



USER MANUAL

**TEST SET, ELECTRONIC SYSTEM: AN/PSM-95L
MAINTENANCE SUPPORT DEVICE-VERSION 4 LIGHT
(MSD-V4L)**

NSN: 6625-01-683-2824

**MANUFACTURED BY LEONARDO DRS
7200 REDSTONE GATEWAY SW
HUNTSVILLE, AL**

**INCLUDING OPERATOR INSTRUCTIONS FOR THE MSD-V4L AND
ACCESSORIES**



COPY RIGHT STATEMENT: The government is authorized to use, reproduce, release, or disclose the User Manual (Test, Set, Electronic System: AN-PSM-95L) within the Government without restriction and outside the Government for a Government Purpose.




DATE: 20 June 2024

Table of Contents

1	INTRODUCTION	7
1.1	PURPOSE AND FUNCTION.....	7
1.2	CAPABILITIES	7
1.3	PERFORMANCE CHARACTERISTICS.....	7
1.4	EQUIPMENT DESCRIPTION.....	11
1.5	POWER AND UTILITY INFORMATION.....	12
1.6	ENVIRONMENTAL INFORMATION.....	13
1.7	DESCRIPTION OF ITEMS FURNISHED	14
1.8	ADDITIONAL ITEMS AND OPTIONAL ACCESSORIES.....	19
1.9	TOOLS AND TEST EQUIPMENT.....	21
1.10	SHIPPING AND HANDLING PRECAUTIONS.....	21
2	PREPARATION FOR USE	23
2.1	QUICK SETUP	23
2.2	REMOVING AND INSTALLING COMPONENTS.....	24
2.2.1	<i>Protective Cover.....</i>	<i>24</i>
2.2.2	<i>Barrel to USB-C Adapter (USB-C Dongle)</i>	<i>24</i>
2.2.3	<i>Connect USB-C Mobile Adapter</i>	<i>24</i>
3	THEORY OF OPERATION	27
4	MSD-V4L NORMAL OPERATION.....	31
4.1	DEVICE STATUS LIGHTS.....	31
4.2	KICKSTAND.....	31
4.3	KEYBOARD	32
4.4	FUNCTION FN KEY LOCK FEATURES.....	34
4.5	ENABLE/DISABLE WIRELESS (Wi-Fi) /AIRPLANE MODE FEATURE	34
4.6	INSTALL SHOULDER STRAP.....	35
4.7	STRAIN RELIEF CABLE TIE.....	36
5	STANDARD ACCESSORIES- NORMAL OPERATION.....	37
5.1	NATO POWER CABLE.....	37
5.2	DC/DC POWER ADAPTER.....	38
5.3	EUROPEAN ADAPTER	39
5.3.1	<i>Configure European Adapter for Use.....</i>	<i>40</i>
5.3.2	<i>Configure US Plug for AUS (Australia).....</i>	<i>41</i>
5.4	BLU-RAY OPTICAL DRIVE.....	42
5.5	ACTIVE PEN STYLUS.....	44
6	OPTIONAL ACCESSORIES.....	45
6.1	MSD-V4 MIL-STD-1553 ADAPTER.....	45
6.2	MSD-V4 USB HUB	46
6.3	EXPRESS CARD ADAPTER.....	47
6.4	AC/DC 400Hz POWER ADAPTER	48
6.5	GPIB ADAPTER.....	51
6.6	RS232/422/485 ADAPTER	51
7	TROUBLESHOOTING.....	54

7.1	TROUBLESHOOTING THE MSD-V4L.....	54
7.2	DC/DC POWER ADAPTER.....	55
7.3	AC/DC 400 Hz POWER ADAPTER	55
7.4	UNIVERSAL WORLD TRAVELER ADAPTER.....	56
7.5	MSD-V4L ACTIVE PEN.....	56
8	MAINTENANCE.....	57
8.1	SERVICE UPON RECEIPT.....	57
8.1.1	<i>Unpacking.....</i>	57
8.1.2	<i>Equipment Inventory.....</i>	57
8.1.3	<i>Inspection.....</i>	57
8.2	PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).....	57
8.3	CLEANING.....	59
8.4	TOUCHSCREEN CALIBRATION	59
8.5	MSD-V4L BATTERY REPLACEMENT.....	62
8.6	DISASSEMBLY, REPAIR, REPLACEMENT, REASSEMBLY, AND CHECKOUT.....	62
8.7	SOFTWARE UPDATE INSTRUCTIONS.....	62
9	PREPARATION FOR SHIPMENT	67
10	STORAGE	69
11	PARTS LIST	71
12	WARRANTY PROGRAM AND CUSTOMER SUPPORT.....	73

Warnings, Cautions, and Notes

-  **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.
-  **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.
-  **NOTE:** A NOTE indicates important information that helps you make better use of the MSD-V4L.

Warning Summary



WARNING

EXPLOSIVE: Using an incompatible battery may increase the risk of fire or explosion. The battery is designed to work with the MSD-V4L and is not replaceable by the operator. Do not use a battery from other computers with the MSD-V4L. Do not attempt to use unserviceable batteries.

FIRE: To prevent ignition in a hazardous atmosphere, batteries must only be removed, changed, or charged in an area known to be non-hazardous. Do not operate the MSD-V4L within 50 feet of a refueling point. A dry type of fire extinguisher must be readily available when recharging batteries.



WARNING

Shock Hazard: Improper connection of the NATO connector can result in serious injury or death from shock. DO NOT touch NATO plug conductor while it is connected to a receptacle.

1 Introduction

1.1 Purpose and Function

The purpose of the Maintenance Support Device - Version 4 Light (MSD-V4L) is to support Army maintainers and institutional Military Occupational Specialty training for Soldiers at Garrison or US Army Training & Doctrine Command schools. Army maintainers may use this equipment to perform diagnostics at the platform/system under test with an interface/connector to automatically test, diagnose, and verify the correct operation of weapon systems after repair.

1.2 Capabilities

The MSD-V4L is capable of hosting and operating Interactive Electronic Technical Manuals (IETMs) and Electronic Technical Manuals (ETM), and interfacing with On-Platform IETMs. The MSD-V4L utilizes IETMs for fault isolation of Line Replaceable Units (LRUs), maintenance work ordering, and part requisitioning. MSD-V4L also performs as software loader/verifier to restore or provide new software/data to weapon systems. The kit contains the accessories most used in a field environment to test or interface with tactical vehicles.

- 13" FHD+ Low Power, low blue light, Gorilla Glass display
- Intel i5 Processor (11th gen.)
- RGB IR camera with proximity sensor
- 512 GB Solid State Drive (SSD)
- 8 GB Memory
- Audio/Microphone/Line or Combined Sound Port
- Built-in Microphone
- Stereo speakers
- Active pen
- Commercial grade protective case
- Trusted Platform Module (TPM) 2.0
- Two Internal Universal Serial Bus (USB-C) Ports
- Computer Access Card (CAC) Enabled Smartcard Reader
- Internal Ethernet Network Interface (wireless)
- Detachable Keyboard
- Cable Strain Reliefs
- Power Sources and Connections

1.3 Performance Characteristics

System characteristics for the MSD-V4L Computer.

Feature	Specification
Chipset	Integrated in processor
Chipset Version	11 th Gen i5 vPro 1140G7
DRAM bus Width	64 bit

Feature	Specification
DRAM bus Speed	LPDDR4X 4266 MHz
Flash EPROM	SPI BIOS ROM- 32 MB
PCIe 3.0 bus	8.0 GHz

Processor Information

Feature	Specification
Type	Intel Core Processor I5 vPro 1140G7
UMA Graphics	Intel UHD Graphics 620 Integrated
Processor Frequency	4.1 GHz

Memory

Feature	Specification
Number of Slots	Soldered on system board
Memory Capacity	8 GB
Memory Type	LPDDR4X
Speed	4267 MHz

Storage (Hard Drive)

Feature	Specification
Type	One Solid-State Drive (SSD)
Form Factor	M.2 2230
Interface	PCIe 3x4 NVME, up to 32 Gbps
Security	SED
Capacity	512 GB

Media Card Reader

Feature	Specification
Type	microSD card
Supported Card	SD 4.0

Audio

Feature	Specification
Controller	Realtek ALC3254-CG
Type	2 Channel High-Definition Audio

Feature	Specification
Stereo Conversion	Supported
Speakers	Stereo
Interface	<ul style="list-style-type: none"> • Internal interface—High-definition audio interface • External interface—Universal Audio Jack supports Headset/Headphone/Line-out/Microphone/Line-in function, Digital array microphones
Internal Speaker Amplifier	Supported
External Volume Controls	Supported
Speaker Output	Average- 2W Peak- 2.5 W
Subwoofer Output	Not supported
Microphone	Supported

Video Card

Feature	Specification
Controller	Intel UHD Graphics 620
Type	UMA LPDDR3
CPU Dependency	Intel Core i5
Graphics Memory Type	Integrated
Capacity	Shared System Memory
External Display Support	HDMI/Display Port through USB-C
Maximum Resolution	<ul style="list-style-type: none"> • HDMI 1.4- 4096 x 2304 @ 24Hz • DisplayPort- 4096 x 2304 @ 60Hz

Camera

Feature	Specification
Front Camera Resolution	<ul style="list-style-type: none"> • Still Images- 8 Megapixels • Video- 1920 x 1080p at 30 fps

Feature	Specification
World Facing Camera	<ul style="list-style-type: none"> • Still Images- 8 Megapixels • Video- 1920 x 1080 at 30 fps • Flash- No • LED- No
Infrared Camera	<ul style="list-style-type: none"> • Still images- 8 Megapixels • Video- 1920 x 1080 at 30 fps
Diagonal Viewing Angle	<ul style="list-style-type: none"> • Front Camera- 77.3 Degree • World Facing Camera- 88.9 Degree • Infrared Camera- 86.7 Degree

Ports and Connectors

Feature	Specification
Smart card reader	Yes
USB	<ul style="list-style-type: none"> • Two USB-C with Thunderbolt 3/Power Delivery/Display Port
Security	Noble Wedge Lock Slot
Media	<ul style="list-style-type: none"> • Universal Audio Jack • Two Internal Microphone- Edge Firing at Top Edge • Two Isolation Mounted Stereo Speakers • Front Facing Camera • World Facing Camera • One Camera Activity LED • Ambient Light Sensor
SIM Card Reader	One Nano SIM Card Reader

Wireless

Description	Specification
Frequency Bands	2.4/5 GHz
Wireless Standards	<ul style="list-style-type: none"> • Wi-Fi 802.11a/b/g • Wi-Fi 4 (Wi-Fi 802.11n) • Wi-Fi 5 (802.11ac) • Wi-Fi 6 (802.11ax)
Encryption	<ul style="list-style-type: none"> • 64-bit/128-bit WEP • AES-COMP • TKIP
Bluetooth	Bluetooth 5.1

1.4 Equipment Description

Model: MSD-V4L Type II

Display

Feature	Specification
Type	13-inch FHD WUXGA (1920X1280) AR+AS touchscreen
Height (active area)	7.2 in
Width (active area)	10.80
Diagonal	13 in
Luminance/brightness	500 Nits
Megapixels	2.46
Pixels Per Inch (PPI)	177.6
Contrast Ratio (min)	1200:1
Refresh Rate	60 Hz
Horizontal Viewing Angle	80 degrees
Vertical Viewing Angle	80 degrees
Pixel Pitch	.1429 mm
Power Consumption (max)	2.65 W
Anti-Glare Coating	Anti-reflection/anti-smudge coating/DXC Durable Coating
Touchscreen	Yes

Keyboard

Feature	Specification
Number of Keys	80
Size	11.56 in x 8.98 in
Backlit Keyboard	Yes
Layout	QWERTY

Touchpad

Feature	Specification
Resolution	<ul style="list-style-type: none">Horizontal- 41.7 +/- 4.2 counts/mmVertical- 39.8 +/- 4.0 counts/mm
Dimensions	<ul style="list-style-type: none">Width- 55 mm (2.16 in)Height- 100 mm (3.93 in)
Multi-Touch	Yes

Operating System

Feature	Specification
Supported OS	Windows 10/11

1.5 Power and Utility Information

Battery

Feature	Specification
Type	40 W/hr 2-Cell polymer battery
Dimension	<ul style="list-style-type: none"> Length- 185 mm (7.28 in) Width- 81.2 mm (3.19 in) Height- 4.8 mm (.18 in) Weight- 160 g (.35 oz)
Voltage	8.9 V
Temperature Range Operating	<ul style="list-style-type: none"> Charging: -0°C to 50°C (32°F to 122°F) Discharging: -0°C to 50°C (32°F to 122°F)
Temperature Range Non-Operating	-20° to 60°C (-4°F to 140°F) NOTE: The battery pack is capable of safely withstanding the above storage temperatures with 100% charge. The battery pack is also capable of withstanding storage temperatures from -20°C to +60°C with no degradation in its performance.

A/C Power Adapter

Feature	Specification
Type	65 W (USB-C)
Input Voltage	100–240 V AC
Input Current (maximum)	1.7 A
Input Frequency	50–60 Hz
Output Current	3.34 A
Rated Output Voltage	19.5 V DC
Temperature Range (operating)	-0°C to 50°C (0°F to +122°F)
Temperature Range (non-operating)	-20° to 60°C (-4°F to 140°F)

DC-DC Power Adapter

Feature	Specification
Power Input:	18-32 VDC
Power Output:	20 VDC
Input Fuse:	See label on input cable
Indicators:	LED on adapter (output power present)
Features:	Output short circuit protected Output current limit Internal Overtemperature shutdown Low input voltage shut down High input voltage shut down Automatic reset of safety shut down

400 Hz AC/DC Power Adapter

Feature	Specification
Input Voltage:	100-240 VAC, VDC (noted on label)
Input Fuse:	Noted on Input Cable Label
Indicators:	LED on Lighter Plug on some Models (input present) LED on Adapter (output power present)
Frequency:	47-400 Hz
Input Current:	1.5 Amperes Maximum
Output Voltage:	20 VDC
Weight/Size:	31.3 ounces / 6.0 x 1.75 x 1.75 inches
Operating Ambient Temp:	0°C to 60°C (32°F to +122°F)
Storage Temp:	-20°C to 60°C (-4°F to +140F)
Operating Rel. Humidity:	5—95% non-Condensing
Features:	Output Short Circuit Protected Output Current Limit Internal Overtemperature Shutdown (DC input only) Low Input Voltage Shutdown (DC input only) Automatic Reset of Safety Shutdown

1.6 Environmental Information

Environmental Specifications

Conditions	Specifications
Temperature — Operating	0°C to 50°C (32°F to 122°F)

Temperature — Storage	-20°C to 60°C (-4°F to 140°F)
Relative humidity (maximum) — operating	95% (noncondensing)
Relative humidity (maximum) — storage	95% (noncondensing)
Altitude (maximum) — operating	3810m (12,500 ft.)
Altitude (maximum) — non- operating	9144m (30,000 ft.)
Airborne contaminant level	G1 as defined by ISA-71.04-1985

1.7 Description of Items Furnished

Standard Accessories

The MSD-V4L kit comes equipped with the items most used in the field environment. Figures 1 and 2 describe in detail those items.



Figure 1. MSD-V4L Kit- PN 13787300.

ITEM	PART NUMBER	QTY	DESCRIPTION
1	13787308	1	MSD-V4L CONFIGURATION SHEET (INSIDE)
2	13748518	1	MSD-V4 SPARE FUSE HOLDER ASSEMBLY (INSIDE)
3	13750906	1	MSD-V4L SHOULDER STRAP (PART OF COMPUTER PROTECTIVE CASE)
4	13787302	1	MSD-V4L COMPUTER, WITH KEYBOARD AND STYLUS
5	13787301	1	MSD-V4L TRANSIT CASE
6	13787307	1	MSD-V4L QUICK START CARD
6	13748513	1	MSD-V4 ETHERNET CABLE (INSIDE POUCH)
7	13748489	2	MSD-V4 CABLE STRAIN RELIEF TIES (INSIDE POUCH)
8	13750908	1	MSD-V4L BARREL TO USB-C ADAPTER

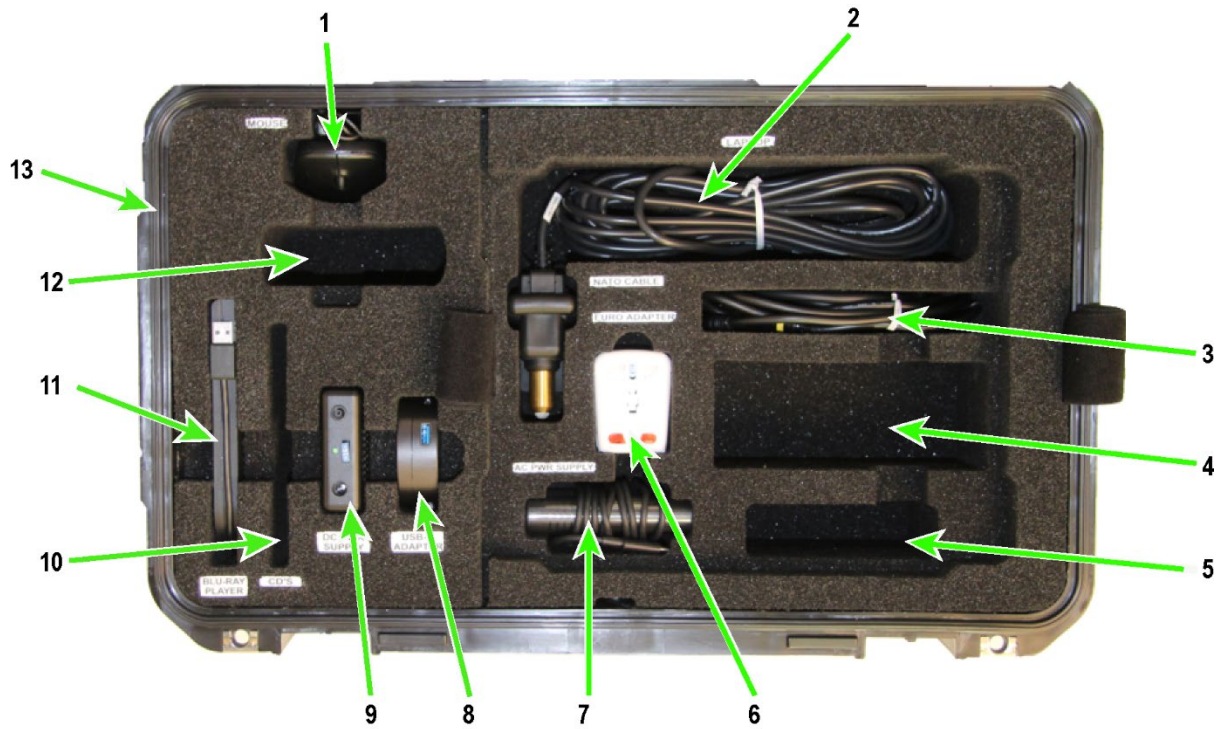




Figure 2. MSD-V4L Kit with MSD-V4L Removed.

ITEM	PART NUMBER	QTY	DESCRIPTION
1	13748515	1	MSD-V4 MOUSE
2	13748512	1	MSD-V4 NATO POWER CABLE
3	13748488 P/O 13748511	1 1	AC POWER CABLE DC OUTPUT CABLE
4		1	ADDITIONAL STORAGE SLOT
5		1	ADDITIONAL STORAGE SLOT
6	13748516	1	MSD-V4 EUROPEAN ADAPTER
7	13787298	1	MSD-V4L AC POWER SUPPLY
8	13750905	1	MSD-V4L USB-C MOBILE ADAPTER
9	13748511	1	MSD-V4 DC/DC POWER ADAPTER
10		1	CD STORAGE
11	13748514	1	MSD-V4 BLU-RAY OPTICAL DRIVE
12		1	ADDITIONAL STORAGE SLOT
13	13750914	1	MSD-V4L TRANSIT CASE

Table 1. Standard Kit Item Inventory

ITEM	PN	NSN	DESCRIPTION
	13787302	7021-01-686-8075	MSD-V4L COMPUTER
	13787306	7045-01-687-0176	RUGGED COMPUTER CASE
	13750908	6130-01-687-0193	MSD-V4L USB-C DONGLE
	13787304	5895-01-687-1035	MSD-V4L DETACHABLE KEYBOARD
	13787303	7050-01-687-1033	STYLUS AND LANYARD
	13787298	6130-01-687-0201	MSD-V4L AC POWER ADAPTER
	13748488	6130-01-676-6977	AC POWER CABLE



ITEM	PN	NSN	DESCRIPTION
	13750905	6150-01-687-1041	MSD-V4L USB-C MOBILE ADAPTER
	13748518 BK/ATM-10 BK/ATM-15 GMA-3-R	5920-01-684-7104 5920-01-611-7031 5920-01-611-7043 5920-01-659-0438	MSD-V4 SPARE FUSE HOLDER ASSEMBLY: 1. CONTAINER HINGE TOP, ROUND, 14MMHX40MM DIA, PLASTIC, WHITE 2- FUSE, BLADE, ATM, 10A, RED BK/ATM-10 2- FUSE, BLADE, ATM, 15A, BLUE BK/ATM-15 2- FUSE, CARTRIDGE, 3A, GMA-3-R
	13748489	5975-01-684-4730	MSD-V4 CABLE STRAIN RELIEF TIE
	13748516	6130-01-684-4759	MSD-V4 EUROPEAN POWER ADAPTER, 100-240 VAC
	13748515	7025-01-668-9311	MSD-V4 MOUSE
	13748514	7025-01-659-5984	MSD-V4 BLU-RAY OPTICAL DRIVE

ITEM	PN	NSN	DESCRIPTION
	13748513	5995-01-684-5770	MSD-V4 ETHERNET CABLE
	13748512	5995-01-684-7754	MSD-V4 NATO CABLE
	13748511	6130-01-684-6957	MSD-V4 DC/DC POWER ADAPTER

1.8 Additional Items and Optional Accessories

In addition to the standard inventory listed above, the MSD-V4L set may also contain one or more of the following optional accessory items that may be required to fulfill the intended mission for that MSD.

Table 2. Optional Additional Accessories.

ITEM	PN	NSN	DESCRIPTION
	13748555	5995-01-668-2169	MSD-V4 MIL-STD 1553 ADAPTER
	13748554		MSD-V4 USB HUB

ITEM	PN	NSN	DESCRIPTION
	13748547		MSD-V4 EXPRESS CARD ADAPTER W/CABLE
	13748544	5895-01-677-1752	MSD-V4 RS 232/422/485 ADAPTER KIT SERIAL CONVERTER, 13748543 SERIAL CABLE, 13748542 USB TO SERIAL ADAPTER, PE76269
	13748553		MSD-V4 PERSONAL COMPUTER MEMORY CARD INTERNATIONAL ASSOCIATION (PCMCIA) ADAPTER
	13748548	7050-01-615-8761	MSD-V4 GPIB ADAPTER
	13748546		MSD-V4 SMART CARD READER
	13748545		MSD-V4 AC/DC 400HZ POWER ADAPTER

1.9 Tools and Test Equipment

Not Applicable

1.10 Shipping and Handling Precautions

Refer to Chapter 9 for detailed shipping and handling information.

2 Preparation for Use

2.1 Quick Setup

△ CAUTION: The AC adapter works with electrical outlets worldwide. However, power connectors and power strips vary among countries. Using an incompatible cable or improperly connecting the cable to the power strip or electrical outlet may cause fire or equipment damage.



1. Remove MSD-V4L and any accessories required for the specified operation from case.
2. Using quick start card, inventory case contents and annotate any missing or broken items on DA 2404 or DA 5988-E.
3. Connect AC adapter to USB-C Port on MSD-V4L.
4. Press power button.



Figure 3. Power button, top of MSD-V4L (with cover attached).

Turning off the MSD-V4L — Windows 10

✎ NOTE: To avoid losing data, save and close all open files and exit all open programs before you turn off the MSD-V4L.

1. Click or tap .
2. Click or tap  and then click or tap Shut down.
3. Disconnect the AC adapter from the MSD-V4L. Grasp the connector end, not the cable, and pull firmly to avoid damaging the cable. When wrapping the AC adapter cable around the adapter for storage, follow the angle of the connector on the adapter to avoid damage to the cable.

Ensure that the MSD-V4L and all attached devices are turned off. If the MSD-V4L and attached devices did not automatically turn off when you shut down the operating system, press and hold the power button for about 6 seconds to turn them off.

2.2 Removing and Installing Components

2.2.1 Protective Cover

1. Ensure there are no cables or accessories connected to the MSD-V4L
2. Lay Protective Cover flat, opening facing up.
3. Inset top of MSD-V4L into top of Protective Cover at an angle.
4. Gently press MSD-V4L into Protective Cover until fully inserted. It may be necessary to gently pull out the sides of the Protective Cover to get the MSD-V4L fully inserted into the protective case.

2.2.2 Barrel to USB-C Adapter (USB-C Dongle)

The Barrel to USB-C adapter is used to connect power supplies that use a barrel-type connector to the MSD-V4L USB-C power port.

1. Connect power supply output cable to barrel connector of USB-C dongle.
2. Connect USB-C end of dongle to USB-C power port of MSD-V4L. Refer to Figure 10.

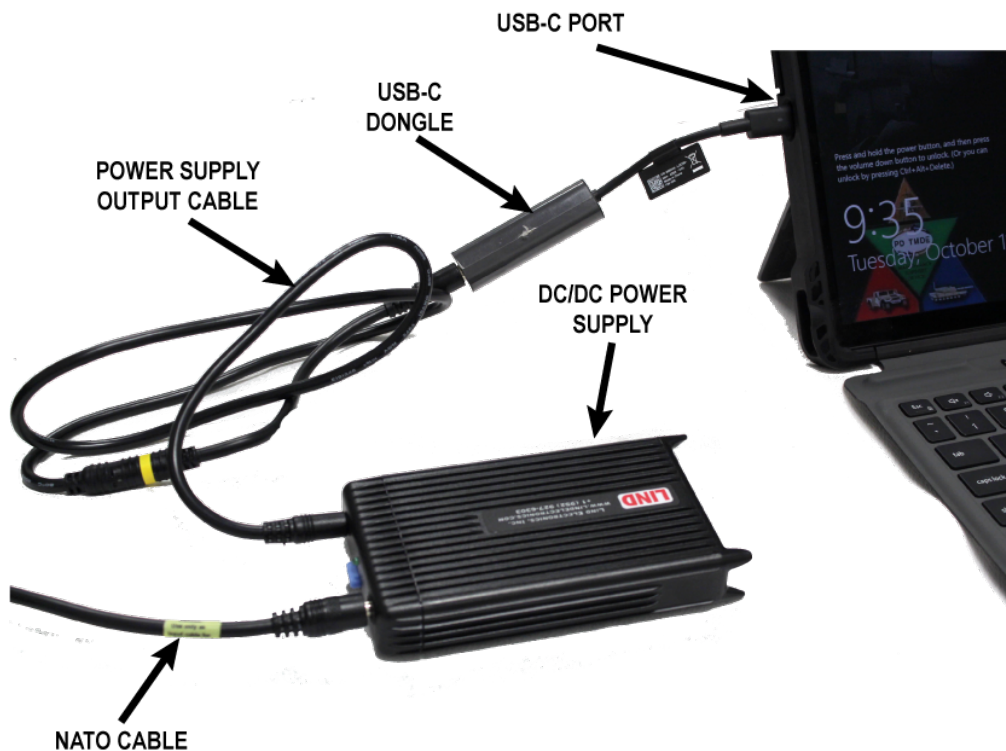


Figure 4. Connect USB-C dongle to MSD-V4L.

2.2.3 Connect USB-C Mobile Adapter

The Mobile Adapter is used to connect various types of communication busses to the MSD-V4L through a USB-C port. The mobile adapter provides the following interfaces:

- USB-A
- USB-C
- Display video- HDMI
- Display video- VGA
- Display video- DisplayPort
- Ethernet 1000- RJ-45

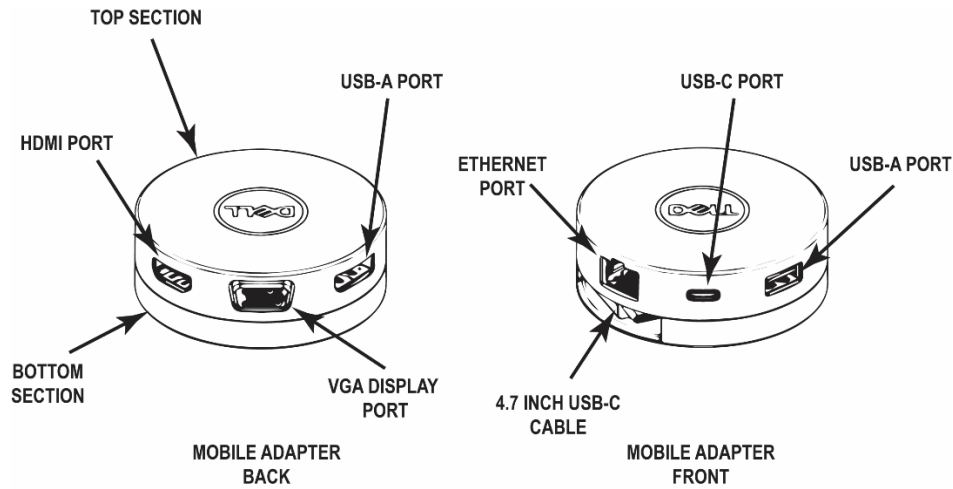


Figure 5. Mobile Adapter.

The mobile adapter connects to theMSD-V4L USB-C port using the integrated 4.7-inch cable.

Connect Mobile Adapter:

1. Hold adapter bottom with fingertips.
2. Twist adapter top section counterclockwise to extract cable.
3. Connect USB-C cable to –USB-C connector on MSD-V4L.
4. Connect additional devices or cables to mobile adapter.

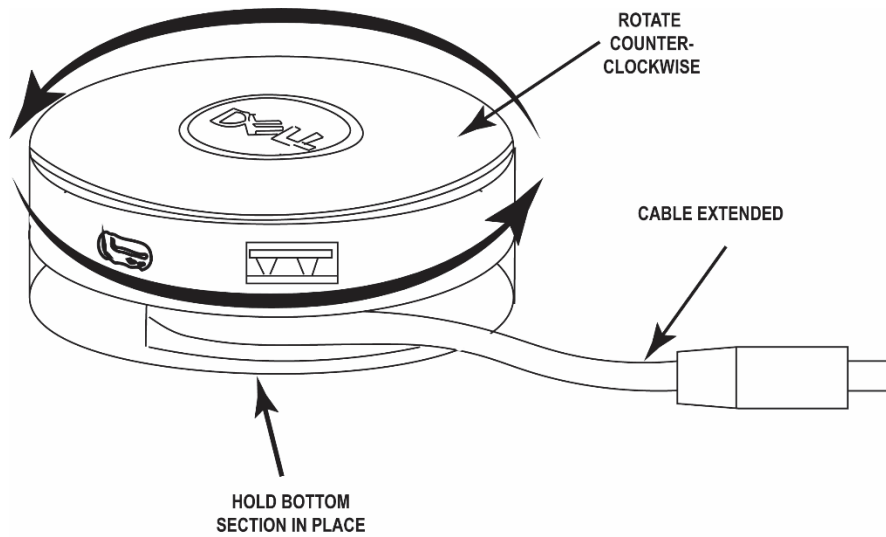


Figure 6. Extract Integrated Cable.

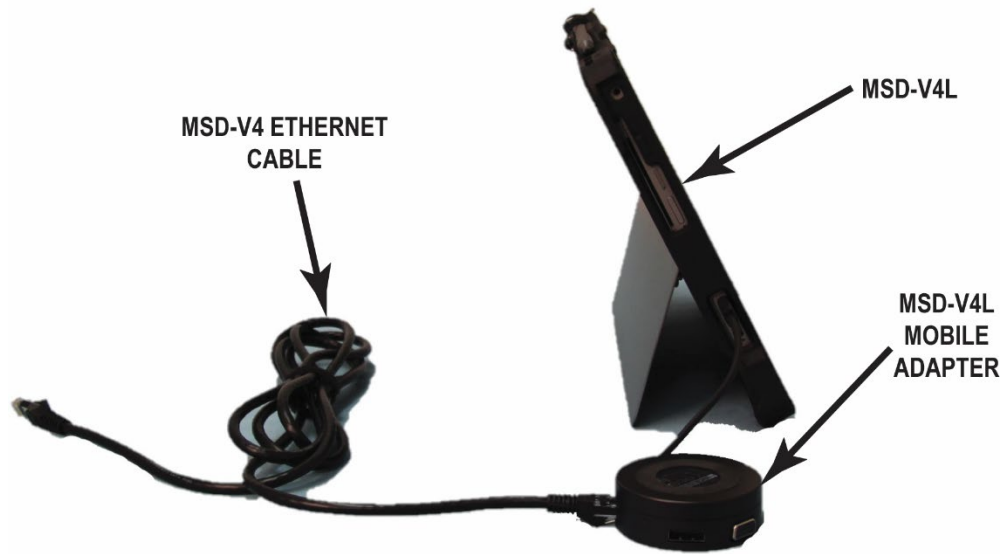


Figure 7. MSD-V4L Ethernet Connection using Mobile Adapter.

Remove Mobile Adapter:

1. Disconnect all cables from mobile adapter.
2. Disconnect adapter USB-C cable from MSD-V4L.
3. Hold mobile adapter bottom with fingertips.

Rotate top section of adapter clockwise to retract USB-C cable.

3 Theory of Operation

The MSD-V4L Test Set is composed of Commercial Off the Shelf (COTS) products that were assembled to support the military maintainer. The COTS solution allows for the US Army to update components as needed without a costly redesign. The kit also allows for items to be replaced without requiring the entire computer/kit to be returned to the maintenance facility. The kit is composed of the following: transit case, MSD-V4L computer, standard accessories, and additional storage for optional accessories. Each of the items above will be discussed in further detail throughout this manual.

Controls and Indicators- MSD-V4L

This section provides high level views of the MSD-V4L, the keyboard, function keys, and components of the MSD-V4L.



Figure 8. MSD-V4L System Front View.

- | | |
|-------------------------|---------------------------------|
| 1. Ambient Light Sensor | 2. IR Emitters |
| 3. IR/RGB Camera | 4. Front/Rear Camera Status LED |
| 5. Proximity Sensor | 6. LED Panel |



Figure 9. System Back View.

- | | |
|-----------------------|---------------|
| 1. Fingerprint Reader | 2. NFC Reader |
| 3. Rear RGB Camera | 4. Kickstand |

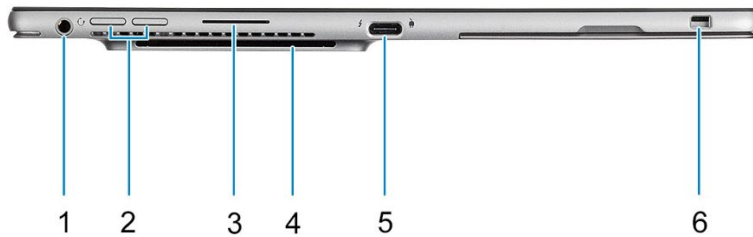


Figure 10. System Left Side.

- | | |
|----------------------------------|--------------------------|
| 1. Headset/Microphone Combo Jack | 2. Volume Up/Down Button |
| 3. Speaker | 4. Smart Card Reader |

5. USB-C Port with Thunderbolt4/Power Delivery/DisplayPort

6. Wedge-Shaped Lock Slot



Figure 11. System Right Side.

1. USB-C Port with Thunderbolt4/Power Delivery/DisplayPort
3. Micro SIM Slot (optional)

2. Speaker

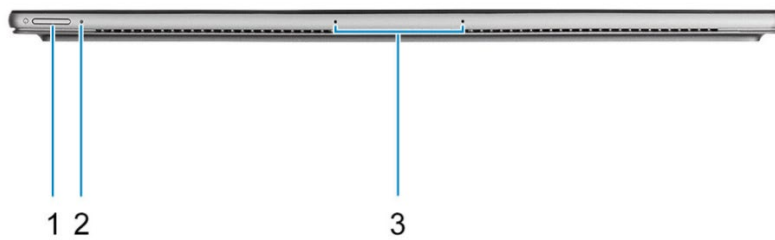


Figure 12. Top View.

1. Power Button
3. Microphone

2. Battery status/Diagnostics LED

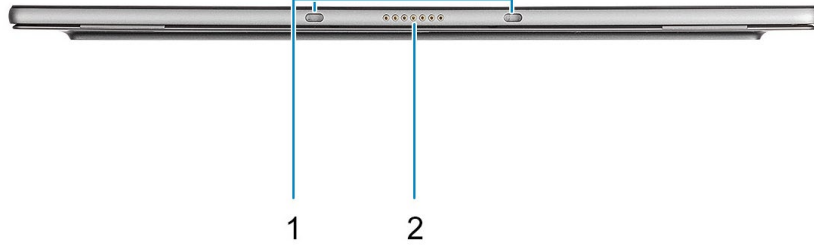


Figure 13. Bottom View.

- 1. Keyboard Docking Magnets
- 2. Pogo Connector

4 MSD-V4L Normal Operation

This section provides information on operating the MSD-V4L, the keyboard, function keys, and normal operation of the MSD-V4L.

4.1 Device Status Lights

Battery Status Light- Indicates the power and battery charge status. Blinks amber along with audible beeps to indicate a failure.

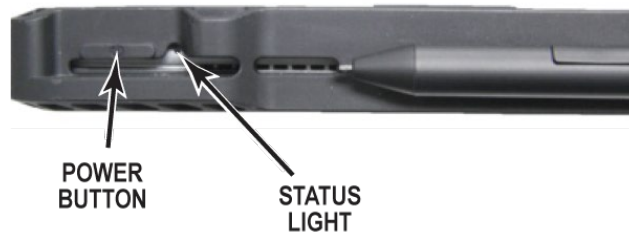


Figure 14. Battery Status Light, Top of MSD-V4L.

Table 3. LED Status

Light Color and State	Definition
Solid White	Power adapter is connected, and the battery has more than 5 percent charge (battery is charging)
Solid Amber	Computer is running on battery and has less than 10 percent charge
Off	<ul style="list-style-type: none">• Power adapter is connected, and the battery is fully charged• Computer is running on battery and the battery has more than 5 percent charge• Computer is in sleep state, hibernation, or turned off
Blinking Amber	Computer failure. See Troubleshooting Chapter for failure codes and definitions

4.2 Kickstand

The MSD-V4L has an integrated kickstand to allow the computer to free stand on a surface.

Open the kickstand- Pull bottom of kickstand away from back of MSD-V4L until it stops.

Close- Press kickstand towards back of MSD-V4L until it latches against the back of the MSD-V4L.



Figure 15. Using the Kickstand.

4.3 Keyboard

The MSD-V4L uses a detachable keyboard as an input device. The detachable keyboard is backlit and has a QWERTY key layout.

Attach/Remove Keyboard

Attach:

1. Place keyboard against MSD-V4L screen with keys facing MSD-V4L. The keyboard will magnetically latch to the MSD-V4L screen.
2. Fold down POGO pin connector of keyboard until it magnetically attaches to POGO pins on bottom of MSD-V4L.
3. Open keyboard from MSD-V4L screen to expose keys.

Remove:

1. Close keyboard by folding it to the MSD-V4L screen until it magnetically latches to screen.
2. Pull keyboard connector away from MSD-V4L bottom.
3. Pull keyboard from MSD-V4L screen.

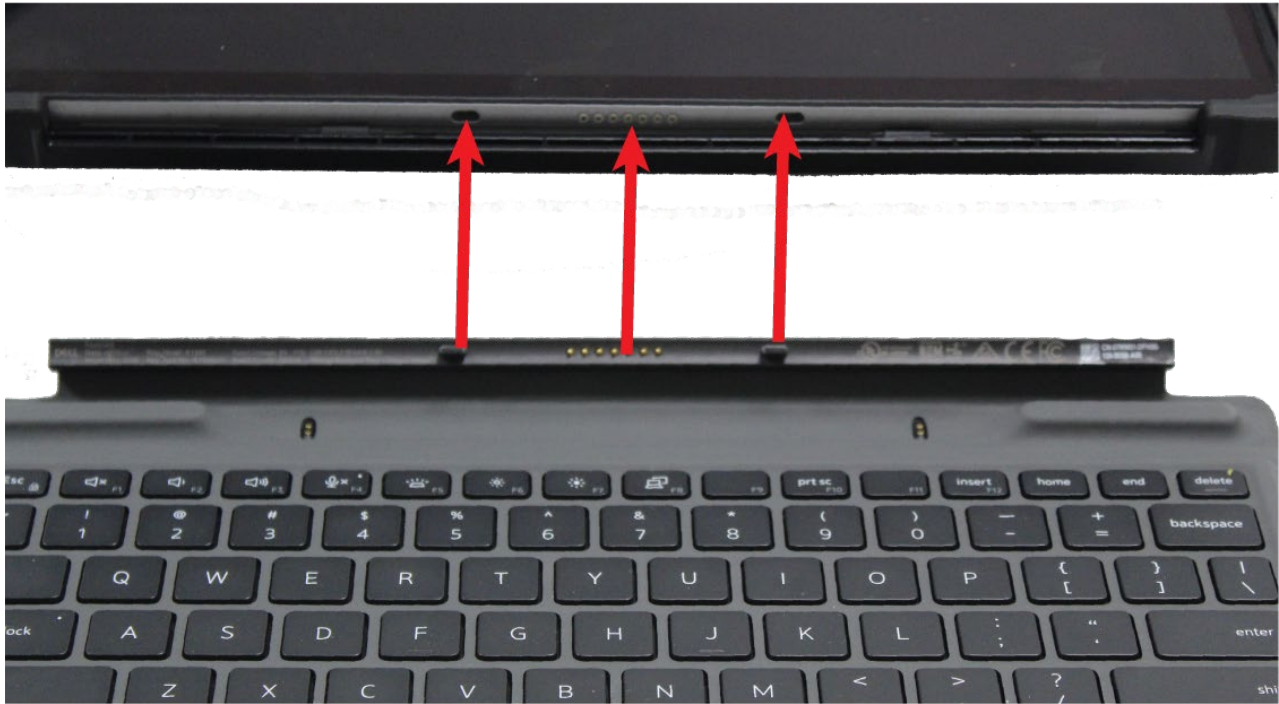


Figure 16. Keyboard POGO Connector and Guides.

Keyboard Backlight

Press Fn+F5 to turn on keyboard backlight. Repeat to cycle through the brightness levels. The backlight brightness changes between low and high. The backlight will fade off after 10 seconds of inactivity.



Figure 17. Keyboard Backlight.

4.4 Function Fn Key Lock Features

The keyboard has Function key Fn lock capability. When activated, the secondary functions on the top row of keys become default and will not require use of the Fn key.

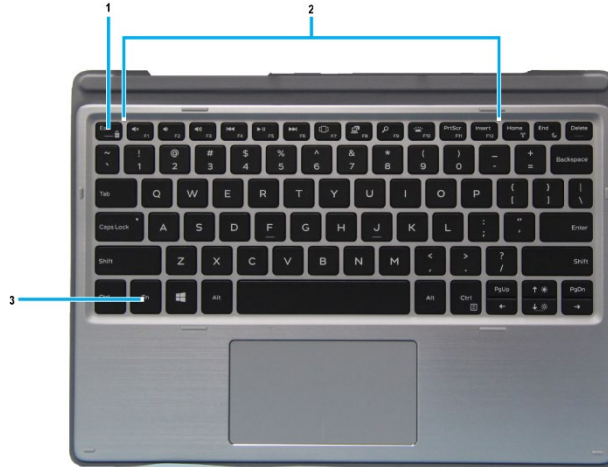


Figure 18. Fn Key Callouts.

1. Fn lock Key
2. Affected Fn Keys
3. Fn Key

NOTE: Fn lock affects only the above keys (F1 to F12). Secondary functions will not require the Fn key to be pressed while enabled.

4.5 Enable/Disable Wireless (Wi-Fi) /Airplane Mode Feature

1. Press **Fn + PrtScr** to enable wireless networking.
2. Press **Fn + PrtScr** again to disable wireless networking.



Figure 19. Enable Wireless Feature.

4.6 Install Shoulder Strap

The MSD-V4L shoulder strap attaches to the protective cover. It is adjustable in length.

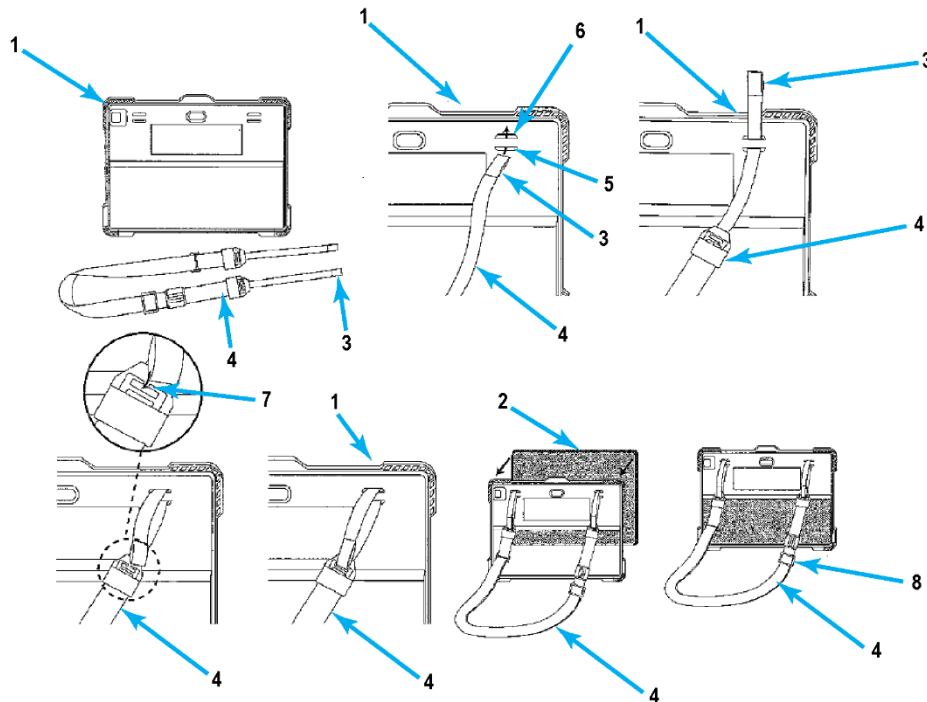


Figure 20- Install Shoulder Strap.

Install Shoulder Strap:

1. Remove protective cover from MSD-V4L if installed.
2. Remove shoulder strap from MSD-V4L transit case (see **Figure 1**).
3. From rear of protective cover (1) feed end (3) of shoulder strap (4) through the bottom slot (5) of protective cover (1).
4. Feed end (3) of shoulder strap through top slot (6) of protective cover (1).
5. Attach end of shoulder strap (3) to slotted buckle (7).
6. Repeat steps 3 thru 5 for other side of shoulder strap.
7. Install protective cover on MSD-V4L.
8. Adjust length of shoulder strap (4) for comfortable fit using buckle (8).

Remove Shoulder Strap:

1. Remove protective cover (1) from MSD-V4L (2).
2. Remove end (3) of shoulder strap (4) from slotted buckle (7).
3. Feed end (3) of shoulder strap through top slot (6) of protective cover (1).

4. Feed end (3) of shoulder strap through bottom slot (5) of protective cover (1).
5. Perform steps 2 thru 4 for other side of shoulder strap.
6. Install protective cover back on MSD-V4L (paragraph 2.2.1).
7. Store shoulder strap in transit case (see **Figure 1**).

4.7 Strain Relief Cable Tie

Use the strain relief cable tie when any accessory is connected to the MSD-V4L using a USB or serial cable. The strain relief cable tie prevents accidental disconnection of a cable during operation. Accidental disconnection of cables can result in damage to equipment.

Connect Strain Relief:

1. Connect shoulder strap to MSD-V4L.
2. Connect device cable to MSD-V4L. Refer to appropriate chapter of this manual for proper device connection.
3. Use strain relief cable tie to secure device cable to MSD-V4L carry case shoulder strap.
 - a. Wrap strain relief around shoulder strap ring and device cable.
 - b. Slide end through slot and slide slotted end down until strain relief is snug around device cable.

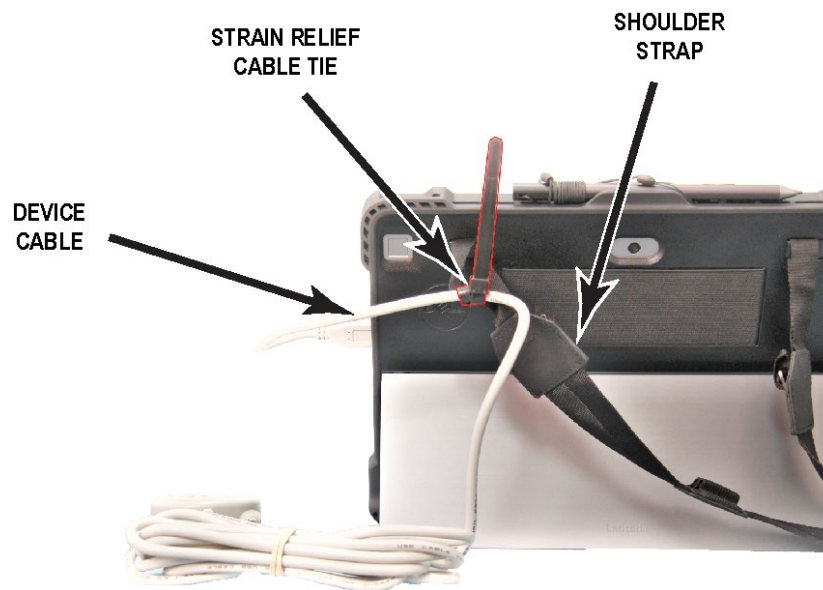


Figure 21. Strain Relief Cable Tie.

Remove Strain Relief from MSD-V4L:

1. Press and hold release tab.
2. Slide slotted end out and off straight end of strain relief cable tie.

5 Standard Accessories- Normal Operation

The test set comes with the following accessories as standard to use the MSD in most field conditions and applications. Additional accessories may be included in the test set, according to the intended application of the MSD.

5.1 NATO Power Cable

The NATO power cable is designed to allow the MSD-V4L to be powered through the NATO connector of a vehicle. The NATO Power Cable is connected between the vehicle and the DC/DC power supply.



Figure 22. NATO Power Cable.

Using NATO Power Cable

⚠ WARNING: Shock Hazard: Improper connection of the NATO connector can result in serious injury or death from shock. DO NOT touch NATO plug conductor while it is connected to a receptacle.

1. Connect NATO cable to DC/DC power supply input jack. Ensure connector is fully inserted into receptacle. No center conductor should be exposed when properly connected.

Proper insertion, no exposed conductor

NATO plug not inserted properly, shock hazard

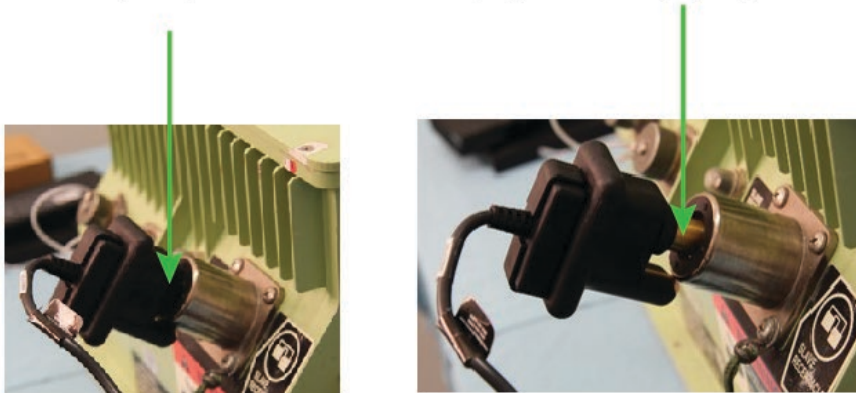


Figure 23. Proper NATO Connection.

2. Locate NATO port on vehicle and connect NATO power cable to NATO connector.
3. Apply power to NATO connector in accordance with the vehicle's normal operating procedures.

5.2 DC/DC Power Adapter

⚠ CAUTION: DO NOT Jump start vehicle with the MSD connected. Many jump start systems use high voltage and can damage the MSD or adapter.

The DC/DC Power Adapter is designed to power the MSD-V4L and to charge its internal battery from an appropriate DC voltage power source (see adapter label for acceptable DC voltage ranges). The adapter supplies current and voltage levels as required by the MSD-V4L.

The adapter provides safe power to the MSD-V4L by protecting it from spikes and power surges which may occur in a DC voltage electrical system.

Use only with Information Technology (IT) equipment. Protection Class III.

Operating Instructions



Figure 24. DC/DC Power Adapter Connections.

1. Connect NATO power cable to input cable jack (see **Figure 21**).
2. Connect output cable to output cable jack (see **Figure 21**).
3. Connect NATO cable to power source (See paragraph **4.1**).
4. Check output present LED and ensure it is lit (see **Figure 21**).
5. Connect output cable to barrel connector of barrel to USB-C adapter (see **Figure 22**).
6. Connect USB-C adapter to USB-C power port of MSD-V4L (see **Figure 22**).

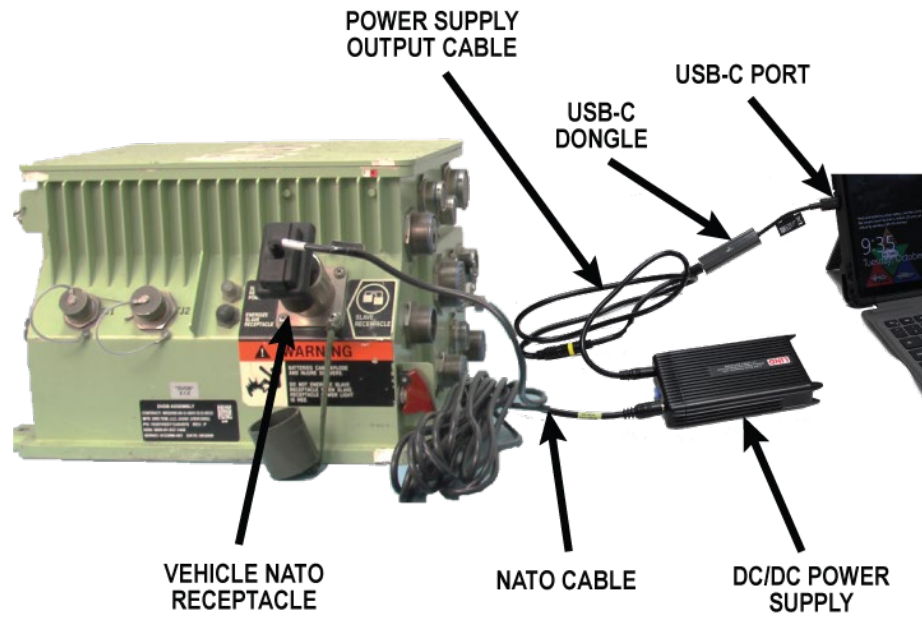


Figure 25. DC/DC Power Supply Hookup.

NOTE: This adapter utilizes components that may degrade if stored unused for several years. Apply power for several minutes yearly to avoid problems.

5.3 European Adapter

The MSD-V4 European Adapter with USB power port allows you to power up and charge up the gear at the same time. The AC POWER and USB Status LED lights indicate ON/OFF status respectively. It is designed to fit UK, US, AU, and EU styled outlets. The USB port is compatible with both 100-125 and 220-250 VAC standards.

CAUTION: The AC POWER port does not convert power voltage. Please ensure the electronics adapter is rated to handle both 100-125- and 220-250-volt standards. Damage to equipment will occur if the adapter is not rated for the voltage standard in use.

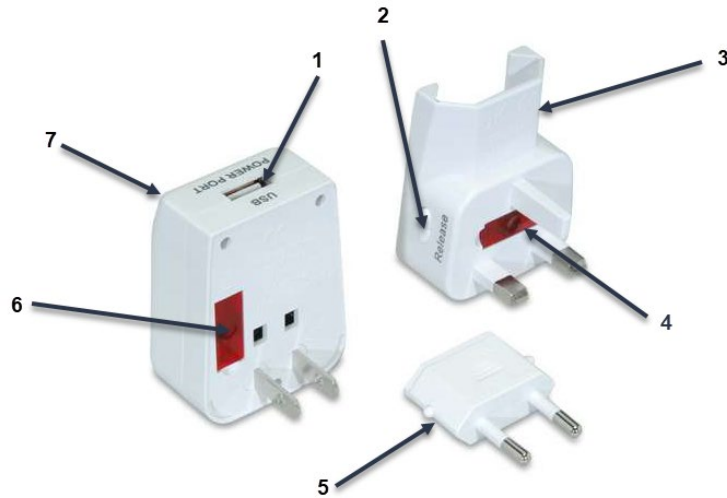


Figure 26. European Adapter (Disassembled).

Find number	Description
1	USB port
2	Release button- releases Plug-UK from Plug-US
3	Plug-UK
4	Replacement fuse compartment with supplied spare fuse
5	Plug-EU
6	Power Fuse
7	Plug-US

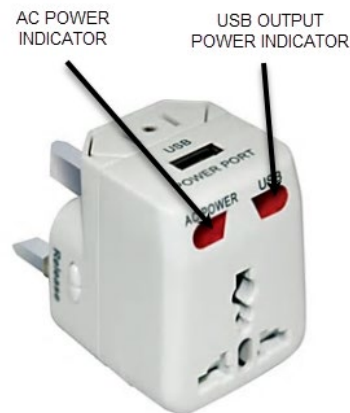


Figure 27. European Adapter Power Indicators.

5.3.1 Configure European Adapter for Use

1. Press the release buttons on both sides of the adapter assembly simultaneously to separate Plug-UK from Plug-US.



Figure 28. Separate UK-US plugs.

2. Pull plug-EU out from socket in plug-UK as shown in Figure 28 to separate the plug-EU from Plug-UK.



Figure 29. Separate Plug-EU from UK plug.

5.3.2 Configure US Plug for AUS (Australia)

1. Insert one pin at a time into the plug-EU as shown.
2. Use the plug-EU to rotate and adjust pins for US or AUS standard use.

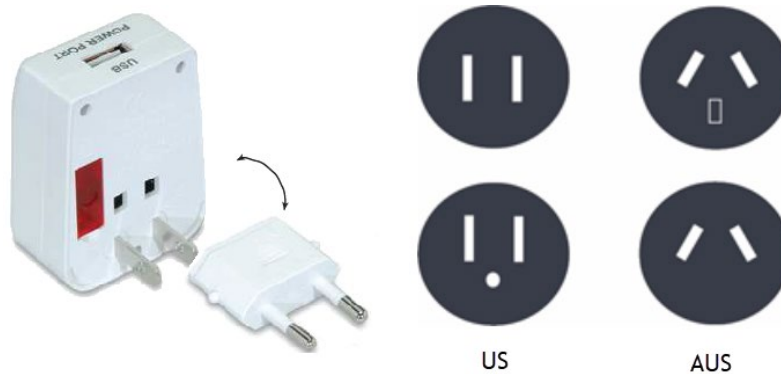


Figure 30. US-AUS pin configuration.

3. Connect power cord or USB cord to adapter (see Figure 31).

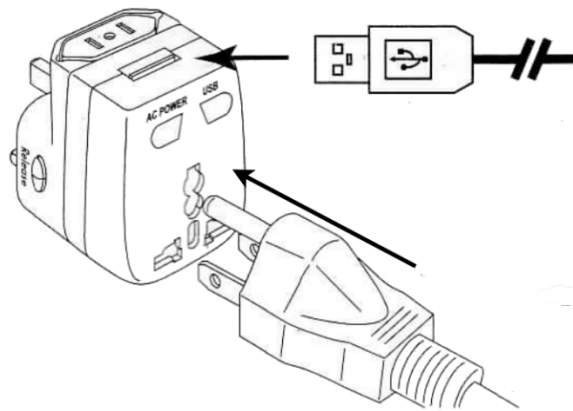


Figure 31. Connect to Adapter.

5.4 Blu-Ray Optical Drive

The Blu-ray allows users to burn, store and transfer data files – up to 128 GB capacity on a single BDXL format disc.

Controls and Indicators

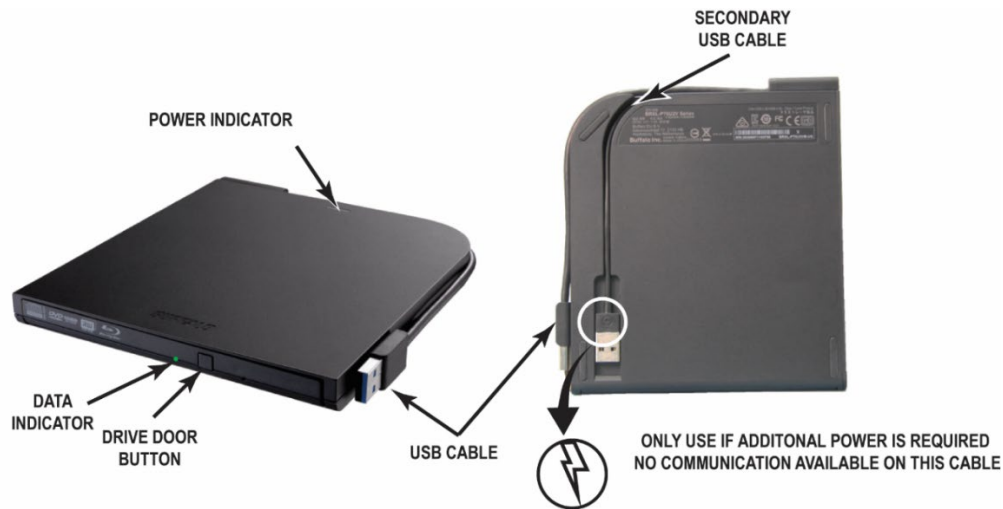


Figure 32. BD Drive Controls and Indicators.

Connecting the BD Drive to the MSD-V4L

1. Power up the MSD-V4L.
2. Connect USB-C mobile adapter to MSD-V4L.
3. Pull the USB cable out of stowage on the BD drive body (Figure 29). Do not use the USB cable located on the bottom of the BD drive unless directed.
4. Connect USB cable to USB-A port on the USB-C mobile adapter.
5. The power indicator will glow green when the drive is initialized and properly powered.
6. Press drive door open to open the BD disk tray.
7. Insert disk -label up- onto tray, ensuring disc snaps into place.
8. Press tray to slide it into the BD drive until it clicks closed.
9. Follow on-screen instructions.

10. Press door button to open the disk tray and remove the disc.

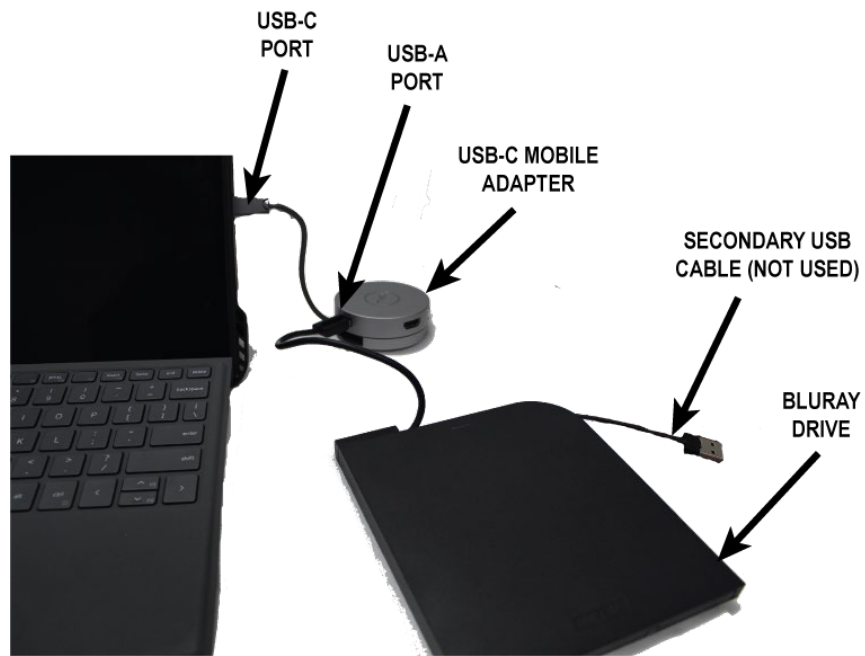


Figure 33. BD Drive Connection to MSD-V4L.

Specifications

Interface	
Standard Compliance	USB 2.0
Connector Type	Device: Micro-B / PC: Type A
Performance	Max 480 Mbps
Read / Write Speeds	
Blu-Ray Disc	
BD-R SL/DL	6x/6x
BD-R TL/QL	4x/4x
BD-RE SL/DL	6x/2x
BD-RE TL	4x/2x
BD-ROM SL/DL	6x Read
DVD	
DVD-R SL	8x/8x
DVD-R DL	8x/6x
DVD+R SL	8x/8x
DVD+R DL	8x/6x
DVD-RW	8x/6x
DVD+RW	8x/8x
DVD-RAM	5x/5x
DVD-ROM SL/DL	8x Read
DVD-VIDEO SL/DL	4x Read
CD	
CD-R	24x/24x
CD-RW	24x/16x
CD-ROM	24x Read
Audio CD/Video CD	10x Read
Other	
Enabled devices	USB3.0/2.0 Windows PC, Mac (Intel processor model), Surface Pro 3 (with power supply)
Supported OS	Windows® 10, Windows® 8.1, Windows® RT 8.1, Windows® 8, Windows® RT, Windows® 7, Windows® Vista, Mac OS® X 10.8 or later
Included Software	Cyberlink Media Suite (Power2Go 8, PhotoDirector 4 LE, PowerMediaPlayer, MediaShow 6 Trial), Adobe Reader
Dimensions (WxDxH)	138 x 14.4 x 152 mm (W x H x D)
Weight	220 grams
Operating environment	5–35°C, 20–80% (non-condensing)
Power consumption	~ 7.5 W
Power supply	USB Bus Powered

5.5 Active Pen Stylus

The PN556W Active Pen is a pressure-sensitive stylus device for the MSD-V4L. It provides enhanced writing and input capabilities that a passive stylus would not on a touchscreen tablet device.

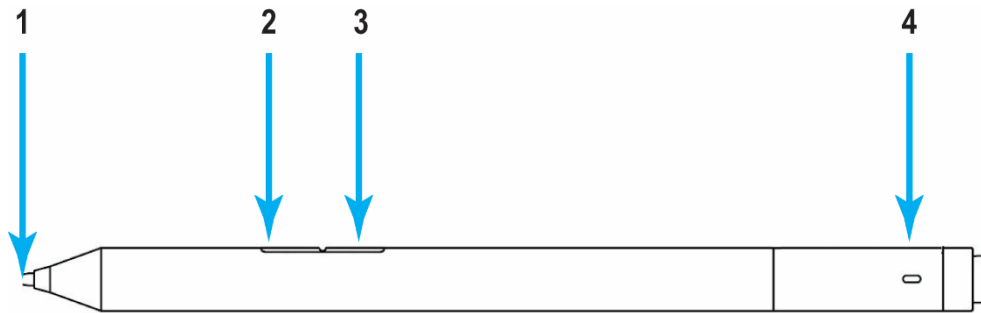


Figure 34. MSD-V4L Active Pen Stylus.

- | | |
|------------------------|------------------------|
| 1. Tip | 2. Lower barrel button |
| 3. Upper barrel button | 4. Top cover |

Functions

Feature	Functionality
Tip	Move tip over touch screen to move pointer. Use the tip to write, draw, or select objects.
Bottom barrel button	Press and hold while moving the tip over area to erase objects
Tom barrel button	Press to open context menu or perform a right-click function.
Top cover	Remove to change AAAA battery

Setup

There is no initial setup required to use the Active Pen.

6 Optional Accessories

The MSD-V4L kit can include a combination of the following optional accessories, appropriate for the intended mission of the test set.

NOTE: Some of these devices may require software or drivers to be installed in order to work with the MSD-V4L. Contact your system administrator for any actions requiring software changes to the MSD-V4L.

6.1 MSD-V4 MIL-STD-1553 Adapter

The MIL-STD-1553 to USB interface cable allows the MSD to communicate on a MIL-STD-1553 bus via USB interface.



Figure 35. 1553-USB Interface Cable.

Using the MIL-STD-1553 to USB Interface Cable

NOTE: While the USB connector can be plugged in with the MSD power on or off, it is preferred that the interface cable be connected to the USB port prior to powering on the MSD.

1. Connect mobile adapter to the MSD-V4L. Refer to Figure 6.
2. If needed, connect mobile adapter to MSD-V4L. Refer to paragraph 4.3.
3. Connect MIL-STD-1553 to USB interface cable to USB port.

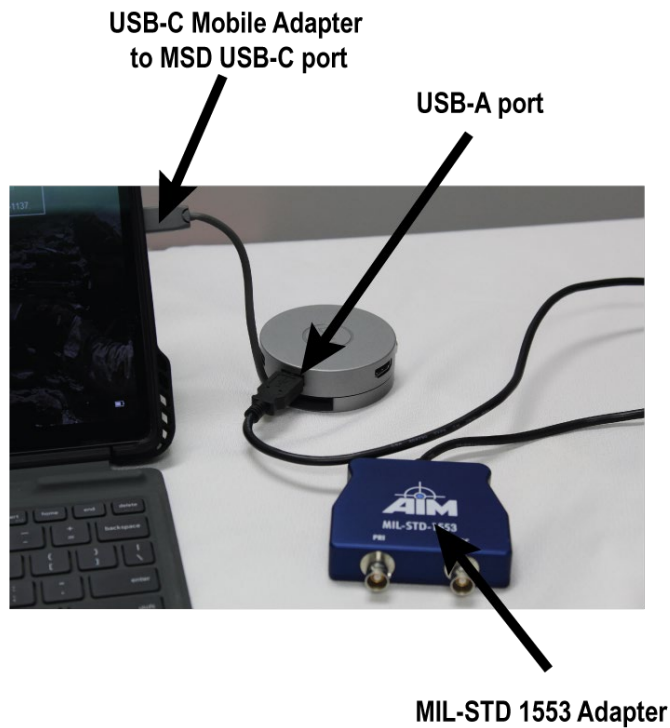


Figure 36. MIL-STD-1553 to USB Connection.

4. Ensure the MIL-STD-1553 to USB interface cable power light is illuminated.

1553 POWER LIGHT



Figure 37. MIL-STD-1553 to USB Interface Power Light.

6.2 MSD-V4 USB Hub

The USB hub can be used when more USB 3.0 ports are required for a task. The USB-C mobile adapter must be used in conjunction with the USB hub (see Figure 38).

1. Connect USB-C mobile adapter to the MSD-V4L.
2. Connect USB hub cable connector to a USB-A port on the USB-C mobile adapter.
3. Connect required device to USB hub.
4. Press button above selected port on hub to activate that USB port.

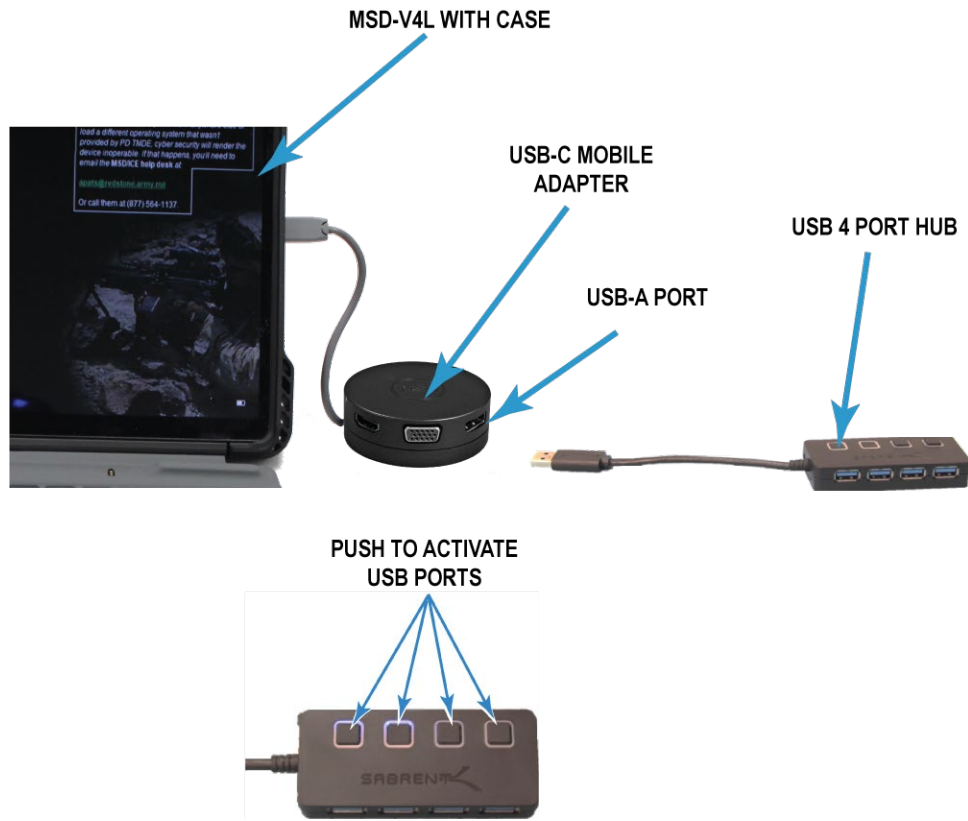


Figure 38. USB 4 Port Hub Connection.

6.3 Express Card Adapter

The Express card adapter works with USB-based Express cards. It allows for hot-swap (connect/detach devices without turning off the system) and is USB 2.0 compliant.

The Express card adapter is a USB-A device, so the mobile adapter must be used to connect it to the MSD.



Figure 39. Express Card Adapter.

 **NOTE:** While the USB connector can be plugged in with the MSD power on or off, it is preferred that the interface cable be connected to the USB port prior to powering on the MSD.

Using the Express Card Reader

Install:

1. Connect mobile adapter to MSD-V4L (refer to paragraph 4.3).
2. Connect Express card adapter to USB-A port on the mobile adapter.
3. Insert Express card gently into the Express Card slot of the adapter until it stops.

Remove:

1. Gently pull Express Card out of Express Card reader.
2. Disconnect Express card reader from the mobile adapter.

6.4 AC/DC 400Hz Power Adapter

The AC/DC 400Hz Power Adapter is used to provide power to the MSD-V4L using various AC and DC power voltage and frequencies. Refer to Chapter 1.5 for technical information on the power output.

The power adapter features:

- Rugged construction allows use in tough operating environments.
- Sealed and potted to resist moisture and high humidity.
- Output: 20 VDC.
- Extended life of the device battery by using DC power in mobile devices.
- Replaceable input and output cables (most models).
- Operation over wide temperature range.
- Short circuit protection.
- Output overvoltage and overcurrent protection.

When using the ruggedized combination AC/DC adapter, follow these precautions:

- When using the AC power input, only use the provided cables.
- The rated AC input voltage is between 90 VAC and 264 VAC at 47 to 400 Hz. The input voltage need not be changed with a transformer or the like.
- Never attempt to disassemble or modify the adapter. In the event of failure, turn in adapter.
- Never use a multi-plug adapter to plug multiple power plugs in the same outlet.
- The metal case of the adapter can get hot during normal use, particularly when operating in high ambient temperatures. Use caution when handling and mounting the adapter.

- Do not cover or restrict airflow around adapter in any manner. Excessive adapter temperature may result.
- Do not damage, stretch, or excessively bend the power cord. A fire or electric shock may result.
- If you detect smoke or unusual smell, turn the device off and unplug the power plug immediately.
- When unplugging the power plug, grasp the plug, not the cord. Pulling the cord forcibly can damage the cord and consequently cause a fire or electric shock.
- Never attempt to plug or unplug the power plug or the connector of the AC adapter when the hands are wet. An electric shock may result.

Operating Instructions

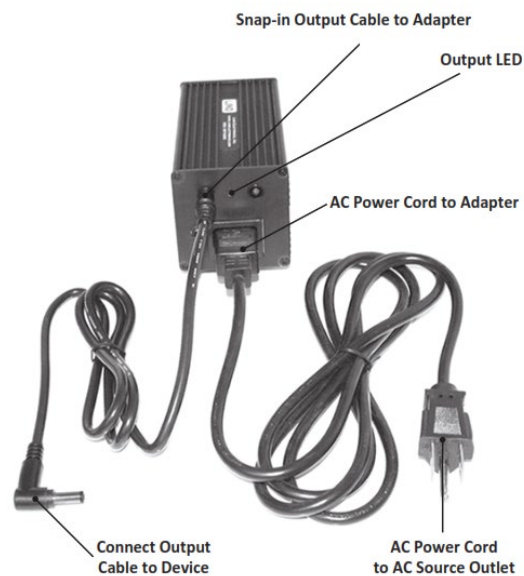


Figure 40. Power Supply with AC Input.

To connect the AC/DC 400Hz Power Adapter to the system from an AC voltage source:

1. Firmly plug the snap-in connector of the DC output cable into adapter output jack.
2. Plug the connector of the DC output cable into the barrel connector of the barrel to USB-C adapter (see Figure 41).
3. Plug barrel to USB-C adapter into the USB-C port of the MSD-V4L (see Figure 10).
4. Plug the AC power cord into the power adapter (see Figure 40).
5. Plug the outlet end of the AC power cord into the AC wall outlet.
6. Confirm that the green “Output Present” LED is on, and that power is now being supplied to the device (see Figure 40).

This connection sequence may be altered without an effect on operation.

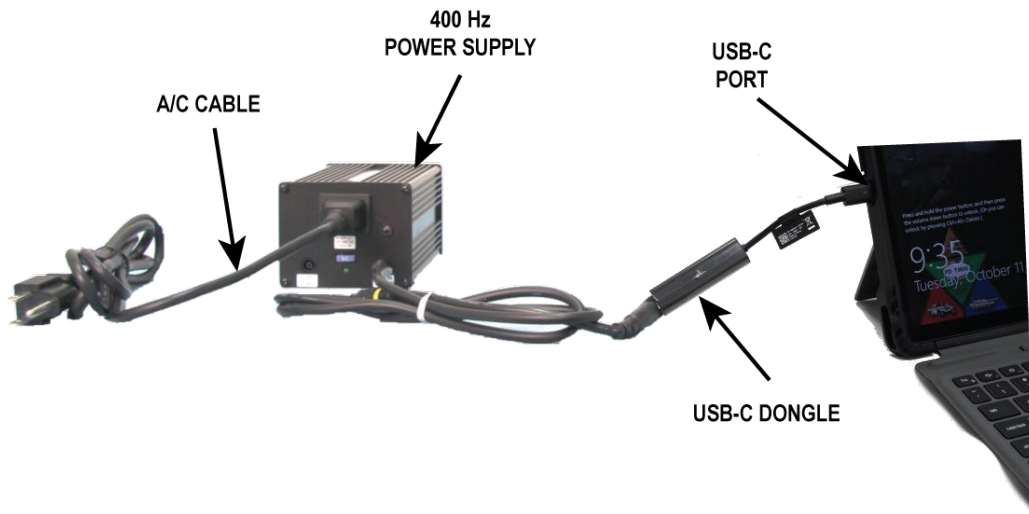


Figure 41. 400Hz Power Adapter Hookup.

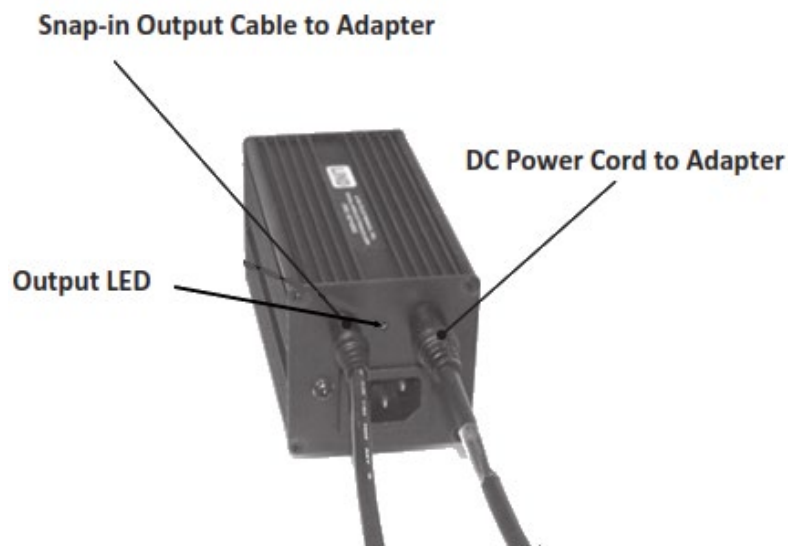


Figure 42. Power Supply with DC Input.

To connect the AC/DC 400Hz Power Adapter to the system from a DC voltage source (Figure 42):

1. Firmly plug the snap-in connector of DC output cable into adapter output jack.
2. Plug the connector of the DC output cable into the barrel connector of the barrel to USB-C adapter (see Figure 41).
3. Plug barrel to USB-C adapter into the USB-C port of the MSD-V4L (see Figure 10).
4. Insert the supplied NATO DC input cable into the power adapter.
5. Insert the supplied NATO DC input cable into the NATO DC voltage source.

6. Confirm that the green “Output Present” LED is on, and that power is being supplied to the device from the DC source. This connection sequence may be altered without an effect on operation. You can now use the system with the power supplied by the adapter.

6.5 GPIB Adapter

The GPIB adapter allows the MSD-V4L to communicate with equipment using the General-Purpose Interface Bus (GPIB) protocol. It converts the bus traffic from GPIB to USB serial and vice versa.

Installation:

1. Power on MSD-V4L.
2. Connect GPIB adapter directly to USB 3.1 port on MSD-V4L.
3. Connect GPIB connector to system interface.

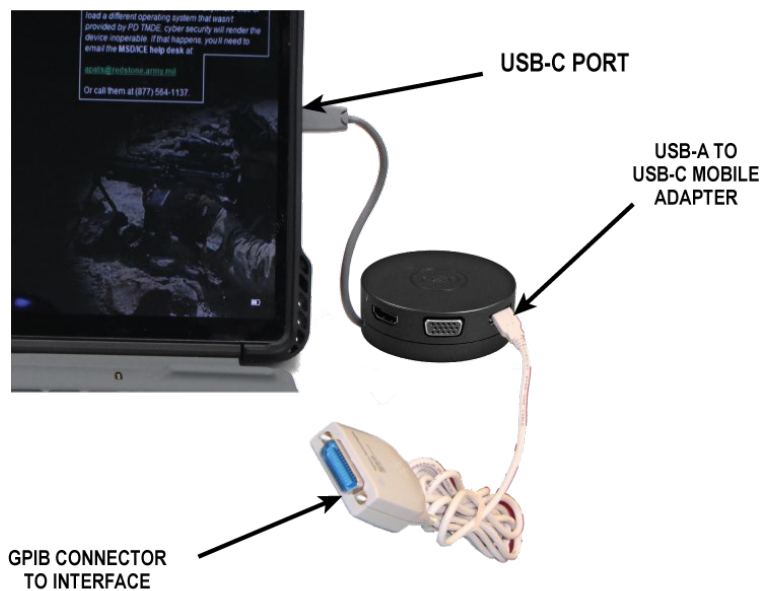


Figure 43. GPIB Adapter Hookup.

Removal:

1. Disconnect GPIB adapter from system interface.
2. Disconnect GPIB adapter from MSD-V4L USB port.

6.6 RS232/422/485 Adapter

The RS232/422/485 Adapter may be used in applications where communication across different RS-232/422 busses is necessary. Used with a DB-9 extender cable, it converts RS-232 traffic from the MSD-V4L to RS422/485 data, and vice versa.

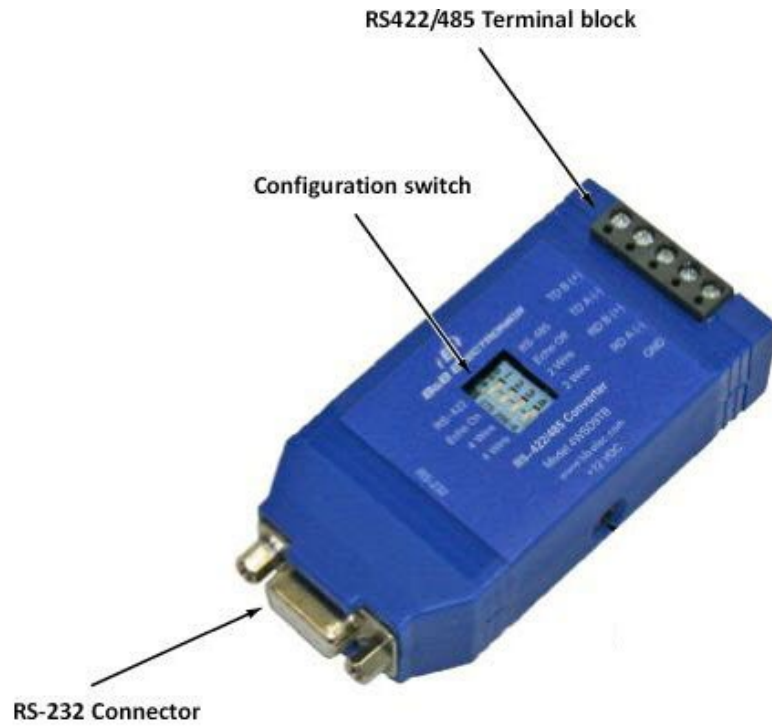


Figure 44. RS232/422/485 Adapter.

Using the RS232/422/485 Adapter

1. Set adapter configuration switches as needed for the intended application.

SWITCH SETTINGS RS-485 2-Wire Half-Duplex		SWITCH SETTINGS RS-485 4-Wire Full-Duplex		SWITCH SETTINGS RS-422 4-Wire Full-Duplex	
SWITCH #	POSITION	SWITCH #	POSITION	SWITCH #	POSITION
1	RS-485	1	RS-485	1	RS-422
2	Echo Off	2	Echo On	2	Echo On
3	2-wire	3	4-wire	3	4-wire
4	2-wire	4	4-wire	4	4-wire

Figure 45: Configuration Switch Settings

2. Connect output cable to the terminal block according to the mode in which it will be used.

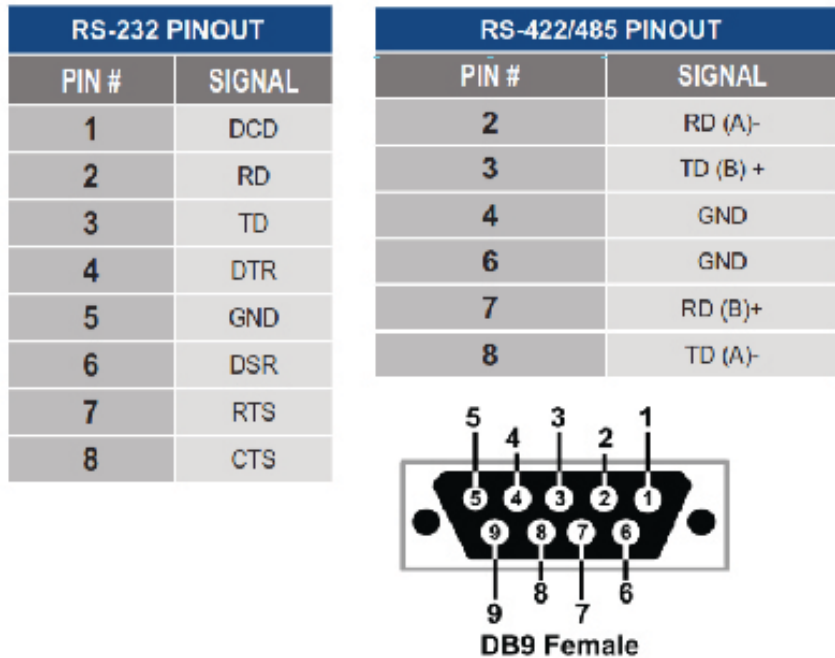
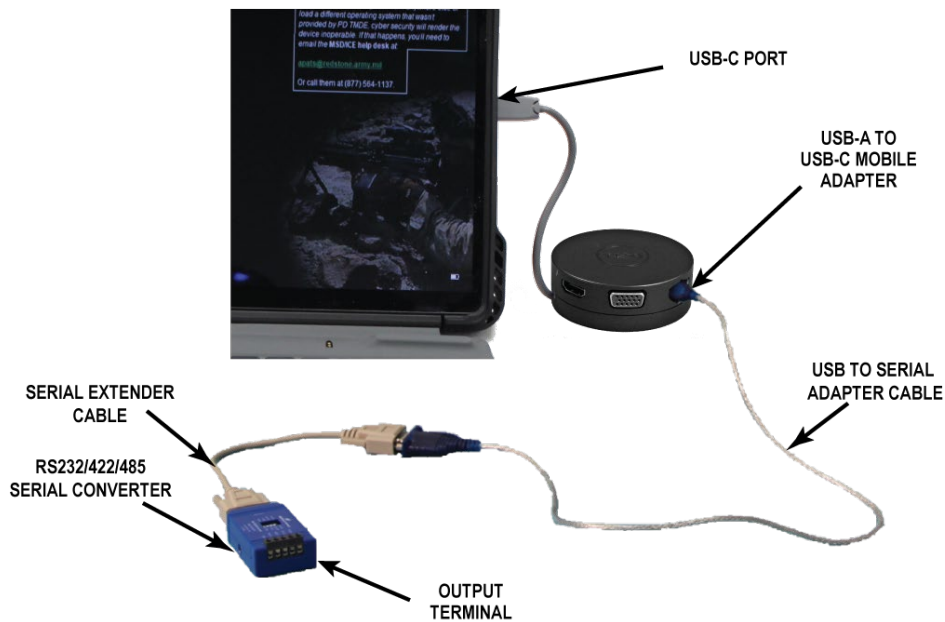


Figure 46. Terminal Block Pinouts.

3. Connect serial extender cable to RS232/422/485 Adapter.
4. Connect USB to Serial (9-pin) adapter to USB port on MSD-V4L.



5. Connect USB to Serial (9-pin) adapter to extender cable.
6. Follow on-screen instructions or instructions from system or test set being supported.

7 Troubleshooting

The MDS-V4L is under warranty. Refer to Chapter 11 of this manual for warranty repair process.

7.1 Troubleshooting the MSD-V4L

Using the table below, locate the appropriate symptom or symptoms, and perform corrective action listed in the corrective action column.

Table 4. MSD-V4L Symptoms and Corrective Actions.

Symptom	Corrective action
Battery Charging Problems	<p>NOTE: The battery should be charged while the system is off for faster charge time. Longer charge times may occur when the system is turned on and running graphics-intensive applications.</p> <ul style="list-style-type: none"> • Check connections between system and power supply. Reseat any loose connections • Switch to different power supply and check for correct charging. If the battery begins charging, the power supply that was removed may be faulty • If fault persists, turn in MSD for warranty repair (refer to Chapter 11)
No Power, or System Does Not Power Up	<ul style="list-style-type: none"> • Connect power supply to the MSD and check that the system has a power light • If the system has no power light, make sure that it is plugged into AC power and that AC power is present at the outlet • If using DC power supply, ensure DC power supply input indicator is lit. Correct connections if needed and check MSD again for power light • Remove all accessories and peripherals from the system, reconnect the AC adapter to the system and try again • Turn in MSD for warranty repair (refer to Chapter 11)
Display Does Not Show, or is Garbled	<ul style="list-style-type: none"> • If the screen is not displaying any video, connect an external monitor to eliminate a Power on Self-Test (POST) no-POST problem. A good image on the external monitor eliminates a video card problem or a POST problem • If screen has color problems, lines that should not be there, or burned-out pixels, turn in MSD for warranty repair (refer to Chapter 11)
Touch Pad and Keyboard	<ul style="list-style-type: none"> • Connect external mouse, or keyboard if available. • Check pogo connector on MSD and keyboard for debris. Clean connectors and retry • Turn in keyboard for warranty repair (refer to Chapter 11)

Symptom	Corrective action
Issues using touchscreen, or cannot access items near the edge of the screen	<ul style="list-style-type: none"> • Perform touchscreen calibration procedure (7.4) • If touchscreen calibration procedure fails to correct the problem, turn in MSD for warranty repair (refer to Chapter 11)

7.2 DC/DC Power Adapter

Table 5: DC/DC Power Adapter Symptoms and Corrective Actions.

Symptom	Corrective action
The output LED on the adapter does not light when plugged in	<ul style="list-style-type: none"> • It is possible that one of the safety shut down circuits in the adapter has tripped. If so, allow the automatic reset to restore the output power for the adapter • Visually check the adapter fuse for damage. Also check fuse for continuity using multimeter. Replace fuse if it shows signs of damage or multimeter reads as open • If adapter does not reset, or fuse checks as ok, turn in DC/DC power adapter. Refer to warranty procedures (Chapter 11)
Adapter gets warm during normal use	Restricted air flow around the adapter may cause the adapter to overheat and shut down. This is a safety feature and does not harm the adapter or the MSD-V4L. Do not place the adapter in an air flow restrictive area or cover it with anything that prevents the heat from dissipating

7.3 AC/DC 400 Hz Power Adapter

Table 6: AC/DC 400 Hz Power Adapter Symptoms and Corrective Actions.

Symptom	Corrective action
The output LED on the adapter does not light when plugged in	<ul style="list-style-type: none"> • It is possible that one of the safety shut down circuits in the adapter has tripped. If so, allow the automatic reset to restore the output power for the adapter • Visually check the adapter fuse for damage. Also check fuse for continuity using multimeter. Replace fuse if it shows signs of damage or multimeter reads as open. • If adapter does not reset, or fuse checks as ok, turn in AC/DC power adapter. Refer to warranty procedures (Chapter 11)
Adapter gets warm during normal use	Restricted air flow around the adapter may cause the adapter to overheat and shut down. This is a safety

Symptom	Corrective action
	feature and does not harm the adapter or the MSD-V4L. Do not place the adapter in an air flow restrictive area or cover it with anything that prevents the heat from dissipating

7.4 Universal World Traveler Adapter

Symptom	Corrective action
The AC power light does not come on when adapter is plugged in	<ul style="list-style-type: none"> • Ensure there is adequate AC voltage at the socket the adapter is plugged into. Move adapter to a different outlet and check that the AC power light comes on • Check outlets for adequate AC power • Turn in adapter for warranty repair (refer to Chapter 11)
No AC output from adapter	<ul style="list-style-type: none"> • Ensure AC power light is on. If not, go to previous action • Replace adapter fuse: <ul style="list-style-type: none"> ○ Remove spare fuse from replacement fuse compartment ○ Open fuse compartment ○ Remove power fuse and check for serviceability ○ Install new fuse into power adapter ○ Plug adapter into outlet and check for AC output • If problem persists, turn in adapter for warranty repair (refer to Chapter 11)

7.5 MSD-V4L Active Pen

Symptom	Corrective action
Pen does not work	<ul style="list-style-type: none"> • Ensure batteries are installed correctly • Replace batteries • If problem persists, turn in adapter for warranty repair (refer to Chapter 11)
Pen does not write, and barrel buttons do not work	<ul style="list-style-type: none"> • Replace AAAA battery • If problem persists, turn in adapter for warranty repair (refer to Chapter 11)

8 Maintenance

8.1 Service Upon Receipt

8.1.1 Unpacking

The MSD-V4L is shipped in its transit case with the standard accessories. It does not require unpacking or assembly.

8.1.2 Equipment Inventory

The MSD-V4L contains a configuration sheet which lists the standard accessories. Use the configuration sheet or Table 1. Standard Kit Item Inventory to conduct inventory of the MSD-V4L set.

8.1.3 Inspection

Inspect the MSD-V4L set for shipping damage. Check for dents, breaks, water damage, or any evidence of mishandling.

8.2 Preventive Maintenance Checks and Services (PMCS)

Table 7. Preventive Maintenance Checks and Services (PMCS) Procedures.

B= Before M= Monthly A= Annually

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
1	B/M	Transit Case	1. Inspect transit case for breaks or cracks. 2. Check case latches to ensure they fasten securely.	1. Any breaks or cracks that would let moisture penetrate the transit case. 2. Any missing or broken latches.
2	B/M	MSD-V4L	Inspect for signs of physical damage.	Any damage that will prevent operation.
3	B/M	MSD-V4L-Connectors	Inspect for signs of physical damage.	Physical damage to connectors that prevent their use.
4	B/M	MSD-V4L DISPLAY	1. Check display for physical damage. 2. Rotate screen from side to side to ensure the screen display transitions freely between portrait and landscape modes.	Screen does not transition between landscape and portrait modes.
5	B/M	MSD-V4L BATTERY	Ensure battery charges when MSD-V4L is connected to power source.	Battery does not charge.
6	B/M	MSD-V4L STYLUS	1. Check for missing or damaged stylus.	Stylus is missing or damaged.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			2. Check that battery is present and serviceable.	
7	B/M	MSD-V4L CARRY HANDLE	Check for missing or damaged carry handle, connect handle to MSD-V4L.	Carry handle is damaged, missing, or cannot be connected to MSD-V4L.
8	B/M	MSD-V4L Detachable Keyboard	Check keyboard for damage or missing keys.	1. Keyboard connector is damaged. 2. Keyboard is missing keys or unusable.
9	B/M	MSD-V4 DC/DC Power Adapter	1. Check power adapter and cables for physical damage. 2. Ensure output status light comes on when adapter is powered. 3. Connect each cable to adapter to ensure proper connection.	1. DC/DC power adapter has physical damage. 2. Output LED does not come on when adapter is powered. 3. One or more cables do not connect properly to adapter.
10	B/M	Accessory Cables	Check for any nicks, cuts, or physical damage to cable, connectors, or connector pins.	1. Cuts or nicks that expose conductor. 2. Damage to connectors or connector pins.
11	B/M	Transit Case Foam Insert	1. Damage or chunks missing from foam insert 2. Damaged or missing pouches.	Any damage or chunks of foam missing that hinder the protection for items stored in case.
12	B/M	Cable Strain Relief Ties	Check for missing or damaged strain relief ties.	Strain relief ties missing or damaged.
13	B/M	MSD-V4L ACCESSORIES	1. Check accessories for physical damage. 2. Connect accessories to MSD-V4L and power up to ensure proper function.	1. Physical damage to the body or connectors of an accessory. 2. Accessory does not power up or function properly when connected to the MSD-V4L.
14	B/M	MSD-V4L SOFTWARE	Inspect date on desktop image to verify software updates.	Date displayed is 3 months or greater than current date. See 7.6 Software Update Instructions.
15	A	MSD-V4 DC/DC ADAPTER	If adapter has not been used, apply power for 10 minutes annually.	DC/DC Adapter does not power up or provide output DC voltage.
16	A	MSD-V4 AC/DC 400HZ ADAPTER	If adapter has not been used, apply power for 10 minutes annually.	AC/DC 400Hz Adapter does not power up or provide output DC voltage.

8.3 Cleaning

Clean the Display

⚠ CAUTION: Do not use water or abrasive solvents to clean any part of the MSD-V4L or any of the accessories. Damage may occur to the MSD-V4L due to improper cleaning methods.

1. Using a microfiber cloth to remove any obvious dust and gently brush off any dust particles.
2. Spray nonabrasive solution onto cleaning cloth. DO NOT spray water or cleaning solution onto the screen.
3. Gently wipe the screen in a circular motion. Do not press hard on the cloth.
4. Remove all excess moisture from the screen.
5. Let the display dry thoroughly before you turn it on.
6. For stains that are hard to remove, repeat procedure until display is clean.

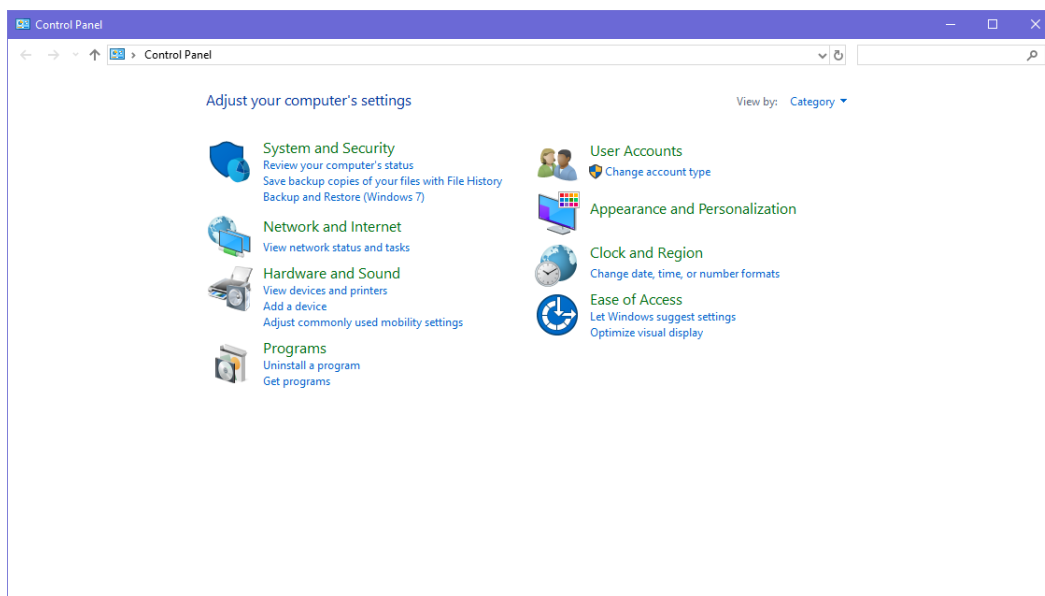
Cleaning the MSD-V4L or Accessory Body

1. Use a soft, dry brush or cloth to gently wipe off dirt and debris from outside of MSD-V4L.
2. Brush off dirt and debris from connector openings and body of MSD or accessory.

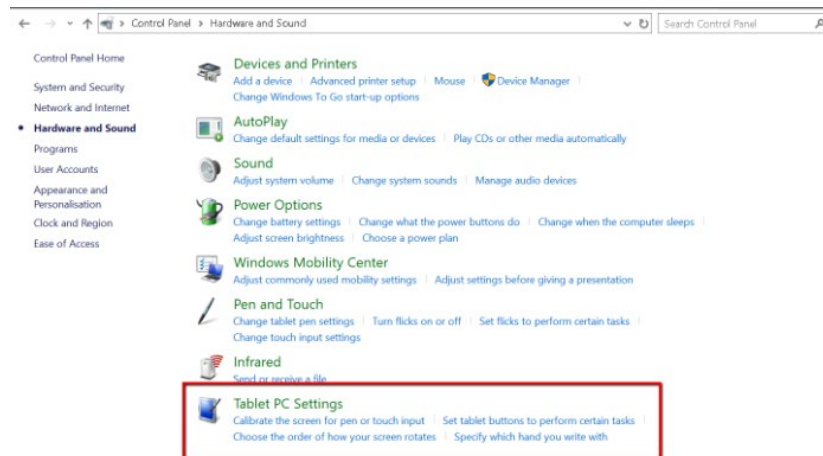
8.4 Touchscreen Calibration

Perform the following steps to re-calibrate the touchscreen.

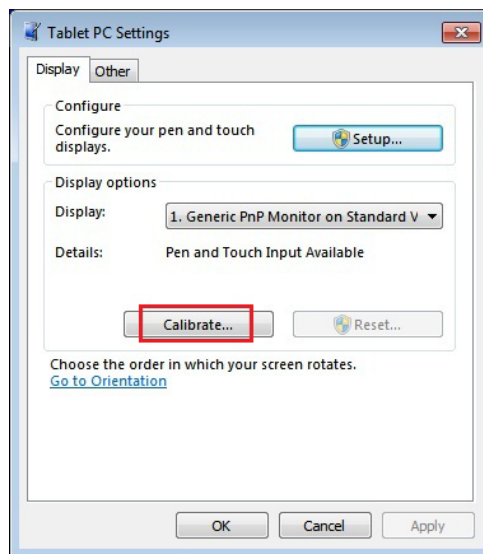
1. Restart the MSD-V4L.
2. Select the Windows start button.
3. Go to the control Panel and select **Hardware and Sound**.



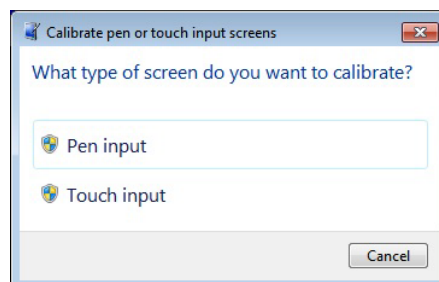
4. In the “Hardware and Sound” menu, Select “**Tablet PC Settings**”.



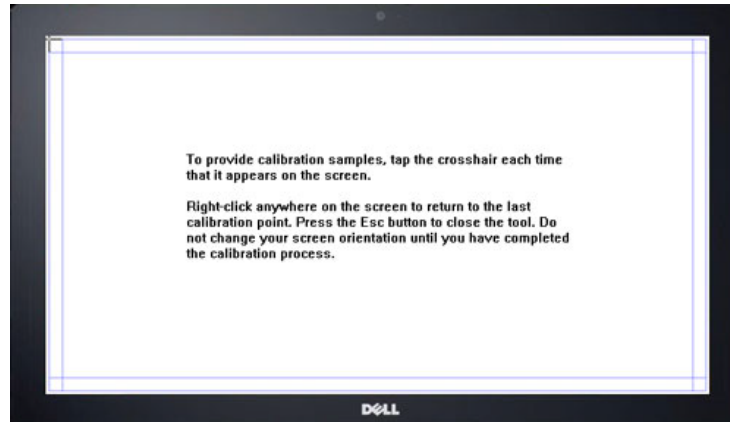
5. Under “Display” tab in the Tablet PC Settings window, select “**Calibrate**”.



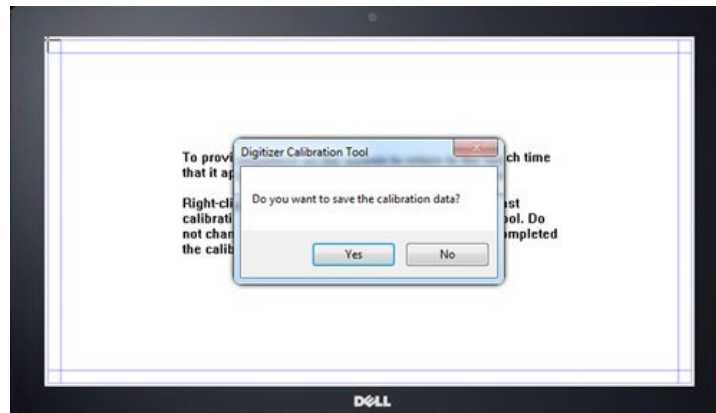
6. Choose “**Pen**” or “**Touch**” input.



7. Perform the instructions on the screen.



8. Save the calibrated data.



8.5 MSD-V4L Battery Replacement

AAAA Battery

1. Remove top cover from pen (1).
2. Remove AAAA battery from pen if installed. Turn pen upside down and shake it lightly to remove the battery if necessary.
3. Insert AAAA battery into pen body with positive end facing inward (2).
4. Replace pen top cover (3).

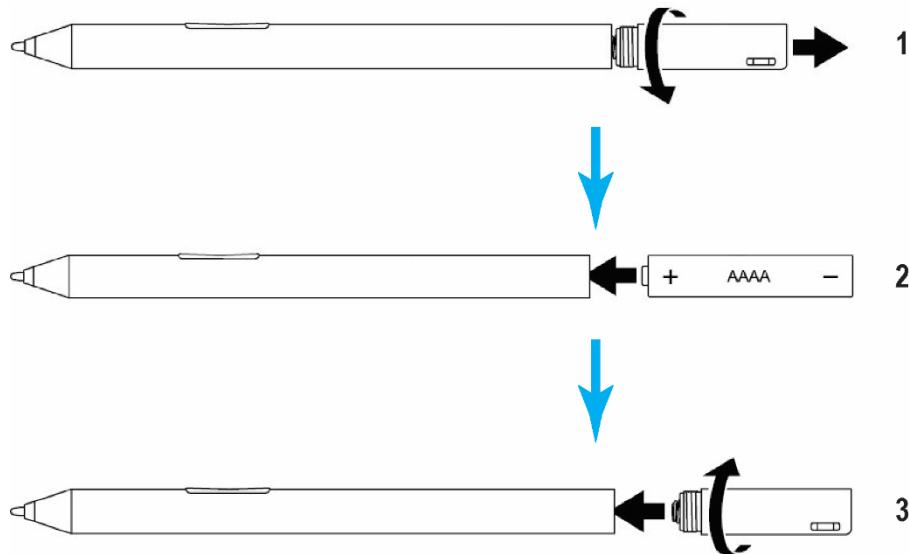


Figure 48. Active Pen AAAA battery Replacement.

8.6 Disassembly, Repair, Replacement, Reassembly, and Checkout

No disassembly of the MSD-V4L Type II computer is authorized.

8.7 Software Update Instructions

1. Download .iso file from CMTool.

Edit	SecureUpdate.iso	MSD V4 Win 10 1809 Build Monthly Updates	March Cumulative Updates	This is the MSD V4 patch to resolve the issue with Windows Auto Updates.	CHADWICK GUERIN	5/10/2021 3:12:00 PM	CHADWICK GUERIN	5/1 12: PM
------	------------------	--	--------------------------	--	-----------------	----------------------	-----------------	------------

Figure 49. CMTool .iso Download.

2. Locate the download and right click on the file and select "Burn disc image".

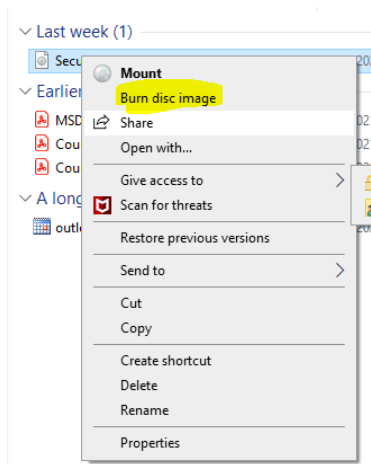


Figure 50. Burn Disc Image Function.

3. This Windows Disc Image Burner Utility will pop up next. Select “Burn” to continue.

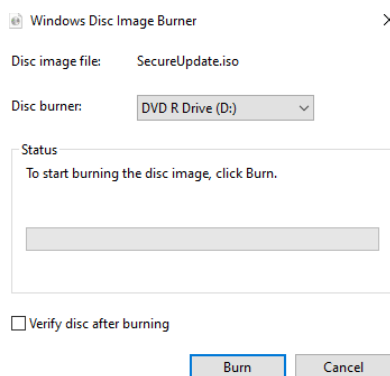


Figure 51. Continue.

4. Burn the .iso file as a disk image to a Disc (CD, DVD, Blu-ray depending on size of update).
5. From the MSD: Login to Windows as an admin,
6. Insert media into disk drive.
7. Open Folder on disk
8. Right click on .exe file, Run as Administrator. Time before next step will vary (For MSD- V4 ~ 3 Minutes)
9. Click yes for “Do you want to allow this app from an unknown publisher to make changes to your device?”
10. Next screen will be similar to the following:

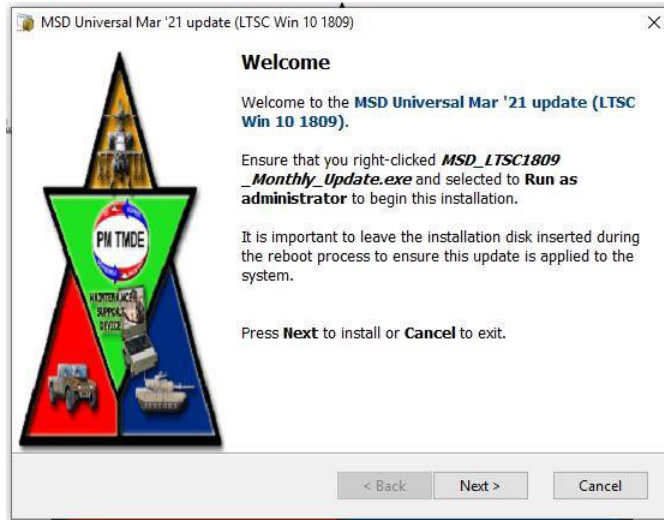


Figure 52. Update Welcome Screen.

11. Click next (updates will now install and window will for example provide a message “Installing Windows updates...”) (release may takes over 12 minutes for the MSD-V4).
12. Next screen will be similar to the following:

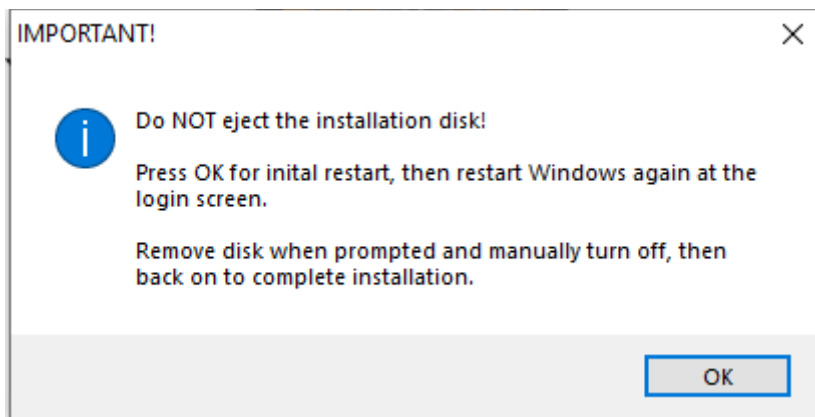


Figure 53. Restart Instructions.

13. After restarting windows, Verify the following message appears on the screen:
SUCCESS: Remove disk and restart computer.

14. If this screen appears instead, keep disk in drive, restart, and press F12 to launch the boot menu. Select "UEFI Boot" from UEFI: Optical Drive (BUFFALO).

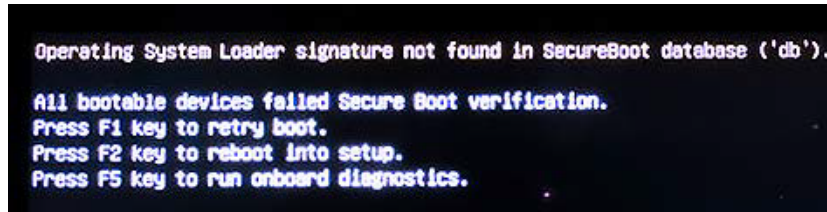



Figure 54. Error during Restart.

15. You should then get the following message:
SUCCESS: Remove disk and restart computer.
16. Remove disk and reboot.
17. System is now ready.

9 Preparation for Shipment

 **NOTE: The MSD-V4L MUST be powered down, with all cables removed. The MSD-V4L may be stored with the protective cover installed.**

1. Power down MSD-V4L.
2. Disconnect any accessories from the MSD-V4L.
3. Place accessories, and MSD-V4L in their corresponding compartments in the carry case. Refer to **Figure 1** and **Figure 2**.
4. Use configuration card to inventory the case contents and locate or annotate any missing components.
5. Return configuration card to case.
6. Close case and secure latches.

10 Storage

Storage Temperature: -4°F to 140°F (-20°C to 60°C)

Altitude (maximum): 9144 m (12,500 ft.)

Relative humidity (maximum): 95% (noncondensing)

Airborne contaminant level: G1 as defined by ISA-71.04-1985

11 Parts list

Table 8. Basic Issue Items.

DESCRIPTION	PART NO.	NSN	QTY
TEST SET, ELECTRONIC, MSD-V4L	13787300	6625-01-683-2824	1
MSD-V4L COMPUTER	13787302	7021-01-686-8075	1
STYLUS AND LANYARD	13787303	7050-01-687-1033	1
MSD-V4L DETACHABLE KEYBOARD	13787304	5895-01-687-1035	1
65-WATT AC POWER ADAPTER	13787298	6130-01-687-0201	1
AC POWER CABLE, 3 FT	13748488	6130-01-676-6977	1
MSDD-V4L TRANSIT CASE	13787301	8145-01-686-6946	1
MSD-V4L RECOVERY DEVICE	TBD		1
MSD-V4L QUICK START CARD	13787307	7610-01-686-6934	1
MSD-V4L CONFIGURATION SHEET	13787308	7610-01-686-6953	1
MSD-V4L RUGGED COVER WITH SHOULDER STRAP	13787306	7045-01-687-0176	1
MSD-V4L MOBILE ADAPTER	13750905	6150-01-687-1041	1
MSD-V4L BARREL TO USB-C ADAPTER	13750908	6130-01-687-0193	1
MSD-V4 CABLE STRAIN RELIEF TIE	13748489	5975-01-684-4730	2
MSD-V4 EUROPEAN ADAPTER	13748516	6130-01-684-4759	1
MSD-V4 SPARE FUSE HOLDER ASSEMBLY	13748518	5920-01-684-7104	1
MSD-V4 MOUSE	13748515	7025-01-668-9311	1
MSD-V4 BLURAY OPTICAL DRIVE	13748514	7025-01-659-5984	1
MSD-V4 ETHERNET CABLE	13748513	5995-01-684-5770	1
MSD-V4 NATO CABLE	12748512	5995-01-684-7754	1
MSD-V4 DC/DC POWER ADAPTER	13748511	6130-01-684-6957	1

Table 9. Additional Authorized Listings.

DESCRIPTION	PART NO.	NSN	QTY
MSD-V4 RS232/422/485 SERIAL CONVERTER KIT	13748544		1
MSD-V4 PCMCIA ADAPTER	13748553		1
MSD-V4 AC/DC 400HZ POWER ADAPTER	13748545		1
MSD-V4 SMART CARD READER	13748546		1
MSD-V4 EXPRESS CARD ADAPTER	13748547		1
MSD-V4 4 PORT USB HUB	13748554		1
MSD-V4 GPIB ADAPTER	13748548	7050-01-615-8761	1
MSD-V4 MIL-STD 1553 ADAPTER	13748555	5995-01-668-2169	1
MSD-V4 IUID READER KIT	13748550		1
MSD-V4 IUID READER	13748551		1

Table 10. Consumable Items List.

DESCRIPTION	PART NO.	NSN
MSD-V4 STRAIN RELIEF CABLE TIE	13748489	5975-01-684-4730
MSD-V4 FUSE ASSEMBLY	13748518	5920-01-684-7104
AAAA battery, non-rechargeable	E96BP2	6135-01-370-9441

12 Warranty Program and Customer Support

For replacement or support notify the MSD Help Desk. The MSD-V4L warranty expiration date is located on the transit case ID plate, and on the MSD-V4L ID plate. For more specific warranty information refer to TB 9-6625-2301-40.

MSD/ICE Helpdesk

Phone# 877-564-1137

Email: apats@redstone.army.mil

Web: <https://www.milsuite.mil/book/groups/msd-ice>

General Information

DRS warrants for the duration of this warranty that the Hardware product(s) (“Product(s)”) produced by DRS will be free from defects in material and workmanship under normal use and service, subject to the terms and conditions set forth herein. This warranty applies to all product and accessories supplied and/or distributed by DRS for Maintenance Support Device V4 (MSD). This warranty extends only to the original purchaser of Products and accessories from DRS (“Original Purchaser”) and original customers of PD TMDE who leverage this contract and purchase products. It is not transferable to anyone who subsequently purchases or obtains the Products from the Original Purchaser.

Length of Warranty

The warranty is valid for a period of one (1) year from the original date of the packing slip from DRS and/or an Authorized Reseller. During this period, DRS will, at its option and expense, either repair or replace with new or reconditioned (of equal or better quality) parts of any of the Products which prove to be defective, provided that such Products are returned in accordance with the terms of this warranty. All exchanged parts and Products replaced under this warranty will become the property of DRS. Any replacement part or Product will be warranted for the remainder of the original warranty period or ninety (90) calendar days, whichever is longer. The MSD-V4R, MSD-V4S, MSD-V4L Kits and optional accessories shall be under warranty as stated herein plus an extended warranty for a total of sixty (60) months.

Terms and Conditions

This warranty covers defects in materials and workmanship in the Products, as follows:

Term	1 year standard and extended for a total of 60 months
------	---

Technical Assistance	Yes-through telephone, electronic mail, and website. Warranty actions will be coordinated through PD TMDE MSD Helpdesk and follow established Customer Support Requests (CSR) processes and procedures. DRS will assist customers to complete a CSR for all warranty actions, hardware, or software inquiries as necessary. CSRs provide a means to distribute MSD specific information to and from the contractor. CSRs will be tracked by the Government.
Shipping Costs	Shipping costs of a Product to DRS are included as part of this Warranty. Shipping costs of a Product to the Original Purchaser after a Warranty repair is included as part of this warranty to any Continental U.S. (CONUS) and outside Continental U.S. (OCONUS) location. If after receipt of a Product for repair under this warranty, it is later determined to be a non-warranted repair, all shipping costs are to be paid by the Original Purchaser.

Turn Around Time on Warranted Items:

Under this warranty agreement, all non-mission capable (i.e., malfunctioning/non-operational) assets procured by the Government will be repaired or replaced within 72 hours from the time of receipt by DRS to the time turned over to carrier for return to the end user, not including weekends and holidays. If an item is needed for further analysis and turn-around time will not be met, DRS will notify the Government immediately to determine specific course of action. Shipping time for warranted items located within the CONUS will not exceed 72 hours, not including weekends and holidays, to or from DRS once the failed/repaired asset is in the shipper’s hand. Shipping time for OCONUS warranted items will not exceed 168 hours, not including weekends and holidays, to or from DRS once the failed/repaired asset is in the shipper’s hand.

This warranty does not cover:

- Software, including the operating system and software added to the DRS hardware products through our factory-integration system, third- party software, or the reloading of software
- Normal wear and tear such as cosmetic damage that does not affect the product's performance, and abusive wear (this warranty does cover any product failure that is a result of normal wear and tear). Any product or accessories subjected to extremes outside specifications MIS-DTL-61265 & MIS-DTL-58668
- Spare parts and repairs outside of warranty are warranted for 90 calendar days from the date of repair or shipment
- Problems that result from external causes such as accident, fire, floods, or acts of God; abuse; misuse; or problems with electrical power; servicing not authorized by DRS; failure to follow the Product instructions or failure to perform preventative maintenance; Problems caused by using accessories, parts, or components not supplied by DRS; improper installation (to include the absence of surge protection in vehicle installations), improper testing, improper operation, improper use or handling of the Product; or unauthorized alteration of Products
- Products with missing or altered service tags or serial numbers
- Products for which DRS has not received payment
- DRS is not responsible for and shall not be liable for transportation and insurance charges incurred in or damages resulting from transporting the Products, Accessories and/or Replacement Products to DRS for warranty service

- DRS is not responsible for any third-party software created for use in the integration and/or operation of any Products, Accessories and/or Replacement Products whether such third-party software was installed by DRS. Maintenance and support service for third-party software is the sole responsibility of the creator thereof

Additional Information

The agents, dealers, and employees of DRS are not authorized to make any modifications to this warranty, or additional warranties binding on DRS about or for Products, Accessories and/or products sold or supplied by DRS. Additional statements, whether oral or written, except signed written statements from an officer of DRS, do not constitute warranties and should not be relied upon.

DRS' SOLE LIABILITY, AND ORIGINAL PURCHASER'S SOLE REMEDY, FOR ANY MALFUNCTIONS AND DEFECTS IN THE PRODUCTS IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS WARRANTY STATEMENT. EXCEPT AS OTHERWISE EXPRESSLY STATED HEREIN, DRS DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE. NO WARRANTIES WILL APPLY AFTER THE WARRANTY PERIOD HAS EXPIRED.

DRS HEREBY DISCLAIMS, AND THE ORIGINAL PURCHASER HEREBY AGREES, THAT DRS DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES PROVIDED FOR IN THIS WARRANTY OR FOR ANY INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY LIABILITY FOR THIRD PARTY CLAIMS FOR DAMAGES, FOR PRODUCTS NOT BEING AVAILABLE FOR USE, OR FOR LOST DATA OR LOST SOFTWARE. NOTWITHSTANDING ANYTHING CONTAINED HEREIN, DRS' TOTAL LIABILITY FOR ANY ALLEGED OR ACTUAL BREACH OF WARRANTY WILL BE NO MORE THAN THE AMOUNT PAID FOR THE PRODUCT THAT IS THE SUBJECT OF ANY SUCH CLAIM. THIS IS THE MAXIMUM AMOUNT FOR WHICH DRS SHALL BE RESPONSIBLE.

Based on local command policy, contact your G/S-6, 94 Series MOS for assistance with repairs and / or replacement procedures. The assigned activity is to complete a technical inspection (TI), document results of TI using a DA Form 2404/DA Form 5998-E and submit a CSR to the APATS help desk for support. Upon receipt of the DA Form 2404/DA Form 5998-E, the APATS help desk will recommend a repair or replacement course of action for the assigned activity to perform.

