dispose of depleted or damaged batteries in accordance with unit SOP.

Installation (Figure 2)

CAUTION

Use of batteries greater than 1.75V can damage the equipment.

NOTE

Ensure the FWS-I is turned OFF prior to removing the batteries.

1. Ensure the sight is powered OFF prior to installing batteries.
2. Open the battery door (3) from the FWS-I housing by turning the battery door retention knob (1) CCW until the battery door opens.
3. Place three AA batteries into the FWS-I, with the positive terminals facing inward. Proper battery orientation is clearly marked on the inside and outside of the FWS-I battery door (3).
4. After all the batteries have been loaded, make sure to check that all batteries are oriented in the correct position by visually inspecting, or by feeling along the bottom of the batteries. The negative (flat) end of each battery should be facing out.
5. Close the battery door (3) and turn the battery door knob (1) CW until hand-tight.

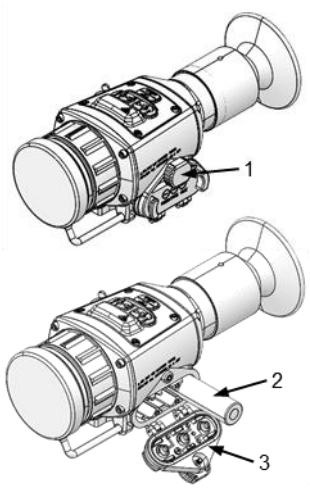


Figure 2. Installation/Removal of Batteries.

Removal (Figure 2)

NOTE

Ensure the FWS-I is turned OFF prior to removing the batteries.

NOTE

If batteries are removed before powering down the sight via the keypad, when reinstalled, the sight may power up automatically.

1. Ensure the sight is powered off prior to removing batteries.
2. Remove the batteries (2) from the FWS-I housing by turning the battery door knob (1) CCW until the battery door releases.
2. Remove batteries from the FWS-I.
3. Install new batteries (2) into the FWS-I housing.
4. Close the battery door (3) and turn the battery door knob (1) CW until hand-tight.

Removal/Installation of Eyecup (Figure 3).

The eyecup should be installed if using the FWS-I as a handheld device or mounted to a weapon in a Standalone configuration. Remove if FWS-I is being used in a Clip-On configuration.

1. Remove eyecup from eyepiece assembly by turning eyecup CCW.
2. Install the eyecup onto the eyepiece assembly by turning CW until snug.

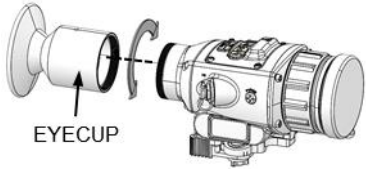


Figure 3. Installing the Eyecup.

Installing the Rail Mount Riser on Weapon (Figure 4).

The Rail Mount Riser is used when mounting the FWS-I to an M4/M16A4 or M249 in a Standalone Mode. It allows the FWS-I to be mounted as far back on the weapon rail as possible without contacting the backup iron sight. The Rail Mount Riser is **NOT** to be used when the FWS-I is being mounted in-line with another optic such as the RCO or CCO. Installation of the Rail Mount Riser on the FWS-I is accomplished as follows:

NOTE

When installing sight or Rail Mount Riser on weapon, any slot can be used as long as Rail Grabber or Rail Mount Riser do not overhang the rail or come in contact with the backup iron sight.

NOTE

When determining the T slot, use the rear bar (from shooters point of view) of the Rail Grabber/Rail Mount Riser to identify the specific slot of weapon sight placement.

1. Unlock the Rail Mount Riser slide lock (1) and move lever 90° to the open position (2).

2. Place Rail Mount Riser on weapon rail (3) as not to interfere with backup iron sight.

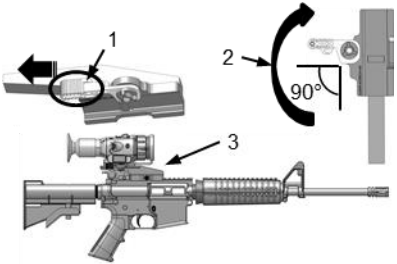


Figure 4. Installing/Removing the Rail Mount Riser.

3. While applying forward pressure to the Rail Mount Riser, move the Rail Mount Riser lever 90° to the closed position and verify security. Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
4. Once proper tension is achieved, lock FWS-I Rail Mount Riser slide lock.

Removing the Rail Mount Riser from Weapon (Figure 4)

1. Unlock the Rail Mount Riser slide lock (1) and move lever 90° to the open position (2).

2. Remove the Rail Mount Riser from the weapon rail.

3. Move lever 90° to the closed position and place in lock position for storage.

MOUNTING/REMOVAL OF FWS-I ON M4/M16A4

Mounting FWS-I on M4/M16A4 (Figure 5)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

1. If present, loosen two knobs on carrying handle and remove carrying handle from rail of weapon. Retain carrying handle.
2. Install eyecup per (Removal/Installation of Eyecup) this WP.
3. Install Rail Mount Riser on Weapon rail as described in (Installing the Rail Mount Riser on Weapon) this WP.
4. Install the FWS-I (3) on the Rail Mount Riser (5):

   a. Unlock the FWS-I Rail Grabber slide lock (2) and move lever 90° (4) to the open position.
   b. Place bar of FWS-I Rail Grabber in slot of Rail Mount Riser (5).
   c. While applying forward pressure on the FWS-I (3), move the Rail Grabber lever 90° to the closed position and verify security. Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
   d. Once proper tension is achieved, lock FWS-I Rail Grabber slide lock.
   e. Ensure proper eye relief and record mounting slot.

Removing FWS-I from M4/M16A4 (Standalone) (Figure 5)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

If Remote is installed, remove Remote prior to these steps. (See Remote removal this WP)

1. Remove FWS-I from Rail Mount Riser.
   a. Close lens cap (1).
   b. Unlock the FWS-I Rail Grabber slide lock (2) and move lever 90° to the open position (4).
   c. Remove FWS-I (3) from Rail Mount Riser (5).
   d. Move lever 90° to the closed position and place in lock position for storage.
2. Remove the Rail Mount Riser (5) from the weapon (See Removing Rail Mount Riser from Weapon this WP).
3. If present, install carrying handle IAW the respective Operator's Manual for the weapon.

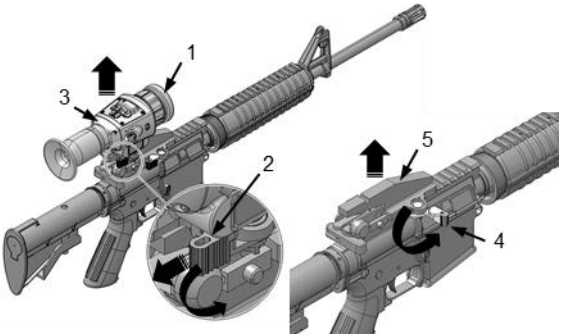


Figure 5. Mounting/Removal of FWS-I on M4/M16A4 (Standalone).

Mounting FWS-I with Shroud on M4/M16A4 (Clip-On) (Figures 6 and 7)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the Shroud or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

When using the FWS-I in-line with a day optic (e.g., CCO, RCO), normal procedure is to place the FWS-I in Clip-On mode. If using STANDALONE mode while in a Clip-On configuration, use only WFOV. Using NFOV in this instance will induce an error in the aiming function of the day optic, and display symbology (including the Main Menu) will not be visible to the operator.

NOTE

Ensure the day optic is zeroed prior to installing the FWS-I in a Clip-On configuration.

1. Mount the CCO or RCO to the weapon IAW the respective Operator's Manual for those devices.
2. Remove the FWS-I Eyecup as described in this WP (See Removal/Installation of Eyecup).
3. Locate the Shroud.
4. Slide Shroud onto the FWS-I eyepiece assembly as depicted in Figures 6 and 7. Square opening should face to the rear.
   - RCO: Rotate square end of Shroud up to cover RCO front.
   - CCO: Rotate square end of Shroud down towards weapon rail.

Figures 6 and 7 show the proper installation of the Shroud.

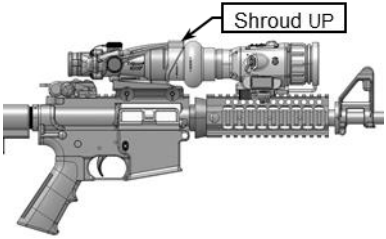


Figure 6. FWS-I Mounted In-Line with RCO.

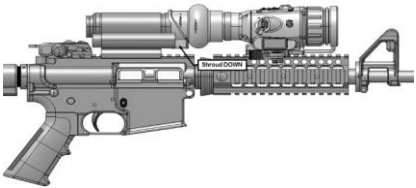


Figure 7. FWS-I Mounted In-Line with CCO.

5. Install the FWS-I (2) on weapon rail. (Figure 8).

   a. Unlock the FWS-I Rail Grabber slide lock (5) and move lever 90° (4) to the open position.

b. Position the FWS-I over the weapon rail to identify the slot that will provide the best mounting location for the FWS-I (2). The best mounting location will ensure that the Shroud (1) is inserted as far as possible into the Objective Lens of the CCO/RCO without collapsing the Shroud. See Figures 6 and 7 for proper orientation of Shroud.
c. Place bar of Rail Grabber in the desired slot of the rail.
d. While applying forward pressure on the FWS-I (2), move the Rail Grabber lever 90° (4) to the closed position (lever arm to rear). Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
e. Once proper tension is achieved, lock FWS-I Rail Grabber slide lock.

Removing FWS-I and Shroud from M4/M16A4 (Clip-On) (Figure 8)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the Shroud or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

If Remote is installed, remove Remote prior to these steps. (See Remote removal this WP)

1. Remove FWS-I from rail:
   a. Close lens cap (3).
   b. Unlock the FWS-I Rail Grabber slide lock (5) and move lever 90° (4) to the open position.
   c. Remove FWS-I (2) from rail.
   d. Move the lever 90° (4) to the closed position and lock slide lock (5).
2. Remove Shroud (1) from FWS-I.

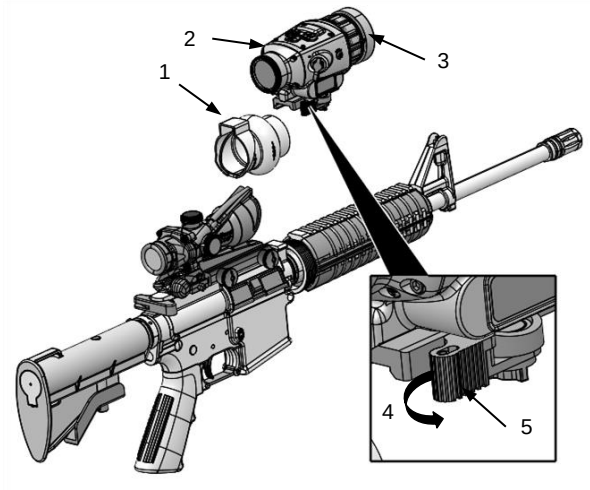


Figure 8. Mounting/Removal of FWS-I on M4/M16A4 (Clip-On).

MOUNTING/REMOVAL OF FWS-I ON M249

Mounting FWS-I on M249 (Standalone) (Figure 9)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

When determining the T slot, use the rear bar (from shooters point of view) of the Rail Grabber/Rail Mount Riser to identify the specific slot of weapon sight placement.

1. Install eyecup (1) per the WP (Removal/Installation of Eyecup).
2. Install Rail Mount Riser (3) on Weapon rail as described in this WP (Installing the Rail Mount Riser on Weapon). Use slots T3 through T10.
3. Install the FWS-I (2) on the Rail Mount Riser (3):
   a. Unlock the FWS-I Rail Grabber slide lock (4) and move lever 90° (5) to the open position.
   b. Place bar of FWS-I Rail Grabber in slot of Rail Mount Riser (3).
   c. While applying forward pressure on the FWS-I (2), move the Rail Grabber lever 90° (5) to the closed position and verify security. Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
   d. Once proper tension is achieved lock FWS-I Rail Grabber slide lock (6).
   e. Ensure proper eye relief and record mounting slot.

Removing FWS-I from M249 (Standalone) (Figure 9)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

If Remote is installed, remove Remote prior to these steps. (See Remote removal this WP)

1. Remove FWS-I from Rail Mount Riser:
   a. Close lens cap.
   b. Unlock the FWS-I Rail Grabber slide lock (4) and move lever 90° (5) to the open position.
   c. Remove FWS-I (2) from Rail Mount Riser (3).
   d. Move the lever 90° (5) to the closed position and lock (6).
2. Remove the Rail Mount Riser from the weapon this WP (Removing Rail Mount Riser from Weapon).

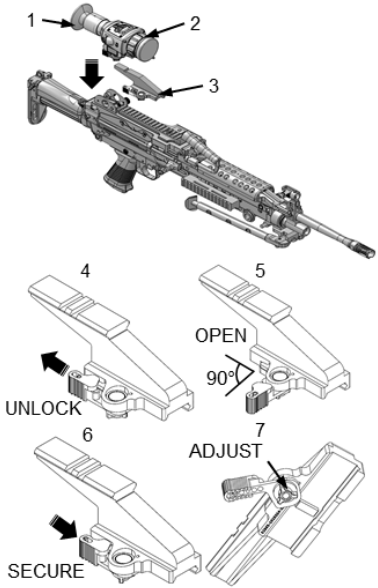


Figure 9. Mounting/Removal of FWS-I on M249 (Standalone).

MOUNTING/REMOVAL FWS-I ON M136 (AT4CS).

Mounting FWS-I on M136 (AT4CS) (Figure 10)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

NOTE

When removing/reinstalling FWS-I onto the same weapon, install in the same slot used for sight alignment. Failing to do so may result in the FWS-I no longer being sight aligned to the weapon.

NOTE

When determining the T slot, use the rear bar (from shooters point of view) of the Rail Grabber/Rail Mount Riser to identify the specific slot of weapon sight placement.

1. Ensure weapon safety measures are in place.
2. Install the eyecup as described in this WP (Removal/Installation of Eyecup).

NOTE

When performing sight alignment, open front and rear sights of weapon prior to installing FWS-I.

3. Unlock Side Rail (5) and swing to the halfway position. (Not in the firing position)
4. Attach the Rail Mount Riser (3) to Side Rail (5):
   a. Unlock the Rail Mount Riser slide lock (4) and move lever 90° to the open position.
   b. Install the Rail Mount Riser (3) on the Side Rail (5) using the 10th slot from rear (T10).
   c. While applying forward pressure on the Rail Mount Riser (3), move the lever (4) 90° to the closed position and verify security. Adjust tension, if required this WP (See Rail Grabber/Rail Mount Riser Adjustment) and repeat this step.
5. Attach the FWS-I (1) to Rail Mount Riser (3):
   a. Unlock the FWS-I Rail Grabber slide lock (2) and move lever 90° to the open position.
   b. Install the FWS-I (1) on the Rail Mount Riser (3).
   c. While applying forward pressure on the FWS-I (1), move the lever (2) 90° to the closed position and verify security. Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
   d. Once proper tension is achieved, lock FWS-I Rail Grabber slide lock (2).
   e. Swing Side Rail (5) into the locked and firing position.

Removal of FWS-I from M136 (AT4CS) (Figure 10)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

1. Unlock side Rail (5) and swing to the halfway position (not in closed position).
2. Remove FWS-I (1) from Rail Mount Riser:
   a. Close lens cap.
   b. Unlock the FWS-I Rail Grabber slide lock (2) and move lever 90° to the open position.
   c. Remove FWS-I (1) from Rail Mount Riser (3).
   d. Move the FWS-I lever (2) 90° to the closed position and lock.
3. Remove the Rail Mount Riser per this WP.
4. Swing side Rail (5) to the closed position.

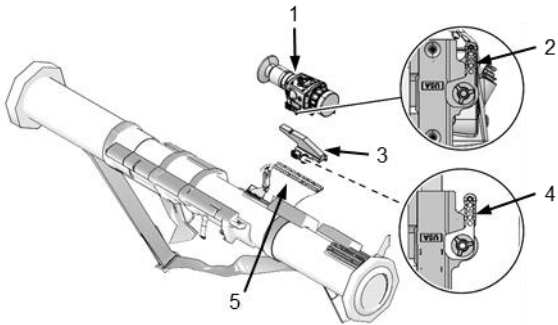


Figure 10. Mounting/Removal of FWS-I on M136 (AT4CS).

MOUNTING/REMOVAL OF FWS-I ON M141 (BDM)

Mounting FWS-I on M141 (BDM) (Figure 11)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

NOTE

When removing/reinstalling FWS-I onto the same weapon, install in the same slot used for sight alignment. Failing to do so may result in the FWS-I no longer being sight aligned to the weapon.

NOTE

When determining the T slot, use the rear bar (from shooters point of view) of the Rail Grabber to identify the specific slot of weapon sight placement.

1. Ensure weapon safety measures are in place.
2. Install the eyecup as described in (See Removal/Installation of Eyecup) this WP.
3. Install the Rail Support Bar (3) (WP 0016) in the center slot of weapon rail (4).

NOTE

The weapon's rear sight cover must be open to attach/remove FWS-I.

4. Attach the FWS-I (2) to rail (4):
   a. Unlock the FWS-I Rail Grabber slide lock (1) and move lever 90° to the open position.
   b. Install the FWS-I (2) on the rail (4) slots T3-T5 from rear of rail.
   c. While applying forward pressure on the FWS-I (2), move the lever 90° (1) to the closed position and verify security. Adjust tension, if required (See Rail Grabber/Rail Mount Riser Adjustment WP 0012) and repeat this step.
   d. Once proper tension is achieved, lock FWS-I Rail Grabber slide lock (1).
   e. Ensure proper eye relief and record mounting slot.

Removal of FWS-I from M141 (BDM) (Figure 11)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

CAUTION

Avoid handling or carrying FWS-I by the eyecup or lens cap. Either of these items may detach from the system, causing it to drop and cause equipment damage.

NOTE

The weapon's rear sight cover must be open to attach/remove FWS-I.

1. Ensure weapon safety measures are in place.
2. Close lens cap.
3. Unlock the FWS-I Rail Grabber slide lock (1) and move lever 90° to the open position.
4. Remove FWS-I (2) from rail (4).
5. Move the lever 90° (1) to the closed position and lock.
6. Remove Rail Support Bar (3) from weapon rail (4) and stow.

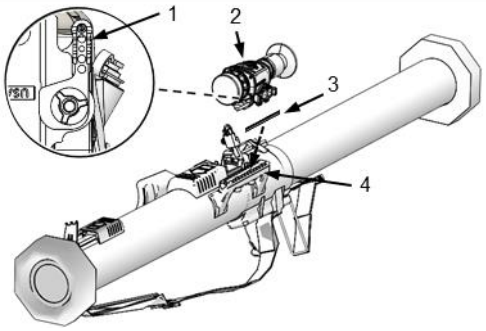


Figure 11. Mounting/Removal of FWS-I on M141 (BDM).

REMOTE

Remote Installation (Figures 12, 13).

The FWS-I is supplied with a Remote (16") for easy operation of the FWS-I or RTA during operation of the weapon. The three-button keypad allows for easy operation by the non-shooting hand. The Additional Authorized List (AAL), authorizes an additional 26.5" Remote for use with the M249. Both Remote configurations mount and operate in the same manner.

CAUTION

Do Not plug in Remote while the FWS-I is powered on. This may cause damage to the FWS-I.

NOTE

When mounting the Remote, be sure to route the cable away from the ejection port, action of the weapon systems or possible pinch points. Failure to do so could cause a malfunction of the weapon or Remote.

1. (Figure 12) Mount Remote (3) to weapon handgrip rail by aligning clips to rail and aligning center bar to a T slot on the handgrip rail so the Remote can be easily manipulated with the non-firing hand (fingers) and snap in place. For the M249, the Remote is often placed on top of the rail in front of the sight.

2. Secure Remote cable to weapon rail such that the cable does not impede operation of any weapon function, present a snag hazard or contact the barrel.

NOTE

When installing the Remote, be sure not to twist or force Remote into the I/O port. Failure to properly install the Remote could cause a malfunction of the weapon sight or Remote and deadline the weapon sight.

3. Align the dots on the connector and I/O port for proper alignment (Figure 12). Connect the I/O connector (2) to the I/O port of the FWS-I (4).

Remote Removal (Figures 12 and 13)

1. (Figure 12) Pull I/O connector (2) out of I/O Port (4).

NOTE

When removing the Remote, be sure not to twist or tug Remote from the I/O port. Failure to properly disconnect the Remote could cause a malfunction of the weapon sight or Remote and deadline the weapon sight.

2. Unsecure the Remote cable.

3. (Figure 12) Remove the Remote (3) from the rail mount by pulling outward on the top or bottom edge of Remote.

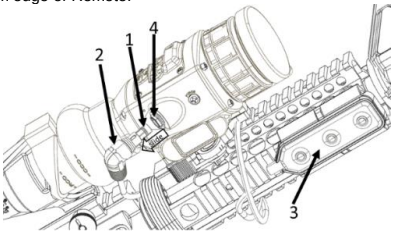


Figure 12. Remote Installation/Removal.

Figure 13 shows the preferred configurations of the Remote.

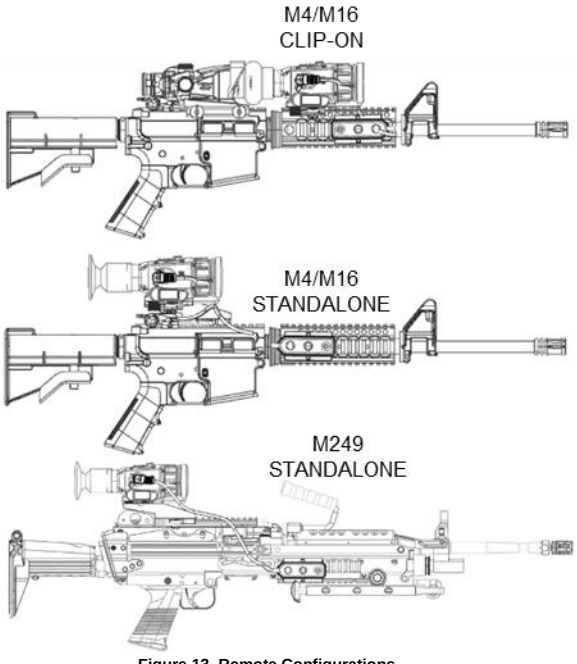


Figure 13. Remote Configurations.

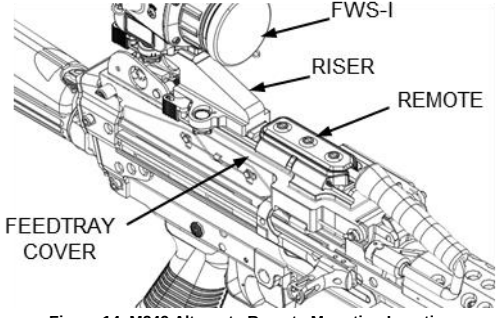


Figure 14. M249 Alternate Remote Mounting Location.

END OF WORK PACKAGE

OPERATION UNDER USUAL CONDITIONS OPERATING PROCEDURES (FWS-I)

INITIAL SETUP:

Tools	**References**
None	None
Materials/Parts	**Equipment Condition**
None	Batteries Installed

FWS-I OPERATING PROCEDURES

CAUTION

Avoid pointing either end of the FWS-I into the sun for extended periods or damage to FWS-I will result.

NOTE

Upon initial power up, system defaults to previously saved settings, CAL is set to AUTO CAL ON, FOV is set to WFOV, and Reticle mode is set to ARC.

NOTE

The operator should periodically check the battery level indicator and the display for the LOW battery indicator. When LOW appears, at least x and up to xx minutes of battery life remains, when using 1.5V Lithium AA L91 batteries.

NOTE

Ensure FWS-I is powered off prior to removing batteries or settings and adjustments not previously saved will be lost. Ensure FWS-I menu settings and adjustments are saved by performing a proper shutdown.

NOTE

All menu adjustments and settings made in one FOV will be reflected in the other FOV.

Manual Setup for Operation (WP 0004 Table 1)

1. While wearing corrective eyewear (if necessary), Press and Hold the PWR/MENU button to power up the FWS-I.
2. Using on-screen menu, navigate to ADMIN > DISP > BRIGHTNESS and adjust display brightness to the desired setting using the LEFT or RIGHT buttons (WP 0004, Table 1).
3. Using on-screen menu, navigate to SETUP > MANUAL > MODE. Highlight and select the desired mode (STANDALONE or Clip-On). If Clip-On mode is selected, go to Step 5.
4. Using on-screen menu select RETICLE and select desired reticle (WP 0004, Table 1).
5. Open the lens cap and select AGC ON or AGC OFF (WP 0004, Table 1).

6. Select an object greater than 5 meters away, and adjust focus ring for best thermal scene.
7. Use the RIGHT button to change POL and/or select MENU > ADMIN > DISP options to adjust AGC LVL and AGC GAIN.
8. Use the LEFT button to perform a calibration for best thermal scene (WP 0004, Table 1).
9. Repeat Steps 6 and 7 as needed to optimize thermal scene.
10. Following operation, turn off power by Press and Hold of the PWR/MENU button until “POWERING OFF”.
11. Close lens cap.

Thermal Scene Optimization

1. AGC ON. Operating the FWS-I with AGC ON usually provides the best thermal image. Level should be adjusted before adjusting gain. As the contrast in the scene increases, gain sensitivity decreases to give the operator visibility of the entire scene. Likewise, as the contrast is reduced, the gain sensitivity increases to maintain visibility of the entire scene. The Level is automatically adjusted to keep the thermal scene visible to the user.
   a. Level is the temperature range capable of being viewed by the FWS-I for a selected thermal scene. With AGC ON, level is automatically set by the system and only allows fine-tuning of the thermal scene by the operator.
   b. Gain increases or decreases the amount of detail between individual pixels of the thermal scene. With AGC ON, Gain is automatically set by the system and only allows fine-tuning of the thermal scene by the operator.

2. AGC OFF. With AGC OFF, the displayed image will not automatically adjust to thermal changes to the scene. Adjustments will have to be made manually to AGC LVL and AGC GAIN to improve and maintain image quality. With AGC OFF, level must be adjusted before adjusting gain.
   a. Level, with AGC OFF, is manually set by the operator and allows larger adjustments of the thermal scene than is possible with AGC ON.
   b. Gain, with AGC OFF, is manually set by the operator and allows larger adjustments of the thermal scene than is possible with AGC ON.

Blooming Present in Display

1. When the weapon iron sights and/or barrel become hot, a significant hot area (blooming) forms at the bottom of the image. The hot area drives gain lower resulting in lowered contrast for the rest of the scene. This can have an adverse effect on targeting.
2. Some of the effects of blooming can be reduced by using the Rail Mount Riser, ensuring the system is set to STANDALONE mode, switching from AGC ON to AGC OFF and manually adjusting AGC LVL and AGC GAIN to achieve a more usable image.

3. When in STANDALONE or STD FULL mode, another method of eliminating the effects of blooming is to switch from WFOV to NFOV. This switching of FOV should leave most of the blooming out of the image area.

INITIAL ZEROING ADJUSTMENTS

When being used in a STANDALONE configuration, the FWS-I must be zeroed or sight aligned with weapon before being mission capable. For zeroing with the M4/M16A4 and M249 at 25 meters, a target must be prepared as detailed in Target Preparation of this WP. Zeroing procedures for a STANDALONE configuration are described in this WP.

NOTE

When using the FWS-I in-line with a day optic (e.g., CCO, RCO), normal procedure is to place the FWS-I in Clip-On mode. If using STANDALONE mode while in a Clip-On configuration, use only WFOV. Using NFOV in this instance will induce an error in the aiming function of the day optic, and display symbology (including the Main Menu) will not be visible to the operator.

When being used in-line with the CCO or RCO, Clip-On mode must be selected via the FWS-I menu system (WP 0004) and zeroing procedures associated with the primary day optic should be used. Placing the FWS-I in front of an already zeroed optic/weapon combination does not require rezeroing. Procedures for sight aligning the FWS-I to the day optic are provided in this WP.

Target Preparation

SUPPLIES: Box, Shipping (WP 0017, Item 1)

Tape, Pressure Sensitive Adhesive
(WP 0017, Item 4)

25-Meter Zeroing Target, M16A2/M16A4
(WP 0017, Item 5)

1. Modify a 25-meter zeroing target (M16A2/M16A4 side). (Figure 1).

   a. Cut a square hole 2 squares wide by 2 squares high in a 25-meter zeroing target (Figure 1).
   b. Draw a 4 x 4 square box centered on the desired point of impact found in Table 1. For M249 only: draw a 6 x 6 square box centered on the desired point of impact from Table 1.

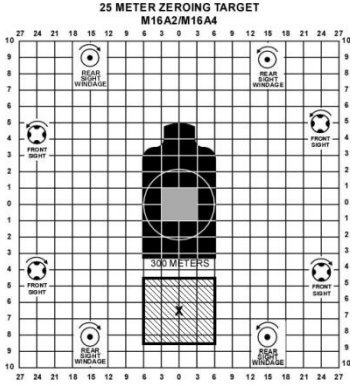


Figure 1. Prepared M16A2/M16A4 25-Meter Zeroing Target (Point of Impact Shown for M4/M16A4).

c. Cut out a rectangle from corrugated cardboard box the same size as the prepared M16A2/M16A4 25-meter zeroing target (22 X 28 cm or 8.5 X 11 in.). (Figure 2).

d. Estimate 2.5 cm (1 in.) in from each side of cardboard rectangle and cut out a rectangular hole.

NOTE

Failure to use a corrugated cardboard frame taped only on the corners will result in loss of the thermal aim point.

e. Tape corners of cardboard frame to back of modified M16A2/M16A4 25-meter zeroing target.

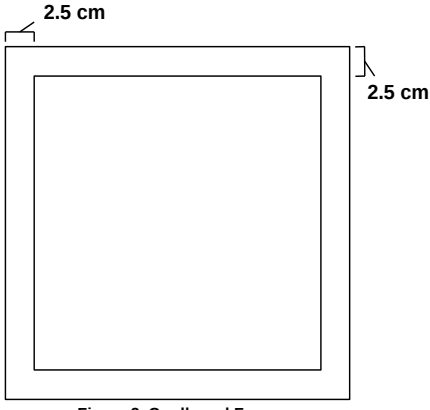


Figure 2. Cardboard Frame.

2. Affix the prepared M16A2/M16A4 25-meter zeroing target to standard E-type thermal blanket (Figure 3 and WP 0017) by only attaching the corners of the target to allow airflow behind the target.

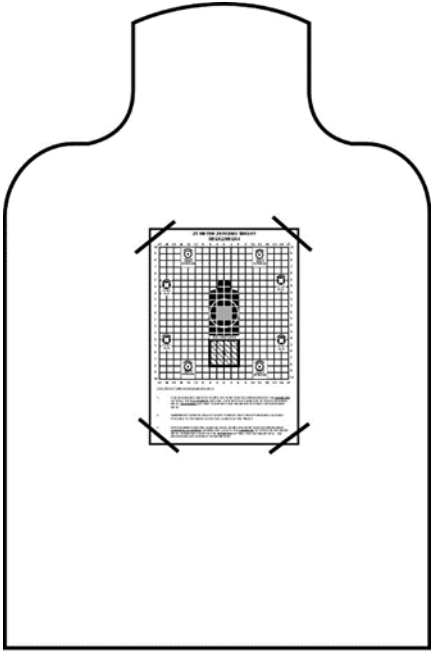


Figure 3. E-Type Silhouette with Prepared 25-Meter Zeroing Target.

Zeroing the M4/M16A4 and M249 in STANDALONE MODE

1. Place modified 25-meter zeroing target, mounted on E-type silhouette with thermal blanket, at a range of 25 meters (Figure 3).
2. Place FWS-I in operation (see Manual Setup for Operation in WP 0006).
3. Mount the FWS-I IAW WP 0005.
4. Assume a good supported firing position and confirm mounting location provides proper eye relief.

NOTE

If the FWS-I has been laser boresighted, use the WND and EL settings obtained in boresighting.

NOTE

If you cannot set the WND or the EL to 000, change to NFOV and set the WND and EL to 000.

5. If laser boresight has not been performed, press the PWR/MENU button, select SETUP, select MANUAL, select the RETICLE sub-menu, and then WINDAGE. Use the LEFT or RIGHT button to set WND to 000. Select ELEVATION from sub-menu and repeat using the LEFT or RIGHT button to set EL to 000.
6. Press the PWR/MENU button to return to the RETICLE Sub-Menu.
7. Either Exit to the main menu by selecting GO BACK three times and selecting EXIT or allow the system to time out to save settings.

WARNING

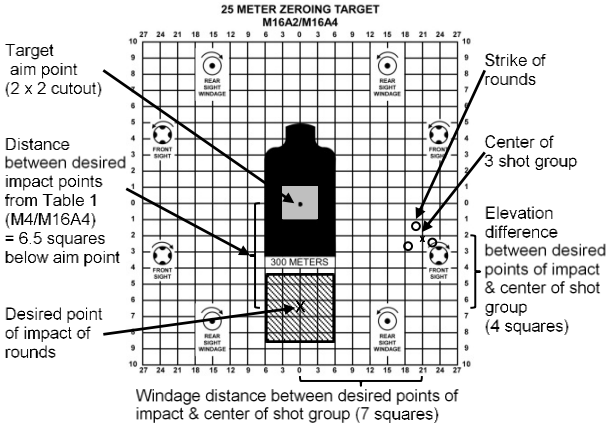
When depressing the eyecup and maintaining a good sight picture, ensure there is sufficient space between the eye and the FWS-I so that normal recoil of the weapon will not harm the operator.

NOTE

The target aim point will always be center of mass on the 25-meter zeroing target. The desired point of impact varies from weapon to weapon. For the desired point of impact, see Table 1.

8. Aim center mass at 25-meter zeroing target and fire three rounds (single shot) to obtain shot group (Figure 4).
9. Locate center of shot group (Figure 4).

Measure distance in WND and EL from the center of shot group to the desired point of impact (Figure 4).



NFOV: 2 Click = 1 Box on 25 Meter Zero Target
WFOV: 1 Click = 2 Box on 25 Meter Zero Target

Figure 4. Zeroing Target.

Table 1. Desired Point of Impact at 25-Meter Range (Calculated).

Weapon	Point of Impact – Squares Below Target Aim Point		10m LBS	
	M855 (Ball)	M855A1 (Ball)	M855 (Ball)	M855A1 (Ball)
M4/M16A4 w/ Rail Mount Riser	5.5 (5.1 cm)	6.1 (5.6 cm)	8.3 cm up	8.6 cm up
M249 w/ Rail Mount Riser	5.4 (5.0 cm)	5.5 (5.1 cm)	9.4 cm up	9.5 cm up
M249 Short Barrel w/ Rail Mount Riser	3.2 (2.9 cm)	4.6 (4.2 cm)	8.6 cm up	9.1 cm up

NOTE

M4/M16A4 weapons must have 5 out of 6 consecutive rounds within the 4x4 block of the desired point of impact. The M249 must have 5 out of 12 non-consecutive rounds within a 6x6 square block on the desired point of impact.

- One click in WFOV equals a change of three (3) increments in WND or EL on the display.
- One click in NFOV equals a change of one (1) increment in WND or EL on the display.
- One click equals the following at 25 meters:

WFOV	NFOV
1.26 cm	0.42 cm

- Adjustments made in one FOV are also reflected in the opposite FOV.
- Once desired reticle adjustment is made, exit Main Menu to save settings.

NOTE

Using Figure 4 as an example, after firing with an M16A4 in NFOV, the center of shot group is 7 squares to the right of the desired point of impact and 4 squares above the desired point of impact. Adjust the WND 14 clicks to the left. If WND was originally 000, the WND indicator will now read L014. Adjust the EL 8 clicks down. If EL was originally 000 the EL indicator will now read D008.

NOTE

An alternate method for zeroing the FWS-I uses the Zeroing Ruler found in WP 0018. Using Figure 5 as an example, after firing with an M4/M16A4 with FWS-I in NFOV, the center of the shot group is 7 squares to the right of the desired point of impact and 4 squares above the desired point of impact of the 25-Meter target.

Using the ruler (WP 0018) measure the horizontal distance between center of shot group to center of desired point of impact. In this case, the shot group is between 10 and 11 blocks on the zeroing ruler. Adjust WND 10 increments to the left. The WND indicator will now read L010.

Using the ruler (WP 0018) measure the vertical distance between center of shot group to center of desired point of impact. In this case, the shot group is just under 6 blocks on the zeroing ruler. Adjust EL 6 increments down. The EL indicator will now read D006.

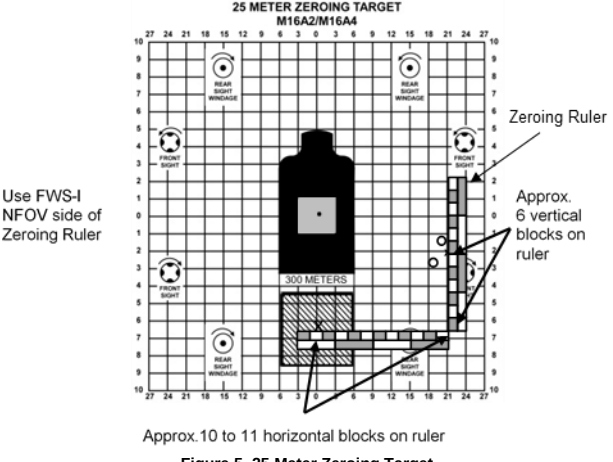


Figure 5. 25 Meter Zeroing Target.

NOTE

The WND and EL reticle settings for each reticle type are automatically saved after Press and Release of the PWR/MENU button and exiting the Main Menu.

a. If center of shot group is above the desired point of impact, use the EL menu function to decrease the up (U) EL setting or increase the down (D) EL setting.
b. If center of shot group is below the desired point of impact, use the EL menu function to increase the up (U) EL setting or decrease the down (D) EL setting.
c. If center of shot group is left of the desired point of impact, use the WND menu function to decrease the left (L) WND setting or increase the right (R) WND setting.
d. If center of shot group is right of the desired point of impact, use the WND menu function to increase the left (L) WND setting or decrease the right (R) WND setting.

10. Adjust reticle to move center of shot group to the desired point of impact.
11. Repeat Steps 8 and 9 until five of six consecutive shots are within a 4x4 square block centered on the desired point of impact except for the M249. For the M249, repeat Steps 8 and 9 until 5 of 12 non-consecutive rounds within a 6x6 square block on the desired point of impact.
12. Record setting of WND and EL indicators and slot used on rail.
13. Save the WND and EL values by Press and Release of the PWR/MENU button, then exiting the menu system by selecting EXIT and Press and Release of the PWR/MENU button again.

Sight Alignment of the FWS-I to the Day Optic

Aligning the FWS-I and day optic mounted on a weapon enables continued use of FWS-I in the event the day optic fails. If day optic fails after aligning, set FWS-I to STANDALONE mode and select desired weapon to continue operation. Do not reposition FWS-I on 1913 rail or alignment is lost. Once the day optic has been removed, either FOV can be used.

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

NOTE

When removing and reinstalling the FWS-I onto the same weapon, install in the same slot used for sight alignment. Failing to do so may result in the FWS-I no longer being sight aligned to the weapon.

NOTE

When sight aligning the FWS-I to the day optic, the FWS-I must be placed in WFOV. The FWS-I will NOT be sight aligned to the day optic when placed in NFOV.

NOTE

If using RCO, Menu will not be visible to the user. Follow Steps 6 and 7 as written to adjust ELEVATION.

NOTE

The day optic must be zeroed before conducting Sight Alignment

1. While in Clip-On mode, enter into the FWS-I Main Menu and select “SETUP”, “MANUAL”, “RTA”, “ALIGN” sub-menus as shown.
2. User will first adjust the WINDAGE of the reticle by moving the crosshair with the LEFT or RIGHT buttons. Once WINDAGE adjustments are complete press and release of the PWR/MENU button will enter ELEVATION Adjustment.
3. User will adjust the ELEVATION of the reticle by moving the crosshair with the LEFT or RIGHT buttons. Press and release of the PWR/MENU button will save settings and enter back into the RTA Sub-menu and the RTA Alignment crosshair will disappear.
4. When done the two reticles should be aligned.

Sight Alignment of the M136 (AT4CS) and M141 (BDM)

WARNING

Ensure weapon is clear and safe before installing/removing bracket and/or FWS-I to or from weapon, and before sight alignment. A loaded weapon may accidentally discharge causing injury or death.

NOTE

When removing and reinstalling the FWS-I onto the same weapon, install in the same slot used for sight alignment. Failing to do so may result in the FWS-I no longer being sight aligned to the weapon.

NOTE

The FWS-I M141 (BDM) reticle will be canted when looking through the sight in normal orientation. This is done to correct the FWS-I sight placement on the M141 (BDM).

1. Open front and rear sights of weapon and adjust for 200-meter range M136 (AT4CS) or 150 meter range M141 (BDM).
2. Place weapon with FWS-I in a stable firing position.
3. Place FWS-I in operation (see Manual Setup for Operation in WP 0006).
4. Select weapon reticle (WP 0004).
5. Repeat the following steps until the weapon sight and FWS-I reticle are both aligned with center mass of target:

a. Select a target at 200 meters for M136 (AT4CS) or 150 meters for M141 (BDM) and adjust position of weapon so the day sight is aligned with center mass of target.
b. Without moving the weapon, use the WND and EL menu functions to align the 200 meter zeroing aim point for M136 (AT4CS) or 150-meter zeroing aim point for M141 (BDM) of reticle with center mass of target.
c. Check weapon sights to ensure that the weapon is still aligned with center mass of target.

6. Record setting of WND and EL indicators and slot used on rail.
7. Either Exit to the main menu by selecting GO BACK three times and selecting EXIT or allow the system to time out to save settings.

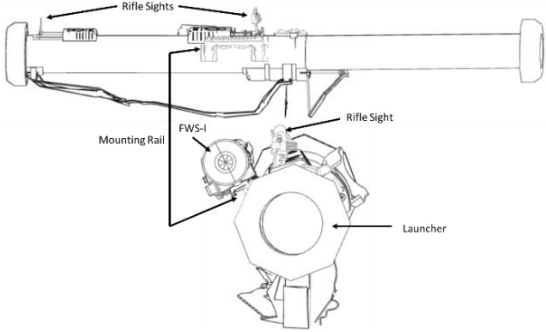


Figure 6. M141 (BDM) Orientation.

END OF WORK PACKAGE

OPERATION UNDER USUAL CONDITIONS OPERATING PROCEDURES (RTA)

INITIAL SETUP:

Tools

None

Materials/Parts

None

References

OFB-TM-ARMY AN/PSQ-42
TM 10-5895-1944-10
TM 10-5895-1942-13&P

Equipment Condition

Batteries Installed

RTA OPERATING PROCEDURES FOR USE WITH THE AN/PSQ-42.

AN/PSQ-42 ENVG-B CONTROLS & MENU NAVIGATION

Refer to Figure 1 and Table 1 for control locations and basic descriptions of AN/PSQ-42 ENVG-B control use.

The ENVG-B is a binocular assembly that incorporates two image intensifiers, a thermal imager, and a bridge assembly.

- The image intensifiers amplify available light to produce a clear image at night and under other adverse viewing conditions. Image intensifiers also detect IR light.
- The thermal imager detects thermal radiation and produces an image based on the temperature of objects within the viewed scene.
- The bridge assembly contains system electronics and user controls.

Both keypad buttons, as well as the Rotary Knob, are multifunctional and produce different results depending on the system status (e.g., on, off, operating mode, etc.) and how they are manipulated. (Refer to OFB-TM-ARMY AN/PSQ-42 Technical Guide for operator control functions).

The AR/RTA-BPA generates unique RTA reticles for display on the AN/PSQ-42 ENVG-B display. RTA reticle type/color are user selectable. Stored zero/alignment settings for the Clip On and Stand Alone weapon selections on the FWS-I are automatically transferred for use in applicable RTA modes. RTA specific mode, function and alignment indicators are displayed only in the AN/PSQ-42 ENVG-B display (not on the FWS-I display).

ENVG POWER ON OFF/RESET AN/PSQ-42

Power On

To turn on the Imaging System, tap the Power button (Figure 1). The system will initially power up in I² Mode.

Power Off

To turn off the Imaging System, press and hold the Power Button (Figure 1) for approximately two seconds until the display turns dark.

Upon power OFF, the AN/PSQ-42 ENVG-B stores display brightness, thermal contrast, image polarity, shutter (calibration) mode, and RTA wireless pairing settings.

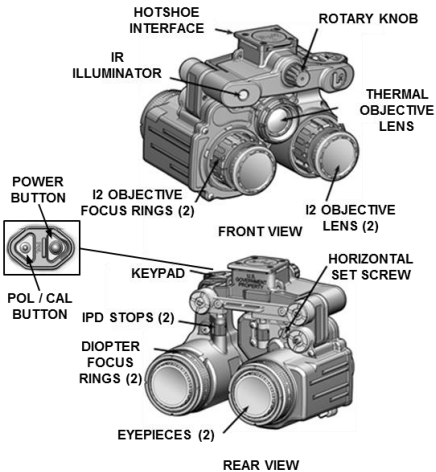


Figure 1. AN/PSQ-42 Operator Controls.

Table 1. AN/PSQ-42 Operator Controls.

Component	Description
Hotshoe Interface	Provides the electrical power/ data connection to the Battery Pack (via the Positioning Assembly and Helmet Mount Assembly (HMA).
Rotary Knob	A multi-function knob used to: a. Access and navigate system menus. b. Adjust 1^2 Gain. c. Adjust Thermal Contrast. d. Adjust Display Brightness.
Thermal Objective Lens	Collects thermal energy from the viewed scene and focuses it onto a thermal imaging detector. The thermal objective lens requires no focus adjustment for the viewing distance being observed.
I2 Objective Lenses / Focus Rings (2)	Collects available light within the viewed scene and focuses it onto the input surface of the image intensifier tubes. Adjustable focus rings are used to accommodate the viewing distance being observed.
IR illuminator (exit port)	Used to provide a supplementary light source in conditions of extreme darkness.
Keypad	Contains multi-function buttons that produce different results depending on system status and how the buttons are pressed.
Horizontal Set Screw	Used to adjust the angle of the display relative to the horizon
Eyepieces (2)	Allows the thermal image, I^2 image, and/or display information to be viewed by the operator.
Diopter Focus Rings (2)	Used to focus the eyepiece lenses to compensate for the operator's individual eyesight.
IPD Stops (2)	Adjusts the range of motion for each of the individual monocular assemblies.

RTA AN/PSQ-42

When used in conjunction with the FWS-I, the ENVG-B features an RTA capability. RTA allows for viewing FWS-I imagery and data, including a boresighted / zeroed weapon reticle, in the ENVG-B display. This, in turn, allows the operator to accurately engage targets without having to bring the weapon to eye level and without the use of active lasers. RTA capability is accessible only when the ENVG-B is in Fused+ AR/RTA Mode.

The ENVG-B supports all RTA modes including "bubble", Picture-in-Picture (PIP), full weapon sight imagery, etc. RTA modes are selected and controlled through the FWS-I user interface.

Network Configuration AN/PSQ-42 (Figure 2).

In order to use RTA, the FWS-I and AN/PSQ-42 AR/RTA-BPA must be joined together in a wireless network. Once the FWS-I is joined with the AR/RTA-BPA, they will remain “joined” for the life of the system, or until either of the two components join a different network. Once joining is complete, the FWS-I and AN/PSQ-42 AR/RTA-BPA will establish a link within a distance of 4 ft.

NOTE

If FWS-I has been powered on for greater than two minutes without establishing a link with the AN/PSQ-42 AR/RTA-BPA, wireless will automatically turn off and must be turned ON using the FWS-I Menu.

1. Power on the AN/PSQ-42 (This WP).

NOTE

If FWS-I wireless is not on “SCAN”, user will need to turn Wireless On before the Pairing process can begin.

2. Power on the FWS-I (WP 0004).
3. From the FWS-I menu select SETUP > MANUAL > RTA > NETWORK CONFIG > NEW NETWORK. Use the LEFT button to scroll the “( )” indicators to select “(Yes)” (Figure 2) and press the MENU button to enter the selection. The FWS-I will begin the pairing operations.

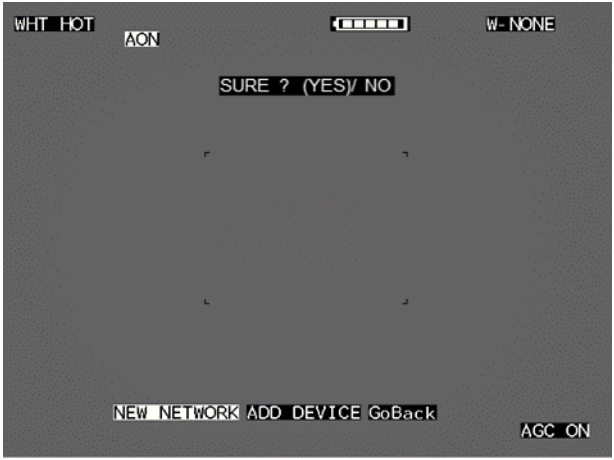


Figure 2. Pairing Confirmation.

4. With the ENVG-B in Fused+ AR/RTA Mode, press and hold the Rotary Knob until the Main Menu appears in the center of the display.
5. Turn the Rotary Knob to select the Settings menu item. Activate by tapping the Rotary Knob.
6. While looking at the ENVG-B display, determine whether wireless communication is enabled or disabled (AN/PSQ-42 Technical Guide). If disabled, continue to Step 7. If enabled, skip to Step 8.
7. From the ENVG-B Menu Mode, scroll to and activate the Settings ➔ Wireless Enable menu item. Verify that the Wireless Disabled is not present in the display.
8. Scroll to and activate the Join Network menu item. The message JOINING NETWORK will appear centered at the bottom of the display. Once joined, the message will disappear and the display will contain FWS-I imagery and data in accordance with the selected RTA mode.

RTA Mode AN/PSQ-42 (Table 2 and Figures 3 – 6)
While in any RTA mode, one of four possible indicators will appear toward the upper right corner of the display as described in Table 2. A graphical representation of each RTA mode is shown in Figures 3 through 6.

Table 2. AN/PSQ-42 RTA Mode Indicators.

Mode	Description
RTA	Partial weapon sight imagery (with reticle) presented within a "bubble" that is spatially aligned with fused imagery of the ENVG-B.
PIP FWS	Simultaneous display of full weapon sight imagery (with reticle) and ENVG-B fused imagery. FWS-I imagery appears in lower right corner of display.
PIP ENVG	Simultaneous display of full weapon sight imagery (with reticle) and ENVG-B thermal imagery. ENVG-B thermal imagery appears in lower right corner of display.
FWS	Allows the thermal image, I2 image, and/or display information to be viewed by the operator.

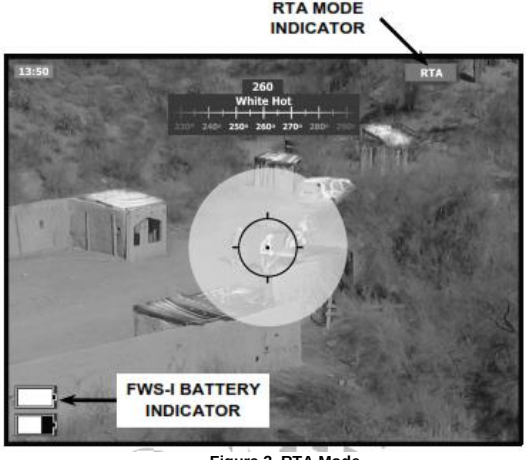


Figure 3. RTA Mode.

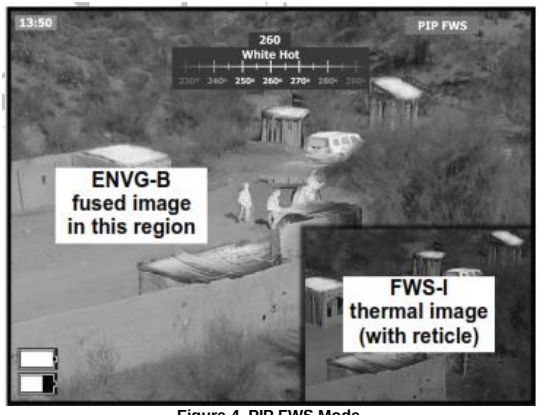


Figure 4. PIP FWS Mode.

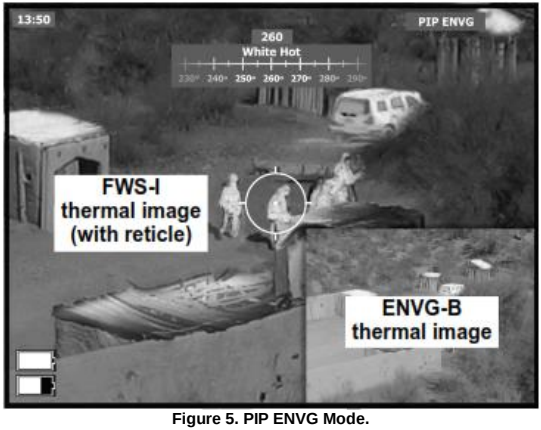


Figure 5. PIP ENVG Mode.

Figure 6. FWS Mode.

RTA INTERFACE

While in any RTA mode, all ENVG-B functionality is available with the exception of polarity, which is adjusted through the FWS-I interface. The polarity setting selected via the FWS-I will affect thermal imagery provided by both systems. Therefore, a single tap of the ENVG-B's POL/CAL button will have no effect. Additionally, the Outline polarity setting is not available while in RTA mode.

AUGMENTED REALITY (AR) WITH RTA NETWORK (AN/PSQ-42)

The AR with RTA configuration requires that the ENVG-B, the Nett Warrior system, and the FWS-I be joined together in a wireless network. The network is created by the FWS-I. Establishing a network between the three systems for the first time is accomplished as follows:

NOTE

The procedure below requires that the ENVG-B EUD plug-in be installed in the ATAK application. This is not an operator function and should be performed prior to the Nett Warrior equipment being issued.

1. Establish a wireless connection between the FWS-I and ENVG-B as described in this Work Package.
2. Ensure the Nett Warrior system is properly connected, configured, and operational per TM 10-5895-1942-13&P and TM 10-5895-1944-10.
3. With the EUD turned on and the ATAK application running (see Nett Warrior user instructions), connect the EWLA to one of the PAN connections on the ISPDS.
4. Once connected, a pop-up window will appear on the EUD display asking the operator for permission to allow the ATAK application to access the EWLA. Select “OK”.
5. From the FWS-I Main Menu, select Add Device.
6. Using the EUD touch screen, from the Options Menu at the far right select Settings →Tool Preferences → ENVG-B HUD Preferences → Wireless (ISW) Settings Network Configuration → New Network.
7. Once the Join Network menu item is selected, a pop-up window will appear on the EUD display asking to confirm the current action. Tap “Confirm”. Joining a new network will erase from the EUD any memory of previously established networks

NOTE

If the Nett Warrior kit leaves the AR with RTA network, the network will still include the FWS-I and ENVG-B devices.

Once established, the wireless network between a specific Nett Warrior kit, ENVG-B, and FWS-I will remain intact indefinitely unless any of the devices join a different network. This is true even if one or more of the network components are turned off.

NOTE

If the ENVG-B has been powered on for greater than two minutes without reestablishing the wireless connection, wireless communication will be disabled. To enable wireless communication for the ENVG-B, activate the Settings → Wireless Enable menu item.

Each time all systems are powered on and in close proximity to one another (approximately 4 feet), the wireless connection between them will automatically be restored.

END OF WORK PACKAGE

OPERATION UNDER UNUSUAL CONDITIONS

INITIAL SETUP:

Tools	**References**
None	None
Materials/Parts	**Equipment Condition**
None	Batteries installed

INCLEMENT WEATHER/ENVIRONMENT

CAUTION

Use of batteries greater than 1.75V can damage the equipment.

NOTE

The operator should periodically check the battery level indicator and the display for the LOW indicator. When LOW appears, at least x and up to xx minutes of battery life remains, when using 1.5V Lithium AA L91 batteries.

NOTE

During cold temperatures while in non-use, spare batteries should be kept close to the body to keep warm. Batteries will last longer and system will warm up faster if batteries are warm.

NOTE

The user should occasionally manually calibrate the FWS-I to optimize the thermal scene in cold temperatures.

Extreme Cold

The FWS-I can be operated down to a temperature of -40°F (-40°C). Avoid exposing lenses to any source of moisture during cold weather. Lenses may fog up or frost over. To prevent fogging or frosting, perform the following procedure:

1. Clean lenses (WP 0011).
2. Coat the eyepiece lens with anti-fogging compound (WP 0011).

Display Operation in Cold Conditions

During operation and storage in cold conditions, the functioning of the display is greatly affected. When the FWS-I is powered up in temperatures below 32°F (0°C), the operator may see a pulsing white image for up to one minute before seeing an optimized thermal scene.

Extreme Heat
The FWS-I can be operated up to a high temperature of x.xx. Operating the FWS-I above this temperature may result in a OVERHEAT/PBIT indicator appearing on the display. If due to extreme heat the OVERHEAT/PBIT indicator appears, immediately power down FWS-I and allow it to cool below x.xx) before operating.

Rain, Fog, or Humidity
In rainy, foggy or humid conditions, observe the following precautions:

1. To prevent fogging of eyepiece lens, perform procedure described in (WP 0011).
2. Keep batteries away from water and battery compartment dry.
3. Dry all parts thoroughly after exposure to moisture.
4. Keep Carry Case closed except to remove or replace equipment.
5. Do not place FWS-I in a wet or damp Carry Case.

Salt Water
In salt water areas, observe the following precautions:
1. After exposure to salt water, clean all components with fresh water.
2. Dry all parts thoroughly after removing all traces of salt water.
3. Do not place FWS-I in a wet or damp Carry Case.

Dust or Sand
If operation is necessary, observe the following precautions:
1. To prevent pitting or scratching of the objective lens, cover lens with plastic sandwich bag, plastic wrap, or plastic garbage bag.
2. Cover as much of the FWS-I as possible to prevent damage to external surfaces.
3. Keep Carry Case closed except to remove or replace equipment.
4. Clean the objective lens and eyepiece frequently (WP 0011).

Mud
After exposure to mud, clean FWS-I exterior, eyepiece and lenses, before mud hardens (WP 0011).

Shutterless Calibration
Shutterless calibration should be performed when shuttered calibration cannot be performed due to a faulty shutter. Shutterless calibration is performed when the FWS-I shutter is stuck in the open position. Since shutterless calibration operates without the shutter closing, the sight needs to have the objective lens covered, or be pointed at a surface with a uniform thermal scene, such as the sky, during calibration.

NOTE

When performing Shutterless Calibration due to faulty shutter, covering the objective lens with the lens cap is the preferred method of obtaining a uniform thermal scene. If a uniform scene is not obtained, a ghost thermal image of the scene will be displayed.

Ensure the CAL is set to AUTO OFF and the menu system has been exited. Cover the objective lens or point the sight at the near ground. Press and Release LEFT button to calibrate the FWS-I.

FORDING AND SWIMMING

Before fording or swimming with the FWS-I, ensure battery compartment and Lens Cap are tightly secured. After fording or swimming with the FWS-I, wipe exterior dry, clean Eyepiece and objective lens (WP 0011) and ensure battery compartment is dry.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) DECONTAMINATION (DECON)

WARNING

Unit deliberate DECON SOP must be followed, since the following procedures are not for total decontamination. Protective mask and gloves should be worn when handling until total decontamination is completed by the DECON site.

NOTE

The FWS-I may be used while wearing Mission Oriented Protective Posture IV (MOPP) gear. Discard the entire Carry Case if it is contaminated.

Chemical Gross Liquid Contamination

Decontaminate the FWS-I with the M295 decontamination kit, or the alternate method if the M295 kit is not available, using the following procedures:

1. Remove and discard the contaminated Eyecup, Lens Cap, Shroud and I/O Port Cap before returning FWS-I to next higher level of maintenance.
2. Decontaminate with M295 Decontamination Kit or by using a cloth and stiff bristle plastic brush with 5-percent solution of sodium hypochlorite and clean with a cloth dampened with soapy water followed by a fresh, clean water rinse. Clean all external surfaces thoroughly. Pay special attention to the difficult to reach areas (controls/buttons).
3. Dry all parts thoroughly.
4. Clean lenses (WP 0011).
5. Using M256 test kit, verify successful decontamination or that chemical contamination is still present. If decontamination was successful, go to Step 8. If still contaminated, repeat Steps 2-4 and then go to Step 6.

6. Retest for contamination using the M256 test kit. If decontamination was successful, go to Step 8. If the sight is still contaminated, repeat Steps 2-4, then go to Step 7.
7. Retest for contamination using the M256 test kit. If decontamination was successful, go to Step 8. If the sight is still contaminated, dispose of the sight per unit SOP.
8. Turn in FWS-I to next higher level of maintenance for:
   a. Eyecup, Lens Cap, Shroud and I/O Port Cap replacement.
   b. Decontamination of the lens assemblies with a cloth soaked in alcohol.

Biological Decontamination

1. Remove and discard the contaminated Eyecup, Lens Cap, Shroud and I/O Port Cap before returning FWS-I to next higher level of maintenance.
2. Use a cloth and stiff bristle plastic brush, dampened with High Test Hypochlorite (HTH) or household bleach (diluted with 10 parts water), to wash the system followed by a fresh clean water rinse.
3. Dry all parts thoroughly.
4. Clean lenses (WP 0011).
5. Tag FWS-I as contaminated prior to returning to next higher level of maintenance.
6. Turn in FWS-I to next higher level of maintenance for:
   a. Eyecup, Lens Cap, Shroud and I/O Port Cap replacement.
   b. Decontamination of the lens assemblies with a cloth soaked in alcohol.

Radiological and Nuclear Decontamination

Remove and discard the contaminated Eyecup, Lens Cap, Shroud and I/O Port Cap. Remove contaminants from FWS-I with a vacuum or brush and rinse in soapy water followed by fresh, clean water. Perform Steps 3 through 6 (Biological Decontamination).

END OF WORK PACKAGE

CHAPTER 3
OPERATOR TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Tools	**References**
None	None
Materials/Parts	**Equipment Condition**
None	Batteries installed

TROUBLESHOOTING TABLE

This table lists the common malfunctions that may occur with the FWS-I. Perform the test, inspections and corrective actions in the order they appear in the Troubleshooting Table (Table 1). After each corrective action that is performed for the fault that brought the operator to this section, check the FWS-I to determine if the fault has been corrected. If not, continue with the troubleshooting steps.

The Troubleshooting Table (Table 1) does not list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or the actions listed do not correct the fault, forward the entire system, to include all items in WP 0015, to next higher level of maintenance.

NOTE

Primary battery is the 1.5V Lithium AA L91. Use of any other type of AA batteries will significantly impact the operational performance.

Table 1. Troubleshooting Procedures.

Malfunction	Test or Inspection	Corrective Action
1. FWS-I does not turn on.	(a) Check to see if battery door is completely closed and locked down.	(a) Close battery door.
	(b) Ensure batteries are correctly installed. Check to see if battery door is making proper contact with system. Inspect battery door, battery compartment, and battery door gasket for dust, environmental contamination, or damage.	(b) Clean battery door and battery compartment (WP 0011) if required. Install batteries (WP 0005) and power on system. If parts are damaged or missing, turn in FWS-I to next higher level of maintenance.
	(c) Perform RESET (WP 0004) and recheck for display indicators.	(c) If display indicators are still not visible, proceed to next step.
	(d) Insert new batteries.	(d) If FWS-I turns on, discard original batteries. If FWS-I still does not turn on, turn in FWS-I to next higher level of maintenance.
2. FWS-I powers on automatically when batteries are installed.	Ensure sight was turned off using normal keypad shutdown procedures.	Power down FWS-I using normal keypad operations.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
3. Low Power.	(a) LOW is illuminated.	(a) Replace batteries (WP 0005).
	(b) Check to see if battery door is making proper contact with system. Inspect battery door and battery compartment for dust, environmental contamination, or damage.	(b) Clean battery door and battery compartment (WP 0011). If parts are damaged/missing or if LOW is still illuminated turn in FWS-I to next higher level of maintenance.
4. Thermal Scene is not visible in FWS-I.	(a) Check to see if lens cap is opened.	(a) Open lens cap.
	(b) Ensure FWS-I and ENVG-B are not linked. When systems are linked the FWS-I display will be set to standby to conserve battery power in the FWS-I and FWS-I Imagery will be present in the ENVG-B.	(b) Turn off ENVG-B and observe the thermal scene in the FWS-I display. NOTE: Allow a minimum of 5 seconds before turning on the ENVG-B for battery pack to reset.
	(c) RESET FWS-I (WP 0004) and check for thermal scene.	(c) If no thermal scene after RESET, cycle power.
	(d) Install new batteries and power on system.	(d) If still no thermal scene, turn in to next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
5. Thermal scene is blurry or distorted.	(a) While wearing corrective eyewear (if necessary), ensure objective lens is focused.	(a) While looking at thermal scene, adjust focus ring.
	(b) Perform Shuttered Calibration (WP 0004).	(b) If thermal scene is still blurry or distorted, proceed to next step.
	(c) Inspect for proper installation of Shroud, if used.	(c) If thermal scene is still blurry or distorted, proceed to next step.
	(d) Turn AGC on or move Level and Gain to mid-levels to optimize the scene.	(d) If thermal scene will not optimize, conduct a system RESET.
	(e) Inspect objective lens and eyepiece for dirt, dust, grime, and damage. If in Clip-On configuration, also check day optic lenses.	(e) Clean lenses (WP 0011). If thermal scene is still blurry or distorted, turn in FWS-I to next higher level of maintenance.
6. Ghost thermal images appear on display.	(a) Perform Shuttered Calibration (WP 0004).	(a) If ghost image still appears, proceed to step (b).
	(b) Cycle FWS-I power.	(b) If ghost image still appears, proceed to step (c).
	(c) Perform Shutterless Calibration (WP 0008).	(c) Turn in FWS-I to next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
7. FWS-I will not mount to weapon.	(a) Ensure Rail Grabber and or Rail Mount Riser are installed correctly (WP 0005).	(a) Install Rail Grabber or Rail Mount Riser correctly (WP 0005).
	(b) Inspect FWS-I Rail Grabber, Rail Mount Riser (if used), and weapon rail for damage.	(b) If damaged, turn in FWS-I, Rail Grabber, Rail Mount Riser, and/or weapon to next higher level of maintenance.
8. Menu does not appear when the PWR/MENU button is pressed.	(a) Determine if STANDALONE or STD FULL mode is selected while the FWS-I is being used in-line with CCO or RCO.	(a) If using in-line with day optic, remove FWS-I from weapon and select CCO or RCO mode (WP 0004).
	(b) Perform Reset (WP 0004).	(b) If menu still does not appear after Reset, cycle power. If problem persists turn into next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
9. Keypad buttons do not work.	(a) Cycle FWS-I power.	(a) Re-attempt to power on FWS-I.
	(b) Install new batteries and cycle FWS-I power.	(b) If problem continues, turn in FWS-I to next higher level of maintenance.
10. FWS-I does not function properly with external device.	If the Remote is the issue go to troubleshooting malfunction 15.	If problem remains, disconnect, then reconnect and recycle power to FWS-I and External Device (per External Device instructions). If problem persists, turn in FWS-I, External Device and interconnect cable to next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
11. System failure indicator displayed.	PBIT FAIL appears on display.	Cycle power. If possibly overheated, allow system to cool. If problem persists, turn in FWS-I to next higher level of maintenance.
12. Wireless communication cannot be established.	(a) Determine if AR/RTA-BPA is properly connected.	(a) Verify helmet mount connection and cycle power on ENVG-B.
	(b) Install new batteries in the AR/RTA-BPA.	(b) Reinstall AR/RTA-BPA and cycle thermal power on ENVG-B.
	(c) Turn on wireless in the FWS-I and verify system is paired. (LNK0-3 indication in the bottom right corner of FWS-I display).	(c) Verify use of correct AR/RTA-BPA to FWS-I.
	(d) Replace batteries in the FWS-I.	(d) Replace with new batteries and cycle power on FWS-I. Perform pairing. If a LNK is not established, turn FWS-I and AR/RTA-BPA into next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
13. Remote does not function.	(a) Determine if Remote is properly connected.	(a) Shutdown FWS-I, Remove and reconnect Remote, and Power On FWS-I.
	(b) Verify FWS-I is not set to KBM mode.	(b) If set to KBM turn RTA Off and check Remote functionality.
	(c) Cycle Power on FWS-I.	(c) If problem continues, turn in Remote to next higher level of maintenance.
14. Bubble Drift	(a) Continued misalignment and spatial alignment drift.	(a) Perform compass calibration (WP 0007) and attempt alignment procedures.
		(b) If continued misalignment and/or spatial alignment drift turn into next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
15. No reticle in display.	(a) Adjust Brightness.	(a) Make sure FWS-I symbology is visible. If not adjust display brightness or perform reset.
	(b) Ensure you are in STANDALONE or STD FULL and NONE reticle is not selected.	(b) Select STANDALONE or STD FULL and a weapon reticle to ensure reticle is present.
	(c) Cycle power.	(c) If problem persists install new batteries. If problem is not corrected turn system in to next higher level of maintenance.

Table 1. Troubleshooting Procedures - Continued

Malfunction	Test or Inspection	Corrective Action
16. No WINDAGE or ELEVATION	(a) Ensure you are in STANDALONE or STD FULL and a weapon reticle is selected.	(a) Select STANDALONE or STD FULL and a weapon reticle to ensure WND and EL are present.
	(b) Cycle power.	(b) If problem persists install new batteries. If problem is not corrected turn system in to next higher level of maintenance.
17. Continuous Menu Scrolling (ENVG RTA Menu)	(a) Verify button 2 or button 3 of the tethered remote or FWS-I keypad are not held down. (b) Verify the thermal control or polarity control of the ENVG-B are not held down. (c) Power cycle system.	(a) If no button is held, press either button 2 or 3 of the tethered remote or FWS-I keypad and verify scrolling has stopped. (b) If the thermal control or polarity control buttons are not held, then power cycle the FWS-I and ENVG-B systems. (c) Return system in to next higher level of maintenance.

END OF WORK PACKAGE

CHAPTER 4
OPERATOR MAINTENANCE INSTRUCTIONS
PMCS

INTRODUCTION TO PMCS TABLE

General. Table 1 (PMCS table) has been provided so you can keep your equipment in good operating condition and mission ready.

Warnings and Cautions. Always observe the WARNINGS and CAUTIONS appearing in your PMCS table. WARNINGS and CAUTIONS appear before applicable procedures. You must observe these WARNINGS and CAUTIONS to prevent serious injury to yourself and others and to prevent your equipment from being damaged.

EXPLANATION OF TABLE ENTRIES

Item No. Column. Numbers in this column are for reference. When completing DA Form 5988-E (DA Form 2404) (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and service for the intervals listed.

Interval Column. This column tells you when you must do the procedure in the procedure column. Before procedures must be done before you operate or use the equipment for its intended mission. During procedures must be done during the time you are operating or using the equipment for its intended mission. After procedures must be done immediately after you have operated or used the equipment.

Location Item to Check/Service Column. This column provides the location and the item to be checked or serviced.

Procedure Column. This column gives the procedure you must do to check or service the item listed in the check/service column to know if the equipment is ready or available for its intended mission or for operation. You must do the procedure at the time stated in the interval column.

Equipment Not Ready/Available If: Column. Faults listed in this column detected when performing Before mission checks that make the FWS-I not mission capable or violate a safety directive must be corrected before the mission. Faults detected when performing Before or During mission checks that are not mission critical may be corrected before or during the mission or recorded/reported for correction after the mission. Faults detected During the mission affecting mission capability or violating a safety directive must be corrected during the mission. After mission faults must be corrected to ensure the FWS-I is fully mission capable prior to storage or the next mission.

PMCS TABLE

To perform the operator PMCS, follow the Preventive Maintenance Checks and Services (Table 1) for AN/PAS-35.

NOTE

After identifying, through PMCS, that the equipment is not ready or available, the operator should perform all applicable troubleshooting steps identified (WP 0009, Table 1).

Table 1. Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
1	Before	Carry Case and contents	(a) Inspect contents of Carry Case (WP 0002). (b) Check material straps and buckles are not torn, ripped or damaged. (c) Check all buckles latch. (d) Check all foam inserts or padding are present and not damaged.	(a) Items/components are damaged or missing. (b) Any components are damaged, ripped or torn. (c) Buckles fail to latch. (d) Foam inserts or padding are missing or damaged.
2	Before	Rail Mount Riser	(a) Inspect for loose, missing or damaged components. (b) Inspect for proper operation. (c) Inspect for dirt and debris and clean (WP 0011).	(a) Components are damaged or missing. (b) Nut does not adjust or locking lever is damaged, loose or missing.
3	Before	Rail Grabber (FWS-I)	(a) Inspect Rail Grabber and Slide lock. (b) Inspect screws. (c) Inspect for dirt and debris and clean (WP 0011).	(a) Rail Grabber or Slide lock is damaged or loose. (b) Screws are loose or missing.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
4	Before	Housing	(a) Inspect FWS-I keypad controls, housing, and exterior screws for damage. Inspect I/O connector and I/O cap for damage, pins broken off in I/O port connector, or debris. (b) As required, clean FWS-I components per WP 0011 to include removing CLP that may be on any sight	(a) Keypad buttons are damaged or missing. I/O cap is damaged or missing. I/O connector is damaged, loose or alignment key is missing; pins broken off in I/O connector; FWS-I housing is damaged or cracked, exterior screws are loose or missing.
5	Before	Objective Lens and Cap	(a) Open lens cap. (b) Check objective lens. (c) Turn focus ring from stop to stop. (d) Close lens cap.	(a) Lens cap is damaged or missing. (b) Lens is cracked or chipped. Condensation is visible inside objective lens. (c) Focus ring binds or does not turn. (d) Lens cap does not close.
6	Before	Eyecup	(a) Install eyecup. (b) Press on eyecup. (c) Release pressure from eyecup (d) Inspect Eyecup for damage, debris or tears.	(a) Eyecup will not install properly. (b) Eyecup flaps do not open. (c) Eyecup flaps do not close. (d) Eyecup is damaged.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
7	Before	Eyepiece	Remove eyecup and inspect eyepiece.	Eyepiece lens is cracked or chipped. Condensation is visible inside eyepiece lens.
8	Before	Shroud	(a) Install/uninstall Shroud. (b) Inspect Shroud for damage, debris or tears.	(a) Shroud will not install (b) Shroud is damaged.
9	Before	Battery Compartment	(a) Inspect battery compartment and Battery Door for corrosion and damage. (b) Clean (WP 0011). (c) Inspect Battery Door O-ring and Knob for damage. (d) Batteries will not install.	(a) Battery compartment and Door are damaged or missing. (b) Battery compartment contacts are corroded or damaged. (c) Battery Door O-ring or Knob is missing or damaged. (d) Install batteries (WP 0005).

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
10	Before	Remote Connector/cable	(a) Inspect the exterior of cable for cuts, tears, cracks, fraying and corrosion. (b) Inspect cable pins and receptacles for deterioration, bent/broken/missing pins and corrosion.	(a) Cable is cut, torn, cracked, frayed or corroded. (b) Receptacles are deteriorated, bent, broken, missing pins or corroded.
11	Before	Remote Keypad	Inspect buttons for damage, tears and proper operation.	Keypad is damaged, torn or buttons do not operate.
12	Before	Remote Housing	(a) Inspect housing for damage. (b) Inspect clips for damage. (c) Inspect for dirt and debris. (d) Clean (WP 0011).	(a) Housing is damaged. (b) Clips are broken or do not attach to rail.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
13	Before	Power ON	(a) Turn FWS-I on. (b) Check display indicators during power-up. (WP 0004, Figure 2) for display indicators.	(a) FWS-I does not turn on. (b) No indicators displayed during power-up. PBIT Fail Message is displayed.
14	Before	Low Battery	If LOW battery indicator is displayed, install new batteries (WP 0004, Figure 2).	LOW battery indicator is still displayed.
15	Before	Displays, Controls, and Indicators	(a) Check Display	(a) Display is not visible. Display jitters or jumps. Display has a problem that adversely affects ability to acquire or engage a target.
			(b) Open lens cap and check for thermal scene.	(b) Thermal scene is not visible.
			(c) View object at approximately 5 meters and adjust focus ring.	(c) Focus ring will not sharply focus on object.
			(d) View a distant object and adjust focus ring.	(d) Focus ring will not sharply focus on object.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
15 (cont).	Before	Displays, Controls, and Indicators	(e) Using the LEFT and RIGHT buttons, adjust level. (f) Using the LEFT and RIGHT buttons, adjust gain until scene changes. (g) Using the RIGHT button, change the polarity of the thermal scene. (h) Using the LEFT button, select AGC OFF. (i) Using the RIGHT button, change the FOV. (j) Record values of WND and EL indicators for the selected weapon. Using on-screen menus, check all menu settings and functions (WP 0004). Restore WEAPON, WND and EL indicators to recorded values.	(e) Level of display does not change. (f) GAIN of thermal scene does not change. (g) Polarity in display does not change. WHT HOT and BLK HOT indicators do not change. (h) AGC OFF cannot be selected. (i) FOV does not change and FOV indicator does not change. (j) Menu settings and functions do not operate properly.
16	Before	Remote	(a) Connect Remote (WP 0005). (b) Check all Non-RTA functions of the Remote.	(a) Remote does not connect. (b) Remote does not change settings in FWS-I display.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
17	Before	FWS-I	(a) Turn system OFF. (b) If installed, remove Remote. (c) Remove batteries (WP 0005) if no mission is immediately scheduled or no further PMCS is required.	(a) Power remains on. (b) Remote cannot be disconnected.
18	Before	Rail Support Bar M141 (BDM) (If used)	(a) Inspect rail support bar. (b) Install rail support bar on weapon bracket and FWS-I on rail (WP 0005). (c) Remove FWS-I from rail, and rail support bar from weapon bracket (WP 0005).	(a) Rail support bar is damaged. (b) Rail support bar or FWS-I does not properly install. (c) Rail support bar or FWS-I does not remove.
19	Before	Transit case	(a) Inspect case to ensure no exterior or interior damage. (b) Inspect latches to ensure transit case remains secure.	(a) Transit case cannot remain sealed.

Table 1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Equipment Not Ready/Available If:
20	During	FWS-I	**WARNING** If FWS-I is operated with eyecup/Shroud missing, light emitting from the eyepiece may be visible to the enemy. Repeat items 2 through 23 with the exception of 2 (if not used), 3.b, 4.b, 6 or 8 (depending on configuration).	
21	During	PBIT Fail Indicator	(a) Monitor for PBIT FAIL indicator. (b) Cycle power.	(a) PBIT indicator appears. (b) PBIT indicator appears.
22	After	FWS-I	Clean and repeat items 1 through 24.	

END OF WORK PACKAGE

GENERAL CLEANING

INITIAL SETUP:

Tools	References
None	None
Materials/Parts	**Equipment Condition**
See “Supplies” under major sub-headings	Assembled

EXTERIOR CLEANING

SUPPLIES: Cloth, Cleaning (WP 0017, Table 1, Item 12)

CAUTION

Ensure Cleaner, Lubricant and Preservative (CLP) used for weapon maintenance and other foreign matter are removed from FWS-I components. Extended contact with CLP and other weapon cleaning compounds may damage components.

FWS-I

1. Ensure battery compartment is closed, lens cap and I/O cap are installed (WP 0005).
2. Wipe exterior to remove dust, dirt, grease, or other foreign matter.
3. Remove caked mud/debris by rinsing exterior surfaces with clean, low pressure, running, fresh water. If required, allow the mud to soak and soften. Wipe dry.

Remote

Wipe down Remote keypad with a damp cleaning cloth to remove dust, dirt, mud and other foreign debris.

Rail Grabber/Rail Mount Riser

Repeat Steps 2 and 3 above.

LENS CLEANING

SUPPLIES: Lens Cleaning Towelettes (WP 0017, Table 1, Item 2)

WARNING

Do not touch, ingest, or inhale particles or fragments of a broken objective lens. Lens contains Germanium that may cause irritation to eyes, skin, upper and lower respiratory tracts, or gastrointestinal tract. If contacted, flush eyes or skin with large amounts of water. If ingested, DO NOT induce vomiting. Rinse mouth with water and give victim 2-4 cupfuls of milk or water. Fragments of lens may be sharp enough to cut personnel if touched.

1. Open lens cap.

CAUTION

Avoid excessive pressure when wiping lens. Foreign matter on lens may scratch lens when wiped off.

2. Using a lens cleaning Towelette, start at the center of the lens, and work outward in a circular pattern, gently wiping glass surface of lens to remove any foreign matter.
3. Repeat Step 2 as necessary to remove any smears or smudges.
4. Close lens cap.
5. Perform Steps 2 and 3 on eyepiece lens.

BATTERY COMPARTMENT CLEANING

SUPPLIES: Cloth, Cleaning (WP 0017, Table 1, Item 12)

FWS-I

1. If installed, remove batteries.
2. Wipe battery compartment, battery compartment door, and all contacts to remove dirt, grease or other foreign matter.

ELECTRICAL CABLES AND CONNECTORS

SUPPLIES: Cloth, Cleaning (WP 0017, Table 1, Item 12)
Isopropyl Alcohol (WP 0017, Table 1, Item 14)
Swab Pack, Cotton (WP 0017, Table 1, Item 13)

WARNING

Isopropyl alcohol is flammable and toxic. To avoid injury, keep away from open fire and use in well-ventilated area.

CAUTION

Use caution when cleaning connector ends, particularly connector pins. Pins can easily be bent or broken, requiring replacement of the cable.

Cable

1. Wipe down exterior of cables with a damp cleaning cloth to remove dust, dirt, mud and other foreign debris.

2. If electrical connector ends (pins and receptacles) are dirty, apply a few drops of isopropyl alcohol to a cotton swab to clean connector pins and receptacles.

Hotshoe

Repeat Step 2 above for AR/RTA-BPA Hotshoe contacts and optical windows.

ANTI-FOG COMPOUND APPLICATION

SUPPLIES: Towelettes, Anti-Fogging (WP 0017, Table 1, Item 3)

CAUTION

Only use the anti-fog Towelettes on the eyepiece lens. DO NOT USE ANTI-FOG TOWELETTE ON THE OBJECTIVE LENS. The anti-fog compound will degrade the IR transmission of the objective lens and is very difficult to remove.

CAUTION

Avoid excessive pressure when wiping lens. Foreign matter on lens may scratch lens when wiped off.

1. If necessary, remove the eyecup or Shroud to access the eyepiece lens.
2. Inspect the lens surface and clean as required in this WP.
3. Remove the anti-fog Towelette from its pouch.
4. With very light pressure, slowly drag the folded anti-fog Towelette across eyepiece lens surface in a circular motion. Streaking may occur if excess compound is deposited on the lens surface.
5. Reseal the anti-fog Towelette in its pouch and retain for future use.
6. Reinstall eyecup or Shroud.

END OF WORK PACKAGE

RAIL GRABBER/RAIL MOUNT RISER ADJUSTMENT

INITIAL SETUP:

Tools
None

References
None

Materials/Parts
None

Equipment Condition
Assembled

ADJUSTMENT

NOTE

The installation tension should be strong such that significant resistance is felt when the lever is closed by hand. FWS-I should be secure with no movement when attached.

NOTE

If possible, leave on rail to make adjustments if you cannot make adjustments while mounted on rail, remove from rail and keep same orientation. When reinstalling ensure mount is placed in same slot.

1. Slide lock to rear (1).
2. Move lever to an angle of 45° (2).
3. Turn the adjustment nut (3) by hand CW one click if tension is too tight or CCW one click if tension is too loose.
4. Move the lever to the closed position (4) and check tension. There should be a sharp rise in tension felt prior to locking. If insufficient, repeat Steps 2 through 4.
5. Slide lock into the closed position (5).

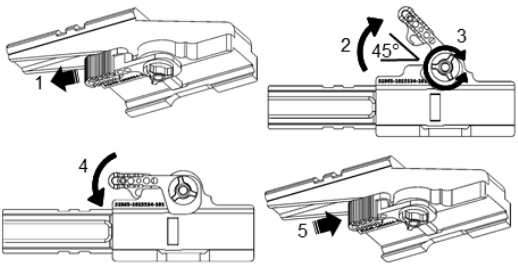


Figure 1. Rail Grabber/Rail Mount Riser Tension Adjustment.

END OF WORK PACKAGE

PREPARATION FOR STORAGE AND SHIPMENT

INITIAL SETUP:

Tools	**References**
None	None
Materials/Parts	**Equipment Condition**
None	Batteries removed

When storing or shipping FWS-I, the following procedures should be followed to prevent any damage:

- Ensure all major components (WP 0002) are dry, free of dirt, debris, contaminants, or foreign material in accordance with WP 0011.
- If required, install the Lens Cap and I/O Port Cap.
- Verify batteries are removed from FWS-I (WP 0005).
- Place FWS-I in Carry Case.

Packing the Carry Case

See Figure 1 for packing the Carry Case.

CAUTION

Ensure batteries have been removed from the system before placing FWS-I in the Carry Case. Damage to system electronics may occur if batteries are still installed.

CAUTION

Avoid storing FWS-I (non-operating) below -51ºF (-46ºC) or above 160˚F (71ºC).

CAUTION

Do not store batteries in a location above 160°F (71°C).

CAUTION

Ensure CLP and other foreign matter are removed from FWS-I components before placing FWS-I in the Carry Case. Extended contact with CLP may damage components.

NOTE

The FWS-I should be transported in the soft Carry Case and the hard transit case. If it is necessary to transport the FWS-I without the hard transit case, the FWS-I must be secured or in a suitable pouch/bag to prevent damage.

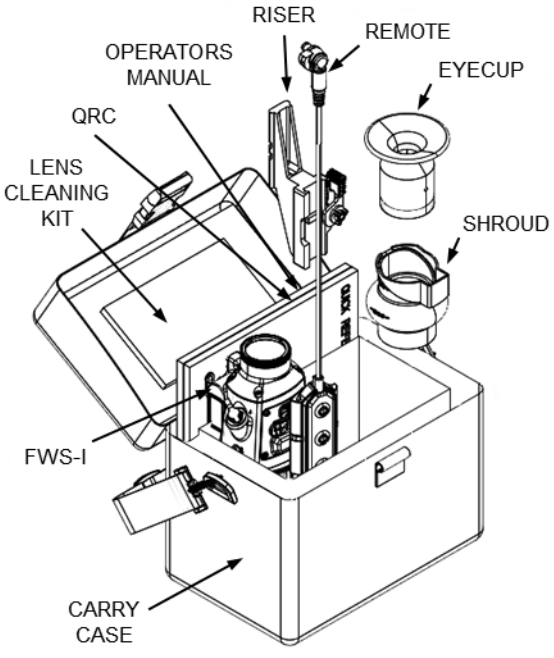


Figure 1. Packing/Unpacking the Carry Case.

1. Open lid of Carry Case. Place operators manual and QRC into the inside compartment (against the back) of the Carry Case.
2. Place the lens cleaning kit in the small pouch under the lid of the Carry Case.
3. Place Rail Mount Riser (slide lock closed), Remote, Eyecup and Shroud into the large pocket on the right side of Carry Case.
4. Place FWS-I (slide lock closed) with Lens Cap installed inside case with objective lens down.
5. Close lid of Carry Case and latch.

STORAGE

Administrative storage of equipment issued to and used by Army activities will have Preventive Maintenance Checks and Services (PMCS) performed before storing. When removing the equipment from administrative storage, the PMCS checks should be performed to assure operational readiness.

END OF WORK PACKAGE

CHAPTER 5
SUPPORTING INFORMATION
REFERENCES

SCOPE

This work package lists all forms, Training Circular (TC), Technical Manual (TM), and miscellaneous publications referenced in this manual.

FORMS

DA 2028	Recommended Changes to Publications and Blank Forms
DA 2404/ DA 5988E	Equipment Inspection and Maintenance Worksheet
DA 7476-R	10m Boresight Offset Target
DD 361	Transportation Discrepancy Report
SF 368	Product Quality Deficiency Report

TECHNICAL MANUALS

TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)
TM 9-1240-416-13&P	Operator and Field Maintenance Manual for the M150 Sight, Rifle Combat Optic (RCO)
TM 9-5860-226-13&P	Laser Borelight System
TM 9-1240-413-13&P	Operator and Unit Maintenance Manual for M68 Sight, Reflex, with Quick Release Mount and Sight Mount
TM 10-5895-1942-13&P	Operator and Field Maintenance Manual for Nett Warrior System A2
TM 10-5895-1944-10	Operator Manual for Nett Warrior Soldier System Covering Software

OTHER PUBLICATIONS

AR 700-138	Army Logistics Readiness and Sustainability
CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable/Durable Items
DA PAM 750-8	The Army Maintenance Management System (TAMMS) User's Manual
OFB-TM-ARMY AN/PSQ-42	Technical Guide for AN/PSQ-42 Enhanced Night Vision Goggle – Binocular (ENVG-B)
TB 43-0134	Battery Disposition/Disposal Handbook
TC 4-02.1	First Aid

END OF WORK PACKAGE

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

SCOPE

This work package lists components of the end item and basic issue items for the FWS-I to help you inventory the items for safe and efficient operation of the equipment.

GENERAL

The Components of End Item (COEI) and Basic Issue Items (BII) Lists are divided into the following tables:

Table 1, Components of End Item List
This list is for information purposes only, and is not authority to requisition replacements. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of the COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Table 2, Basic Issue Items
These essential items are required to place the FWS-I in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the FWS-I during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns

Column (1), No. This column gives you the number of the item illustrated.

Column (2), National Stock No. This column identifies the National Stock Number (NSN) of the item to be used for requisitioning purposes.

Column (3), Description, CAGEC and Part Number. This column identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parenthesis) and the part number.

Column (4), Usable On Code. If the item you need is not the same for different models of the equipment, a Usable On Code (UOC) will appear on the right side of the description column on the same line as the part number. These codes are identified below:

CODE	USED ON
6XM	AN/PAS-35 Sight, Thermal

Column (5), U/I (Unit of Issue). This column indicates how the item is issued for the NSN shown in column (2).

Column (6), QTY ROD. This column indicates the quantity required.

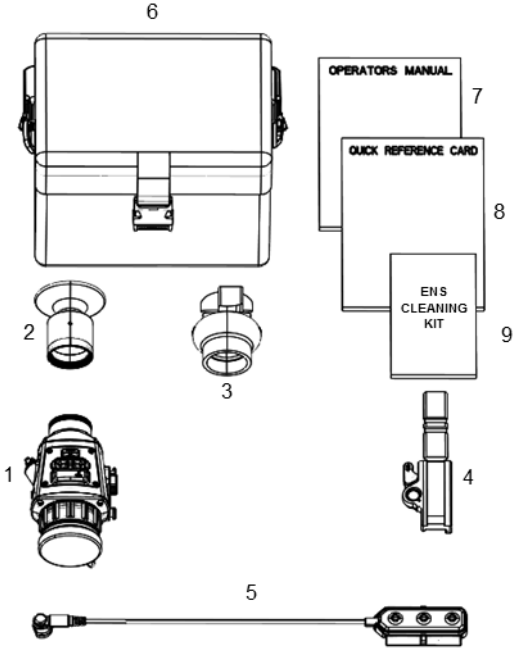
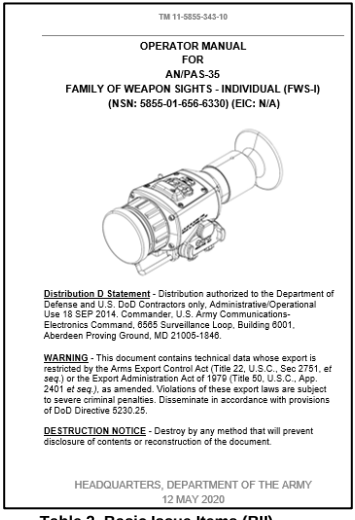


Figure 1. Family of Weapon Sight-Individual (FWS-I). AN/PAS-35.

Table 1. Components of End Item List.

(1) NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, & PART NUMBER	(4) USABLE ON CODE	(5) U/I	(6) QTY RQD
1		FAMILY OF WEAPON SIGHTS, INDIVIDUAL (FWS-I) (32865) 1026825-101	8AK	EA	1
2	5855-01-666-9530	EYEGUARD (EYECUP) (32865) 1026081-001	8AK	EA	1
3	4140-01-666-9562	SHROUD (32865) 1026078-101	8AK	EA	1
4	1240-01-666-9930	RAIL MOUNT RISER (32865) 1026079-101	8AK	EA	1
5	5895-01-666-9850	REMOTE (16") (32865) 1026088-103	6XM	EA	1
6	5855-01-673-0646	CARRY CASE (32865) 1016080-101	8AK	EA	1
7	11-5855-343-10	OPERATORS MANUAL (32865) 1021099-001	6XM	EA	1
8		QUICK REFERENCE CARD (32865) 1021130-001	8AK	EA	1
9	6850-01-448-9653	LENS CLEANING KIT (CT811) (32865) 1004838	8AK	EA	1

BASIC ISSUE ITEMS



TM 11-5855-343-10

OPERATOR MANUAL
FOR
AN/PAS-35
FAMILY OF WEAPON SIGHTS - INDIVIDUAL (FWS-I)
(NSN: 5855-01-656-6330) (EIC: N/A)

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HEADQUARTERS, DEPARTMENT OF THE ARMY
12 MAY 2020

Table 2. Basic Issue Items (BII).

(1) NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, & PART NUMBER	(4) USABLE ON CODE	(5) U/I	(6) QTY RQD
1		OPERATORS MANUAL FOR AN/PAS-35 FAMILY OF WEAPON SIGHTS- INDIVIDUAL (FWS-I) TM 11-5855-343-10	8AK	EA	1

END OF WORK PACKAGE

ADDITIONAL AUTHORIZATION LIST

Table 1. Additional Authorization List.

NATIONAL STOCK NUMBER	DESCRIPTION CAGEC & PART NUMBER	USABLE ON CODE	U/I	QTY RQD
6135-01-333-6101	Battery, AA, Lithium (4U407) L91	8AK	EA	3
6135-00-985-7845	Battery, AA, Alkaline (06101) BA-3058	8AK	EA	3
	Remote, M249 (26.5") 1026088 (32865)	8AK	EA	1
	Rail Support Bar	8AK	EA	1

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST

SCOPE

This work package lists expendable and durable items that you will need to operate and maintain the FWS-I. This listing is for information only and is not authority to requisition the listed items. These items are authorized by CTA 50-970, Expendable/Durable Items (except medical, class V repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

EXPLANATION OF COLUMNS

Column 1, No. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item.

Column 2, Level. This column identifies the lowest level of maintenance that requires the item.

C – Crew (Operator)

Column 3, National Stock Number. This is the National Stock Number (NSN) assigned to the item which you can use to requisition it.

Column 4, Item Name, Description, Commercial and Government Entity (CAGE) Code, and Part Number. This provides the other information you need to identify the item.

Column 5, Unit of Measure. This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

SECTION II

EXPENDABLE AND DURABLE ITEMS LIST

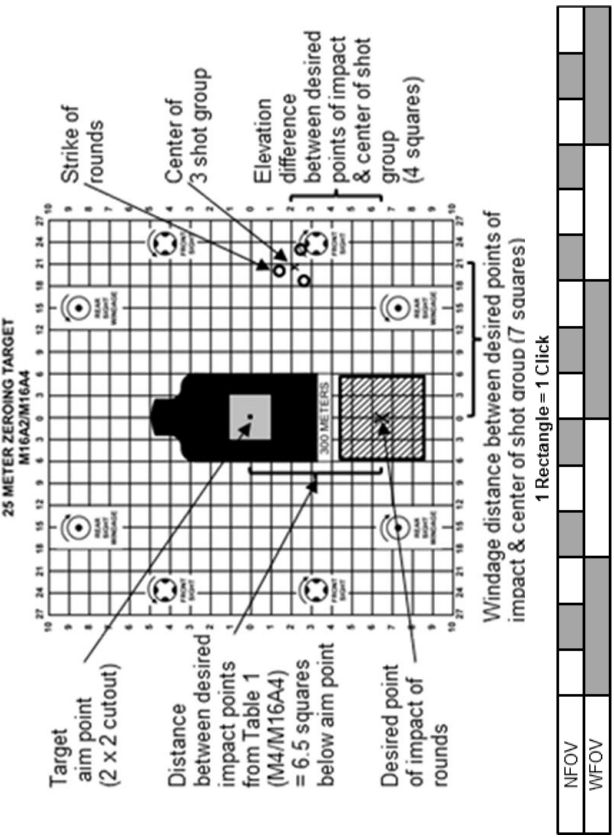
Table 1. Expendable and Durable Items List.

(1) NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE CODE, PART NUMBER	(5) U/M
1	C	8115-00-290-5482	Box, Shipping ASTM-D5118 (81346)	BD
2	C	6850-01-448-9653	Kit, Lens Cleaning (Towelettes) 811 (09ZF6)	BX
3	C	6540-01-579-5201	Anti-Fog Towelettes 82032CFE (1W4L4)	PK
4	C	7510-00-266-6712	Tape, Pressure Sensitive Adhesive 8783476 (19203)	RO
5	C	6920-01-395-2949	Target, M16A4A2/M16A4A4 25-Meter Zeroing 12012024 (19200)	BX
6	C	6920-01-516-9912	Thermal E-Silhouette, 115 VAC (Thermal Blanket) 01-01-0101 (4V009)	EA
7	C		Harness, Single Target, 115 VAC 02-02-1501-1 (4V009)	EA
8	C		Harness, Dual Target, 115 VAC 02-02-1502-1 (4V009)	EA
9	C	6920-01-281-8721	Thermal E-Silhouette, 12V (Thermal Blanket) 01-01-0101-LV-12 (4V009)	EA
10	C		Harness, Single Target, 12 VDC 02-02-1501-2 (4V009)	EA
11	C		Harness, Dual Target, 12 VDC 02-02-1502-2 (4V009)	EA

(1) NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE CODE, PART NUMBER	(5) U/M
12	C	7920-00-401-8043	Cloth, Cleaning (80244) 7920-00-401-8043	HD
13	C	8320-01-362-5829	Swab Pack, Cotton (17794) 6003-0019	EA
14	C	6810-01-220-9907	Alcohol, Isopropyl (81349) MIL-I-10428	BT

END OF WORK PACKAGE

ZEROING RULER



TM 11-5855-343-10
DD Month YYYY

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

GERALD B. O'KEEFE
Administrative Assistant to the
Secretary of the Army
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Commander, Proponent Name, Proponent Address

FROM: *(Activity and location) (Include ZIP Code)*
Jane Q. Doe, SFC
1234 Any Street
Anytown, AL 34565

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-1234-567-14	15 Jan 2016	Operator, Field and Sustainment Support Maintenance Manual ... Radio, AN/ABC-123

ITEM	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording for recommended changes, if possible).
1	WP 0005-3		2			Test or Corrective Action column should ... ent WP number.

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PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COL. NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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PUBLICATION/FORM NUMBER	DATE	TITLE

ITEM	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).

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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COL. NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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