OUTLINE SHEET 3-3-1

KEYBOARD-VIDEO-MOUSE (KVM) AMPLIFIER UNITS

A. INTRODUCTION

The Electronic Chart Data and Information System-Navy/Automatic Radar Plotting Aid (ECDIS-N/ARPA) subsystem provides centralized monitoring of electronic navigation and other automatic functions that are vital to the ship's steering system. To keep steering dependable under all service conditions, it is important to understand how to maintain and operate the ECDIS-N/ARPA subsystem and associated equipment. This lesson will cover the function and maintenance of the Keyboard-Video-Mouse (KVM) amplifier unit.

B. ENABLING OBJECTIVES

3.7 **MAINTAIN** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

3.8 **TROUBLESHOOT** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

3.9 **REPAIR** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

C. TOPIC OUTLINE

1. Overview.
2. Component Description.
3. Initial Voltage Verification (IVV) Checks.
4. Cleaning and Inspection Procedures.
5. Symptoms and Indications of Malfunction.
6. Repair Procedures.

INFORMATION SHEET 3-3-2

KEYBOARD-VIDEO-MOUSE (KVM) AMPLIFIER UNITS

A. INTRODUCTION.

The Electronic Chart Data and Information System-Navy/Automatic Radar Plotting Aid (ECDIS-N/ARPA) subsystem provides centralized monitoring of electronic navigation and other automatic functions that are vital to the ship's steering system. To keep steering dependable under all service conditions, it is important to understand how to maintain and operate the ECDIS-N/ARPA subsystem and associated equipment. This lesson will cover the function and maintenance of the Keyboard-Video-Mouse (KVM) amplifier unit.

B. REFERENCES.

1. Integrated Bridge and Navigation System (IBNS) Electronic Chart Display Information System-Navy/Automatic Radar Plotting Aid (ECDIS-N/ARPA) for DDG 111 and DDG 112, S9420-BX-MMC-010.
2. Integrated Bridge and Navigation System (IBNS), Volume 1, Interactive Electronic Manual, S9420-BX-IEM-010.
3. Naval Ships' Technical Manual (NSTM) Chapter 300, Electric Plant – General, S9086-KC-STM-010.
4. Maintenance Index Page (MIP) 5600/111, Maintenance Requirement Card (MRC) R-5M, Clean and Inspect NAV 3 Remote KVM Amplifier Unit.

C. INFORMATION.

1. Overview.
   a. The Keyboard-Video-Mouse (KVM) amplifier units enable communication between Integrated Bridge and Navigation System (IBNS) Cabinet Assembly Number (No.) 1 and the NAV 1 and NAV 3 navigation stations.
   b. The KVM amplifier units receive and amplify video, keyboard, and mouse commands from the navigation computers and transmit the data to the corresponding KVM amplifier located in IBNS Cabinet No. 1.

c. The NAV 1 and NAV 3 stations each have two assigned KVM amplifier units, a remote KVM amplifier unit and a local KVM amplifier unit, which are functionally the same. The remote KVM amplifier unit and the local KVM amplifier unit are shown in Figure 3-3-1.

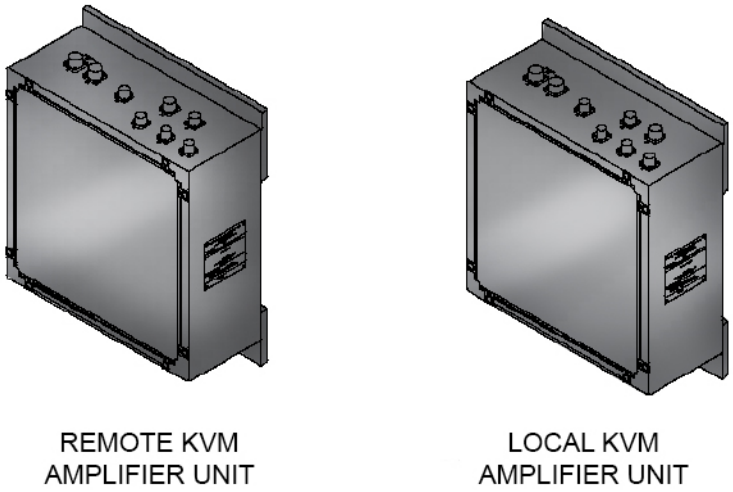

Figure 3-3-1: Remote and Local KVM Amplifier Units

1) The remote KVM amplifier units (Unit 20 and 23) are located away from IBNS Cabinet No. 1 and connect to the display, keyboard, and mouse of the respective navigation station.
   a) Remote KVM amplifier unit (Unit 20) connects to NAV 1 station.
   b) Remote KVM amplifier unit (Unit 23) connects to NAV 3 station.
2) The local KVM amplifier units (Unit 21 and 24) are located near IBNS Cabinet No. 1 and connect to the computer of the respective navigation station.
   a) Local KVM amplifier unit (Unit 21) connects to NAV 1 station.
   b) Local KVM amplifier unit (Unit 24) connects to NAV 3 station.

2. Component Description.

   a. The major components of the remote KVM amplifier units (Unit 20 and 23) are an Electromagnetic Interference (EMI) line filter (FL1), a power supply (PS1), and a KVM amplifier (A1). The remote KVM amplifier units receive 115 Volts Alternating Current (VAC) power from the ship's supply. A block diagram of the remote KVM amplifier units are shown in Figure 3-3-2.

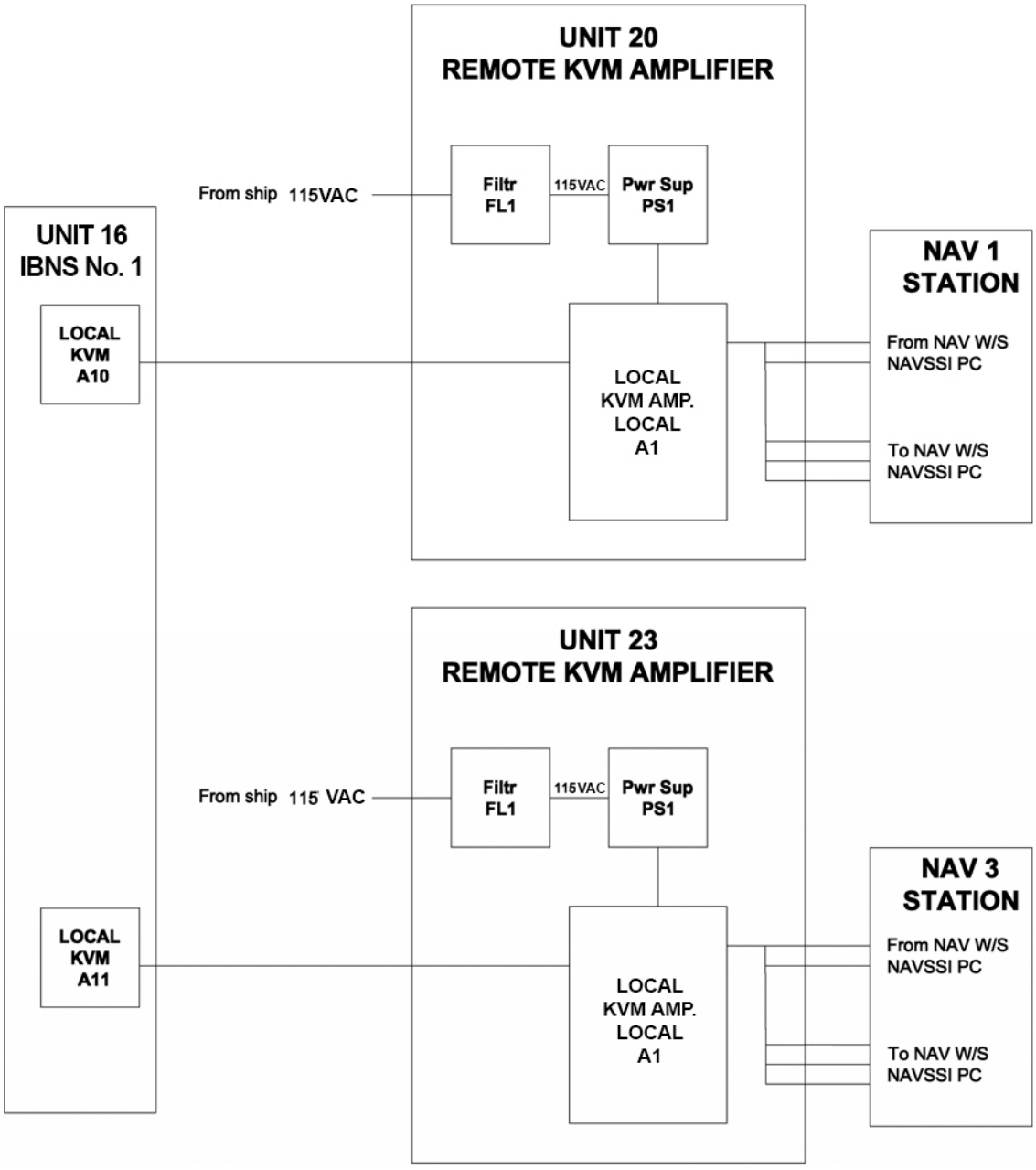

Figure 3-3-2: Remote KVM Amplifier Unit Block Diagram

1) The remote KVM amplifier (A1) is a major component in the remote KVM amplifier units (Unit 20 and 23). It allows more distance (longer cable runs) between the computers and the keyboard, monitor, and mouse without losing any signal strength.

b. The major components of the local KVM amplifier units (Unit 21 and 24) are an EMI line filter (FL1), a power supply (PS1) and a KVM amplifier (A1). The local KVM amplifier unit receives 115 VAC power from the ship's supply. A block diagram of the local KVM amplifier units are shown in Figure 3-3-3.

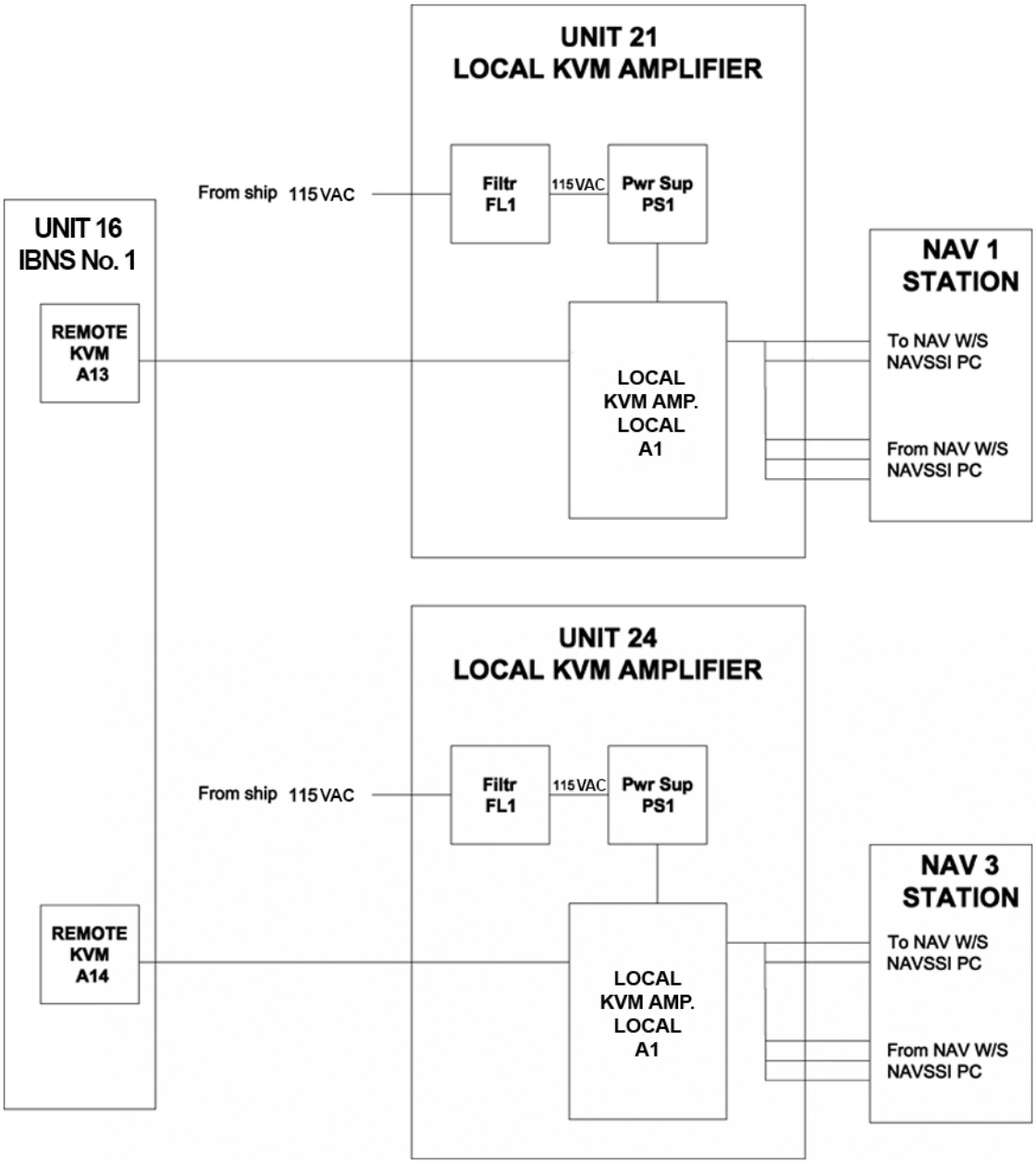

Figure 3-3-3: Local KVM Amplifier Unit Block Diagram

1) The local KVM amplifier (A1) is a major component in the local KVM amplifier units (Unit 21 and 24). It allows more distance (longer cable runs) between the computers and the keyboard, monitor, and mouse without losing any signal strength.

3. Initial Voltage Verification (IVV) Checks.

WARNING
High-voltage systems can cause extreme damage to personnel and equipment. Voltages equal to or greater than 1,000 VAC are considered high voltage in the Navy. Except in the circumstance for the IVV checks, work on energized high voltage equipment is prohibited unless approved by Naval Sea Systems Command (NAVSEA). IVV checks are to be performed in accordance with (IAW) the procedures in Naval Ships' Technical Manual (NSTM) Chapter 300, Electric Plant – General.

a. There are planned maintenance evolutions that involve working on equipment that is energized or is not yet proven to be de-energized. During these evolutions, specific sets of requirements, such as the IVV checks, are used to balance the completion of maintenance with the protection of personnel.

b. Personnel are required to conduct IVV checks prior to beginning maintenance on electrical equipment and systems to verify it is de-energized. Equipment is considered energized until IVV checks verify it is de-energized.

c. IVV requirements.

1) Ensure the proper Personnel Protective Equipment (PPE) required per NSTM Chapter 300, Table 300-2-1b, is worn prior to conducting the IVV checks.

2) Ensure a safety brief with supervisory personnel is conducted prior to commencing work. Ensure that all involved personnel are properly briefed, understand the work being conducted, and are aware of the associated hazards.

3) Ensure properly rated test equipment and the test equipment leads are in good condition.

4) Ensure the personnel conducting the IVV checks are trained in electrical equipment greater than 1,000 VAC.

5) Ensure the personnel conducting the IVV checks do not work alone.

d. IVV procedures.

WARNING
Do not approach or take a conductive object without an approved insulating handle closer than 2 feet to potentially energized and exposed equipment without proper PPE.

1) Ensure that metering and control circuits are checked, as well as power circuits. In many cases, metering and control circuits are connected to the supply side of a circuit breaker or supplied from a separate source.

a) A check of the load side of a circuit breaker may indicate the power circuit is de-energized after the circuit breaker is opened, but such a check gives no assurance the associated metering and control circuits are de-energized.

2) Ensure the removable test lead connections on portable meters are tight. Shock, arc flash, and fire hazards are created if the meter end of an energized test lead is allowed to come adrift during a check of energized circuits. Only the portion of test leads that are necessary to make contact with the electric circuit or meter should be bare conductors; all other portions should be insulated.

WARNING
The electrical charge retained by secured electrical equipment may be great enough to cause a shock. This danger must be considered before touching the terminals to apparently de-energized equipment.

3) Ensure there is no retained electrical charge in the equipment under test. Capacitors used in EMI suppression, electrical power and lighting, interior communications, fire control, and other electrical equipment have the potential to retain a capacitive voltage.

a) If capacitive voltage is detected after the circuit is de-energized, and before touching a capacitor that is connected to a de-energized circuit, discharge the equipment to ground by momentarily connecting the terminal to ground using a shorting probe or a built-in grounding bar if provided.

b) Capacitors and Cathode Ray Tubes (CRT) can redevelop a charge over time due to dielectric properties and may need to be shorted several times before being fully discharged. As such, three shorting evolutions spaced approximately 10 seconds apart should eliminate nearly all of the original energy that was stored.

4) Minimize access to open electrical equipment by posting signs and erecting barriers at the electrical safety boundary or Flash Protection Boundary (FPB) IAW NSTM 300 Table 300-2-1b. Ensure the covers of unattended equipment are secured.

4. Cleaning and Inspection Procedures.

a. Maintenance Index Page (MIP) 5600/111, Maintenance Requirement Card (MRC) R-5M, Clean and Inspect NAV 3 Remote KVM Amplifier Unit.

b. The cleaning and inspection procedure for the remote KVM amplifier unit (Unit 23) of the NAV 3 station is the same procedure for all other KVM amplifier units (Unit 20, 21, and 24).

c. Equipment, materials, and tools.

1) The technician performing the required maintenance will need to obtain the following materials: paint brush, wiping rag, danger tags, disposable nitrile gloves, and industrial non-vented goggles.

2) The technician performing the required maintenance will need to obtain the following tools: 10 inch (in.) adjustable wrench, 6 in. flat tip screwdriver, 8 in. cross tip screwdriver, and a non-metallic nozzle electric vacuum cleaner.

d. Preliminary procedure.

NOTE
The following procedure is applicable to all four KVM amplifier units (Unit 20, 21, 23, and 24) in the ECDIS-N/ARPA subsystem.

1) While inport, perform maintenance on the KVM amplifier units every twenty-four months.

NOTE
Consult the applicable Combat Systems Operational Sequencing System (CSOSS) prior to de-energizing the Combat Information Center (CIC) KVM Amplifier and IBNS Cabinet No. 1.

CAUTION
Powering down IBNS Cabinet No. 1 before a proper shutdown is performed can result in the loss of operating system data.

2) Obtain permission from the Officer of the Deck (OOD)/Command Duty Officer (CDO) to perform maintenance on the unit.

3) Exit the Voyage Management Software (VMS) at the CIC NAV 3 station IAW the Engineering Operational Sequencing System (EOSS).

WARNING
To prevent personnel injury, tag-out procedures shall be IAW the Tag-Out Users Manual (TUM), S0400-AD-URM-010/TUM.

4) De-energize the NAV 3 station and danger tag DO NOT OPERATE IAW the TUM.

5) De-energize IBNS Cabinet No. 1 and danger tag DO NOT OPERATE IAW the TUM.

e. Procedure.

WARNING

Avoid contact with Electrostatic Discharge (ESD) marked components.

WARNING

Consider all electrical leads to be energized until positively proven they are de-energized.

WARNING

To prevent personnel injury, electrical safety procedures shall be IAW NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b.

1) Conduct an IVV check IAW the NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b to ensure the equipment is de-energized.
2) Remove the cabinet door of the remote KVM amplifier unit.
3) Ensure the circuits are de-energized.
4) Remove the shield and extend the drawer for access to the interior components of the remote KVM amplifier unit.
5) Inspect the interior of the remote KVM amplifier unit.
6) Check the interior for loose cable or wire connections.
7) Check the interior for worn or chafed wire and cable insulation.
8) Check the interior for loose, missing, or incorrect hardware.
9) Check the interior for overheated components.
10) Check the interior for presence of dirt, debris, or foreign material.
11) Check the interior for corrosion.
12) Put on gloves and goggles.
13) Perform any cleaning that is required based on inspection.
    a) Use the vacuum cleaner and brush on areas where dirt/dust/accumulation is significant.
    b) Re-vacuum and wipe down the interior components if any dirt is still visible.
    c) Tighten loose connections.
    d) Consult the equipment technical manual for the replacement of defective parts.

14) Remove gloves and goggles.

15) Reinstall and secure the cabinet door of the remote KVM amplifier unit.

16) Remove the danger tags and energize the circuits IAW the TUM.

17) Return the equipment to readiness condition.

18) Notify the OOD/CDO that maintenance is complete.

19) Report the results to the work center supervisor and make the required material history entries.

20) Restore the equipment/system to desired status or readiness condition.

5. Symptoms and Indications of Malfunction.

a. The KVM amplifier units enable communication between IBNS Cabinet No. 1 and the NAV 1 and NAV 3 navigation stations. Certain symptoms and indications of malfunction may point to a problem with the KVM amplifier units.

1) The power Light Emitting Diode (LED) does not illuminate on the KVM amplifier unit.

b. Many problems may be diagnosed quickly by a visual inspection of the equipment. Leakage, mechanical damage, and broken or loose electrical connections or wires are examples.

c. Other problems will be apparent by listening to the equipment operate. Bearing failure, pump cavitation, internal valve leakage, and loose or broken drive components are examples.

d. If the problem source is not immediately apparent, the process of elimination may begin by identifying the system at fault, utilizing the six step troubleshooting process.

e. The six step troubleshooting process enables technicians to break down complex problems (faults) into smaller, manageable steps.

1) Six step troubleshooting method.

a) Step 1: Symptom recognition – This step involves the action of recognizing a problem, malfunction, or abnormal operating condition.

b) Step 2: Symptom elaboration – This step involves obtaining a more detailed description of the problem, malfunction, or abnormal operating condition detected in Step 1.

c) Step 3: Listing probably faulty functions – This step involves assessing the problem and determining the most probable function or unit that is causing the malfunction.

d) Step 4: Localizing the faulty function – This step involves determining which of the functional areas or units determined in Step 3 is actually the faulty unit or area.

e) Step 5: Localizing trouble to the circuit – This step involves extensive testing to further isolate the faulty area or unit found in Step 4 to a faulty part, component, or circuit.

f) Step 6: Failure analysis – This step involves making a determination as to which part, component, or circuit is faulty and identifying the corrective action necessary to repair the fault.

f. Equipment technical manual troubleshooting charts and logic diagrams further assist technicians in completing the steps in the six step troubleshooting process.

1) Troubleshooting charts provide valuable information including, a list of faulty symptoms, immediate actions that should be taken when a faulty symptom is recognized, the possible causes of faulty symptoms, and the corrective actions necessary to repair faulty symptoms. An excerpt from the troubleshooting chart in the technical manual for the IBNS ECDIS-N/ARPA for DDG 111/112 is shown in Figure 3-3-4.

Symptom	Detection Method	Probable Cause(s)	Corrective Action(s)
Power LED does not illuminate on Local KVM Amplifier	a. Operator b. Operator c. Operator	a. Line Filter open coil b. Power Supply Defective c. Remove KVM Amplifier Defective	a. Replace FL1 b. Replace PS1 c. Replace A1

Figure 3-3-4: KVM Amplifier Unit Troubleshooting Chart

g. An example troubleshooting procedure for the power LED not illuminating on the local KVM amplifier follows.

1) Six step troubleshooting method.

a) Step 1 – Symptom recognition.

i. The power LED does not illuminate on the KVM amplifier unit.

b) Step 2 – Symptom elaboration.

i. No further indications noted.

c) Step 3 – List the probable faulty functions.

i. EMI line filter (FL1).

ii. Power supply (PS1).

iii. KVM amplifier (A1).

d) Step 4 – Localizing the faulty function.

i. EMI line filter (FL1) has an open coil.

ii. Power supply (PS1) is not outputting 115 VAC or is defective.

iii. KVM amplifier (A1) is defective.

e) Step 5 – Localizing the trouble to the circuit.

i. A continuity check of EMI line filter (FL1) shows no indication of an open coil.

ii. Power supply (PS1) is outputting 115 VAC.

iii. KVM amplifier (A1) is outputting 90 VAC.

f) Step 6 – Failure analysis.

i. Due to the indication that the KVM amplifier (A1) is outputting voltage unequal to the ship's supply, KVM amplifier (A1) needs to be replaced.

6. Repair Procedures.

a. Repair of the KVM amplifier unit consists of replacing the EMI line filter (FL1), the power supply (PS1), or the KVM amplifier (A1). These replaceable items are accessed by removing the unit's cabinet door. The exterior and interior of the unit, as well as FL1, PS1, and A1, are shown in Figure 3-3-5.

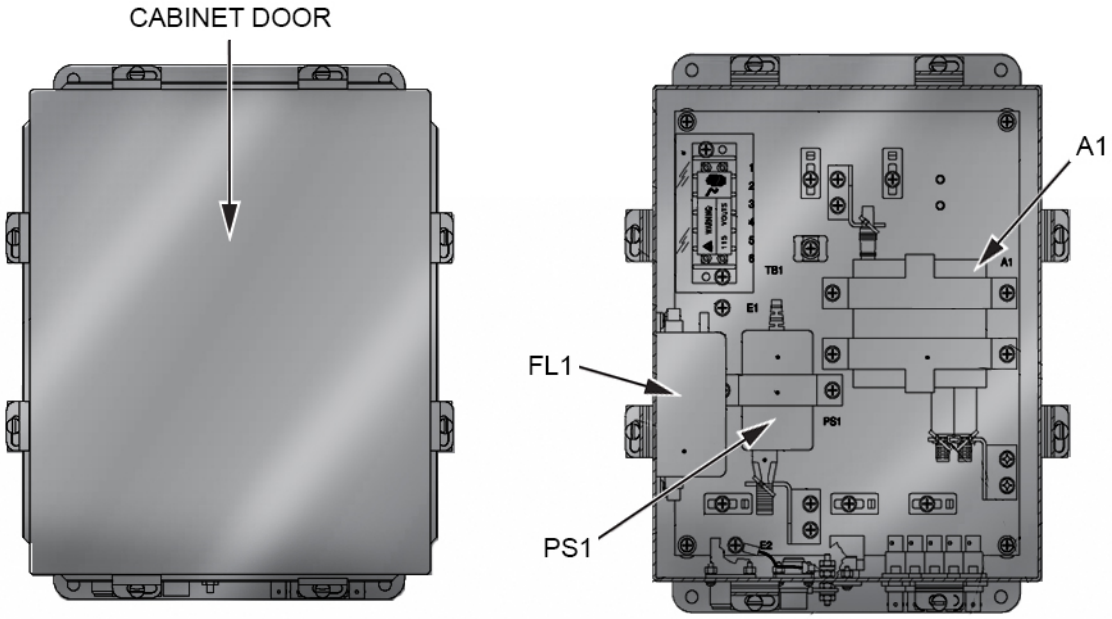

Figure 3-3-5: Exterior and Interior of the KMV Amplifier Unit

b. EMI line filter (FL1) replacement procedure.

1) The FL1 replacement procedure for the remote KVM amplifier unit (Unit 23) of the NAV 3 station is the same procedure for all other KVM amplifier units (Unit 20, 21, and 24).

CAUTION
Powering down the IBNS Cabinet No. 1 before a proper shutdown is performed can result in the loss of operating system data.

NOTE
Obtain permission from the OOD/CDO to perform maintenance on the unit.

2) Obtain permission from the OOD/CDO to perform maintenance on the unit.
3) Exit the VMS at the CIC NAV 3 station IAW the EOSS.

WARNING
To prevent personnel injury, tag-out procedures shall be IAW the TUM, S0400-AD-URM-010/TUM.

4) De-energize the NAV 3 station and danger tag DO NOT OPERATE IAW the TUM.
5) De-energize IBNS Cabinet No. 1 and danger tag DO NOT OPERATE IAW the TUM.

WARNING
Avoid contact with ESD marked components.

WARNING
Consider all electrical leads to be energized until positively proven they are de-energized.

WARNING
To prevent personnel injury, electrical safety procedures shall be IAW NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b.

6) Conduct an IVV check IAW the NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b to ensure the equipment is de-energized.
7) Remove the cabinet door of the remote KVM amplifier unit.
8) Ensure the circuits are de-energized.
9) Remove the shield and extend the drawer for access to the interior components of the remote KVM amplifier unit.
10) Remove FL1 as follows:
    a) Remove the screws that secure FL1 to the cabinet.
    b) Disconnect the wiring from FL1.
    c) Remove FL1.

11) Install the replacement FL1 as follows:

a) Connect the wiring to FL1.

b) Assemble FL1 to the cabinet, then secure it by using the screws removed previously.

c) Tighten the screws.

WARNING
Voltage that is dangerous to life is present when the equipment is open and energized. Do not work alone.

12) Reinstall and secure the cabinet door of the remote KVM amplifier unit.

13) Remove the danger tags and energize the circuits IAW the TUM.

14) Notify the OOD/CDO that maintenance is complete.

15) Report the results to the work center supervisor and make the required material history entries.

16) Return the equipment/system to desired status or readiness condition.

c. Power supply (PS1) replacement procedure.

1) The PS1 replacement procedure for the remote KVM amplifier unit (Unit 23) of the NAV 3 station is the same procedure for all other KVM amplifier units (Unit 20, 21, and 24).

CAUTION
Powering down the IBNS Cabinet No. 1 before a proper shutdown is performed can result in the loss of operating system data.

NOTE
Obtain permission from the OOD/CDO to perform maintenance on the unit.

2) Obtain permission from the OOD/CDO to perform maintenance on the unit.

3) Exit the VMS at the CIC NAV 3 station IAW the EOSS.

WARNING
To prevent personnel injury, tag-out procedures shall be IAW the TUM, S0400-AD-URM-010/TUM.

4) De-energize the NAV 3 station and danger tag DO NOT OPERATE IAW the TUM.

5) De-energize IBNS Cabinet No. 1 and danger tag DO NOT OPERATE IAW the TUM.

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6) Conduct an IVV check IAW the NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b to ensure the equipment is de-energized.
7) Remove the cabinet door of the remote KVM amplifier unit.
8) Ensure the circuits are de-energized.
9) Remove the shield and extend the drawer for access to the interior components of the remote KVM amplifier unit.
10) Remove PS1 as follows:
    a) Remove the screws that secure the mounting bracket to the cabinet to gain access to PS1.
    b) Remove the screws that secure PS1 to the mounting bracket.
    c) Disconnect the wiring from the defective PS1.
    d) Remove PS1.
11) Install the replacement PS1 as follows:
    a) Connect the wiring to PS1.
    b) Assemble PS1 to the mounting bracket, then secure it by using the screws removed previously.
    c) Secure the mounting bracket to the cabinet by using the screws removed previously.
    d) Tighten the screws.
12) Reinstall and secure the cabinet door of the remote KVM amplifier unit.
13) Remove the danger tags and energize the circuits IAW the TUM.
14) Notify the OOD/CDO that maintenance is complete.

15) Report the results to the work center supervisor and make the required material history entries.

16) Return the equipment/system to desired status or readiness condition.

d. KVM amplifier (A1) replacement procedure.

1) The A1 replacement procedure for the remote KVM amplifier unit (Unit 23) of the NAV 3 station is the same procedure for all other KVM amplifier units (Unit 20, 21, and 24).

CAUTION
Powering down the IBNS Cabinet No. 1 before a proper shutdown is performed can result in the loss of operating system data.

NOTE
Obtain permission from the OOD/CDO to perform maintenance on the unit.

2) Obtain permission from the OOD/CDO to perform maintenance on the unit.

3) Exit the VMS at the CIC NAV 3 station IAW the EOSS.

WARNING
To prevent personnel injury, tag-out procedures shall be IAW the TUM, S0400-AD-URM-010/TUM.

4) De-energize NAV 3 station and danger tag DO NOT OPERATE IAW the TUM.

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6) Conduct an IVV check IAW the NSTM Chapter 300, Section 300-2.4 and Table 300-2-1a, and/or Section 300-2.5 and Table 300-2-1b to ensure the equipment is de-energized.
7) Remove the cabinet door of the remote KVM amplifier unit.
8) Ensure the circuits are de-energized.
9) Remove the shield and extend the drawer for access to the interior components of the remote KVM amplifier unit.
10) Remove A1 as follows:
    a) Remove the screws that secure the mounting bracket to the cabinet to gain access to A1.
    b) Remove the screws that secure A1 to the mounting bracket.
    c) Disconnect the wiring from the defective A1.
    d) Remove A1.
11) Install the replacement A1 as follows:
    a) Connect the wiring to A1.
    b) Assemble A1 to the mounting bracket, then secure it by using the screws removed previously.
    c) Secure the mounting bracket to the cabinet by using the screws removed previously.
    d) Tighten the screws.
12) Reinstall and secure the cabinet door of the remote KVM amplifier unit.
13) Remove the danger tags and energize the circuits IAW the TUM.
14) Notify the OOD/CDO that maintenance is complete.
15) Report the results to the work center supervisor and make the required material history entries.
16) Return the equipment/system to desired status or readiness condition

ASSIGNMENT SHEET 3-3-3

KEYBOARD-VIDEO-MOUSE (KVM) AMPLIFIER UNITS

A. INTRODUCTION

The Electronic Chart Data and Information System-Navy/Automatic Radar Plotting Aid (ECDIS-N/ARPA) subsystem provides centralized monitoring of electronic navigation and other automatic functions that are vital to the ship's steering system. To keep steering dependable under all service conditions, it is important to understand how to maintain and operate the ECDIS-N/ARPA subsystem and associated equipment. This lesson will cover the function and maintenance of the Keyboard-Video-Mouse (KVM) amplifier unit.

B. ENABLING OBJECTIVES

3.7 **MAINTAIN** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

3.8 **TROUBLESHOOT** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

3.9 **REPAIR** Keyboard-Video-Mouse (KVM) amplifier units given applicable technical documentation with 80 percent accuracy.

C. STUDY ASSIGNMENT

1. Review the lesson material.
2. Answer the study questions.

D. STUDY QUESTIONS

1. Which Keyboard-Video-Mouse (KVM) units are used with the NAV 1 station and which KVM units are used with the NAV 3 station?
   a. Remote KVM Amplifier Unit 20 is used with the NAV1 station.
   b. Remote KVM Amplifier Unit 23 is used with the NAV 3 station.
   c. Local KVM Amplifier Unit 21 is used with the NAV1 station.
   d. Local KVM Amplifier Unit 24 is used with the NAV 3 station.
2. How often should the cleaning and inspection procedures on the Keyboard-Video-Mouse (KVM) amplifier unit be performed while inport?
   a. Every twenty-four months.
3. What are the three replaceable major components that are found in all four Keyboard-Video-Mouse (KVM) units?
   a. Electromagnetic Interference (EMI) line filter (FL1).
   b. Power supply (PS1).
   c. KVM amplifier (A1).

4. What is the relationship between the Keyboard-Video-Mouse (KVM) amplifier units to IBNS Cabinet No. 1?

   a. The KVM amplifier units transmit the data from the navigation computers to the corresponding KVM amplifier located in IBNS Cabinet No. 1.

5. What input voltage is required to operate all four Keyboard-Video-Mouse (KVM) units?

   a. 115 VAC from the ship.