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Description - This material is intended only for Signa Horizon systems.

1- INTRODUCTION

There are times, when troubleshooting the Gradient Driver Subsystem, that it would be helpful to swap a GRAM from one axis with a GRAM from another axis. This can be done by physically swapping one GRAM with another; however, there is a GRAM Troubleshooting Harness that allows GRAMs to be swapped without actual physical movement. The GRAM Troubleshooting Harness is a proprietary service tool. The GRAM Troubleshooting Harness Kit number is 2141174.

This kit includes two harness assemblies. One harness assembly brings the input and output signals from one GRAM to another; the second brings the input and output signals from the second GRAM to the first. It is critical that the data and control signals for each GRAM be exchanged. This can be done by swapping the cables at the interface panel for the GRAM Cabinet.

2- GRAM TROUBLESHOOTING HARNESS KIT CONTENTS

The GRAM Troubleshooting Harness Kit contains two GRAM Cable Harnesses, four extenders and bolts, and a set of operating instructions.

3- GRAM SWAPPING PROCEDURE

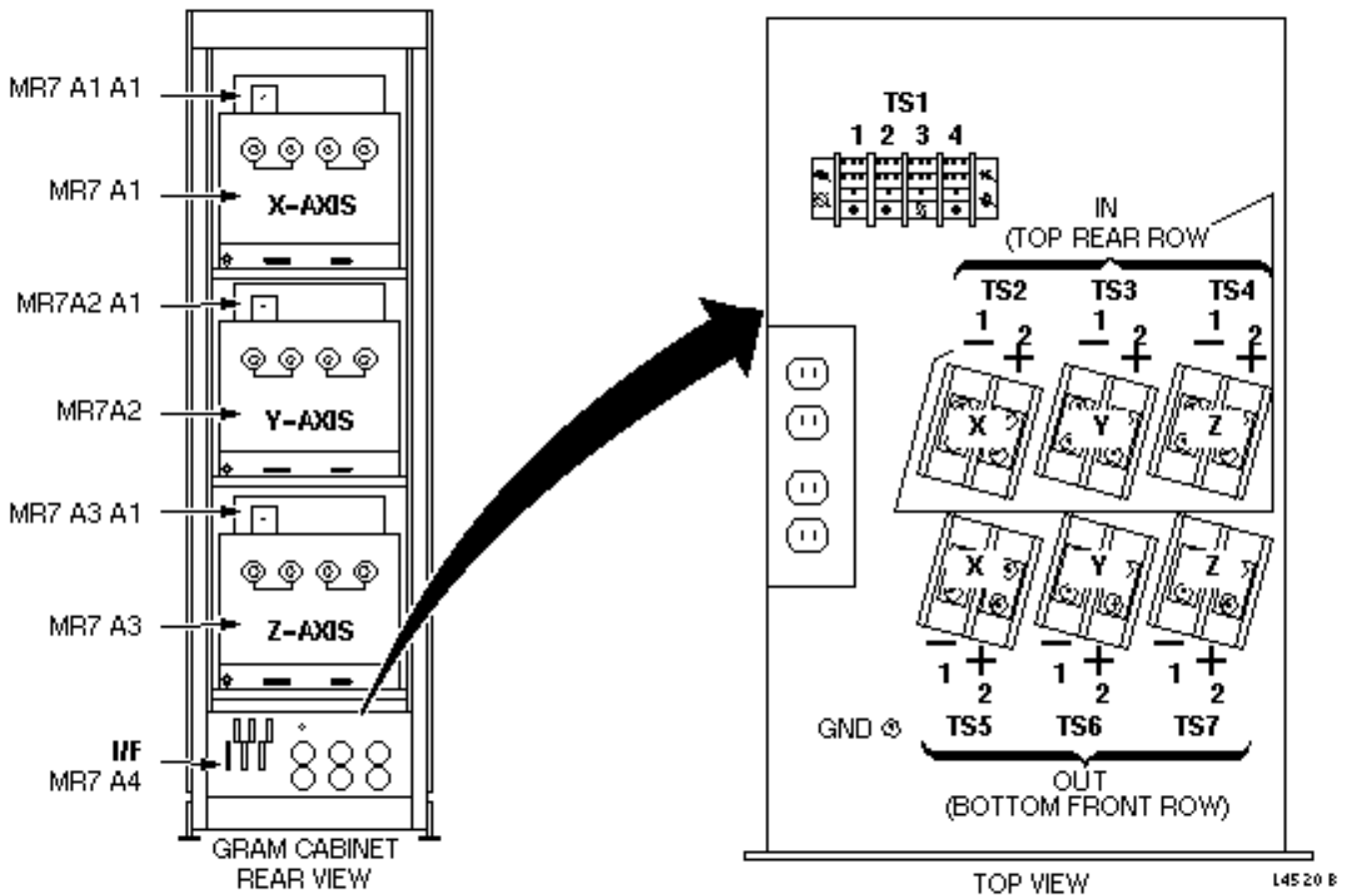
3-1 Preliminary Set-up

1. Lock out and tag out the PDU Circuit Breaker for the GRAM Cabinet and the 8645 Gradient Amplifier Cabinet using appropriate OSHA procedure. (Refer to *Procedure For Safety: Section 6.*)

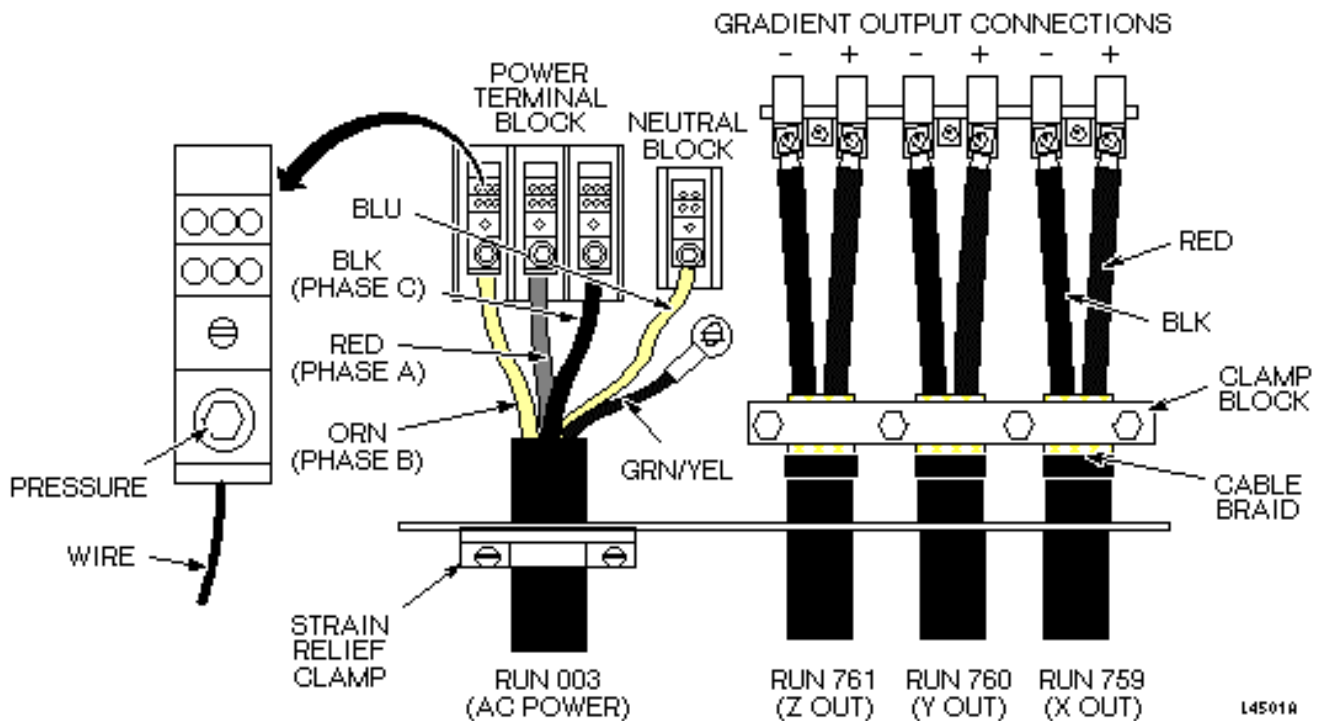
Note

Access to TS1 - Gain access to TS1 by sliding the bottom GRAM assembly (Z-axis) forward. Ensure stability of GRAM Cabinet by first extending the stabilizer feet.

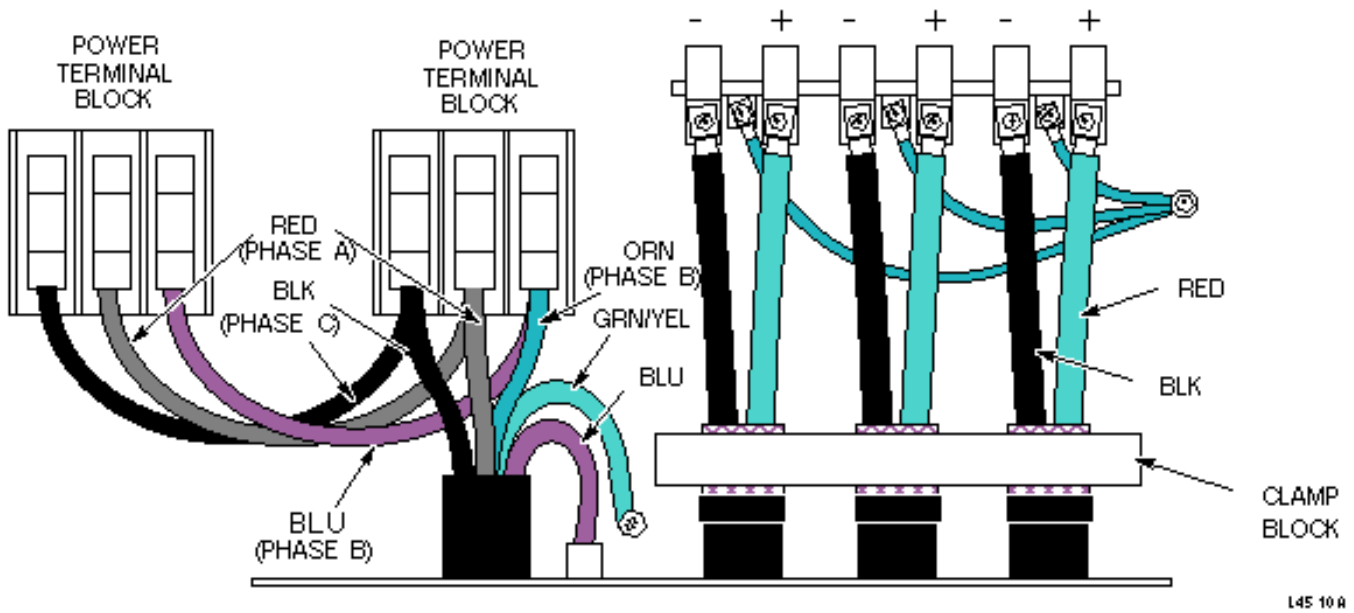
2. Verify that all of the energy has been disabled by measuring incoming power to the GRAM Cabinet at TS1. See Illustration L4520B. Verify that all energy has been disabled for the 8645 Gradient Amplifier Cabinet by measuring power at TS1. Also see Illustration L4501A for Signa Horizon HiSpeed system, or Illustration L4510A for Signa Horizon or Horizon EchoSpeed systems.



GRAM CABINET, REAR VIEW – BOTTOM PANEL AND TS1
 ILLUSTRATION L4520B



8645 CABINET POWER AND OUTPUT CABLE CONNECTIONS
 ILLUSTRATION L4501A



INCOMING POWER TO A DOUBLE-BAY 8645 GRADIENT CABINET
 ILLUSTRATION L4510A

DANGER!!

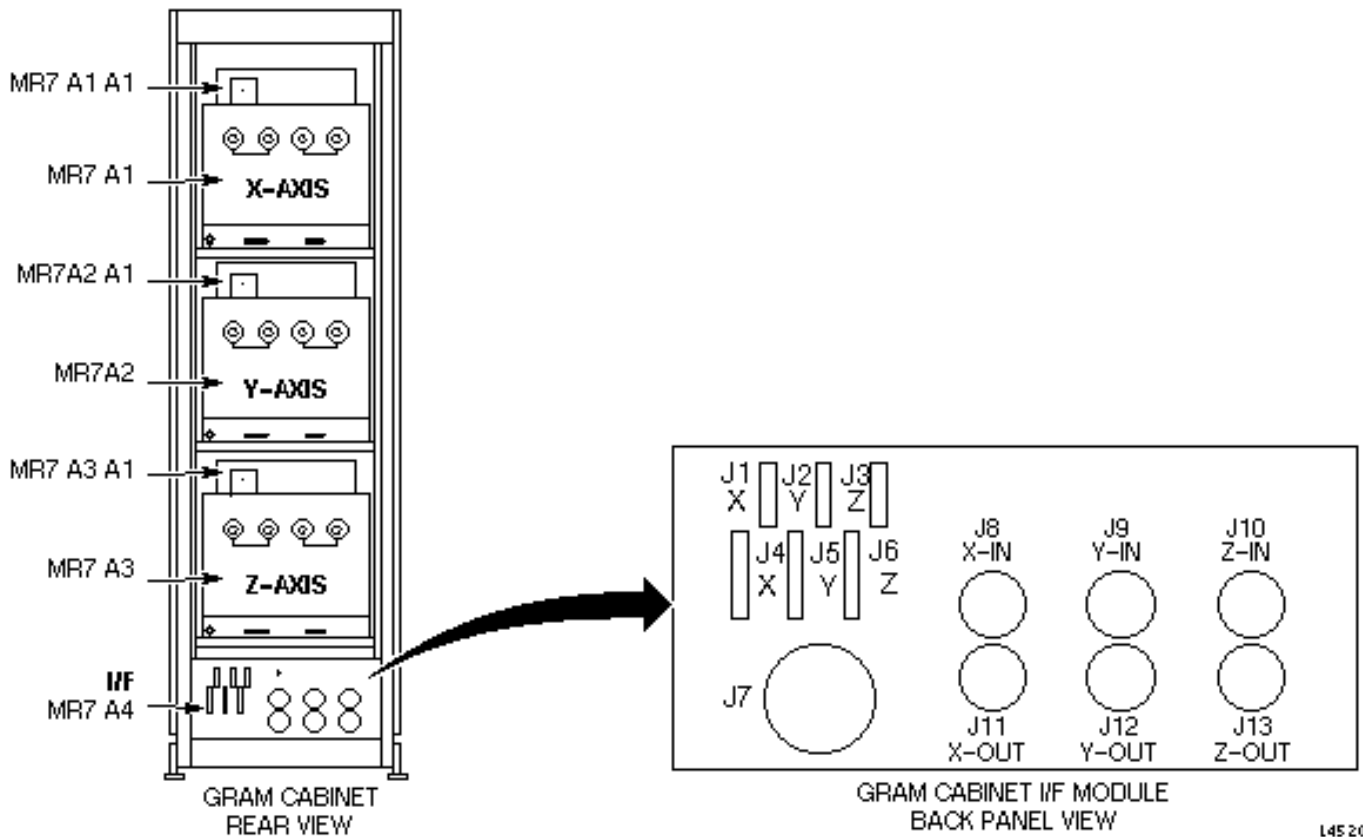
CATASTROPHIC HARDWARE FAILURE!! APPROPRIATE DATA AND CONTROL CABLES MUST BE SWAPPED WHEN USING THIS TEST FIXTURE. FAILURE TO DO SO CAN CAUSE CATASTROPHIC HARDWARE FAILURE. FOR EXAMPLE, IF SWAP-PING X AND Y GRAM MODULES USING THIS FIXTURE, ALSO SWAP X DATA AND CONTROL (J1 & J4) WITH Y DATA AND CONTROL (J2 & J5) AT THE GRAM CABINET INTERFACE.

3-2 - Swapping Procedure

1. The appropriate data and control cables at the GRAM Cabinet Interface. See Table 1 and Illustration L4520C.

TABLE 1
 GRAM DATA AND STATUS CABLES

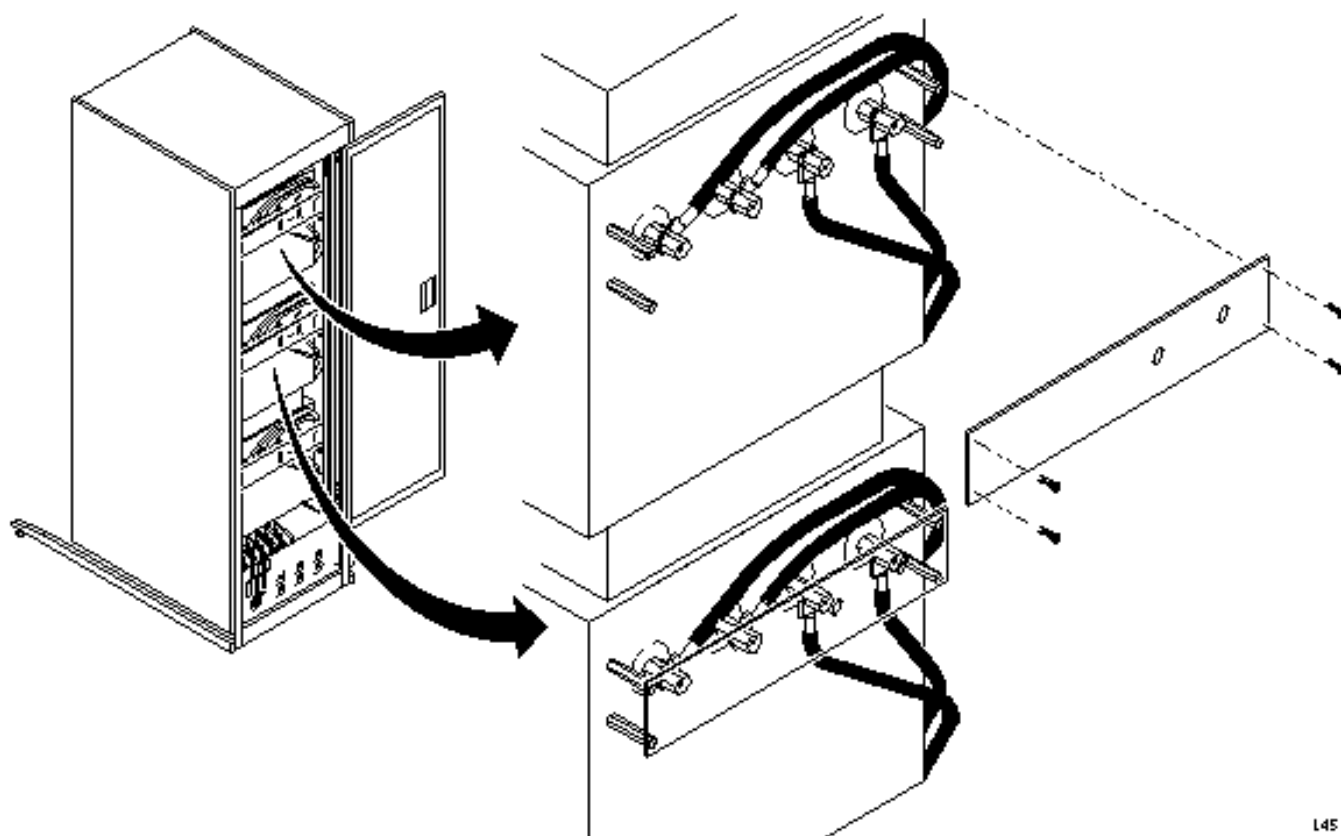
Axis	GRAM Data Cable	GRAM Status Cable
X	J1	J4
Y	J2	J5
Z	J3	J6



I/F MODULE BACK PANEL - STATUS AND CONTROL INTERCONNECTS
ILLUSTRATION L4520C

L45 20 C

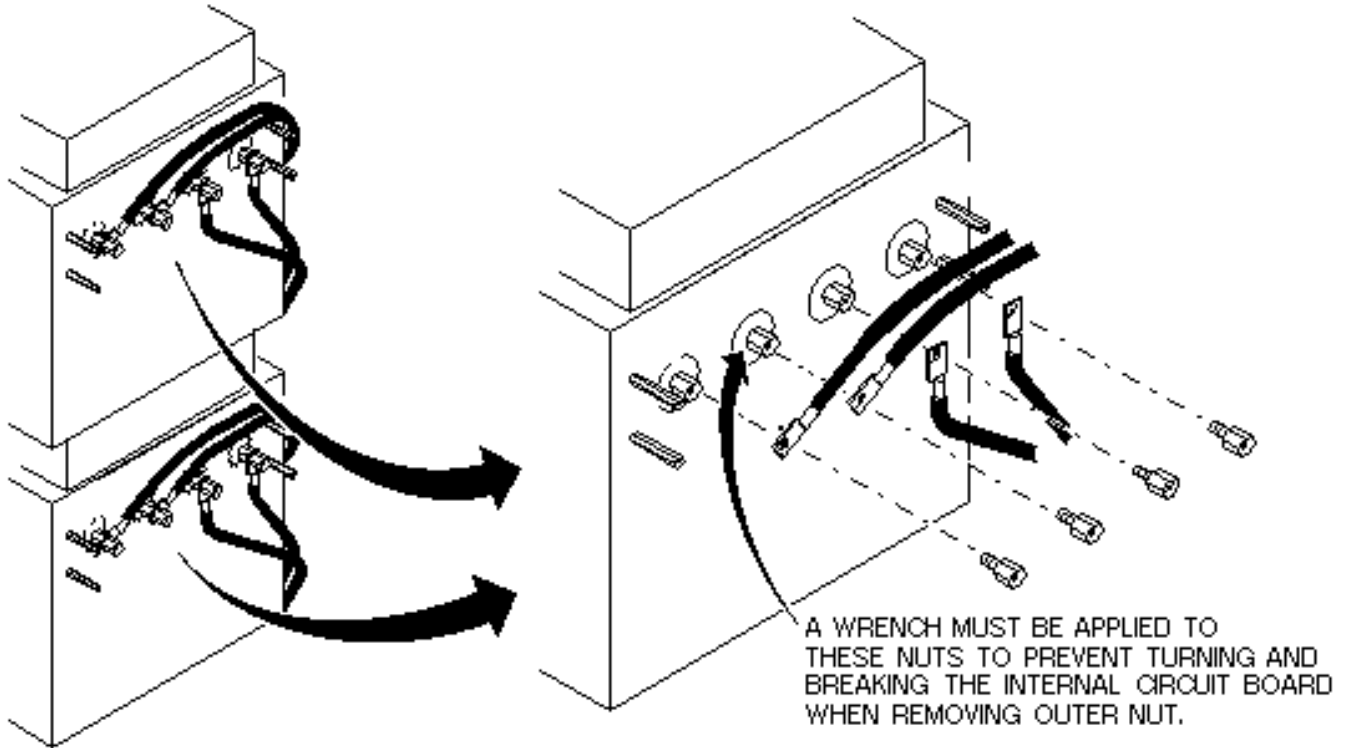
2. Disconnect the protective cover from the rear of the GRAM for the two axes of interest. See Illustration L4578A.



GRAM SWAPPING: REMOVE PROTECTIVE PANEL
ILLUSTRATION L4578A

L4578A

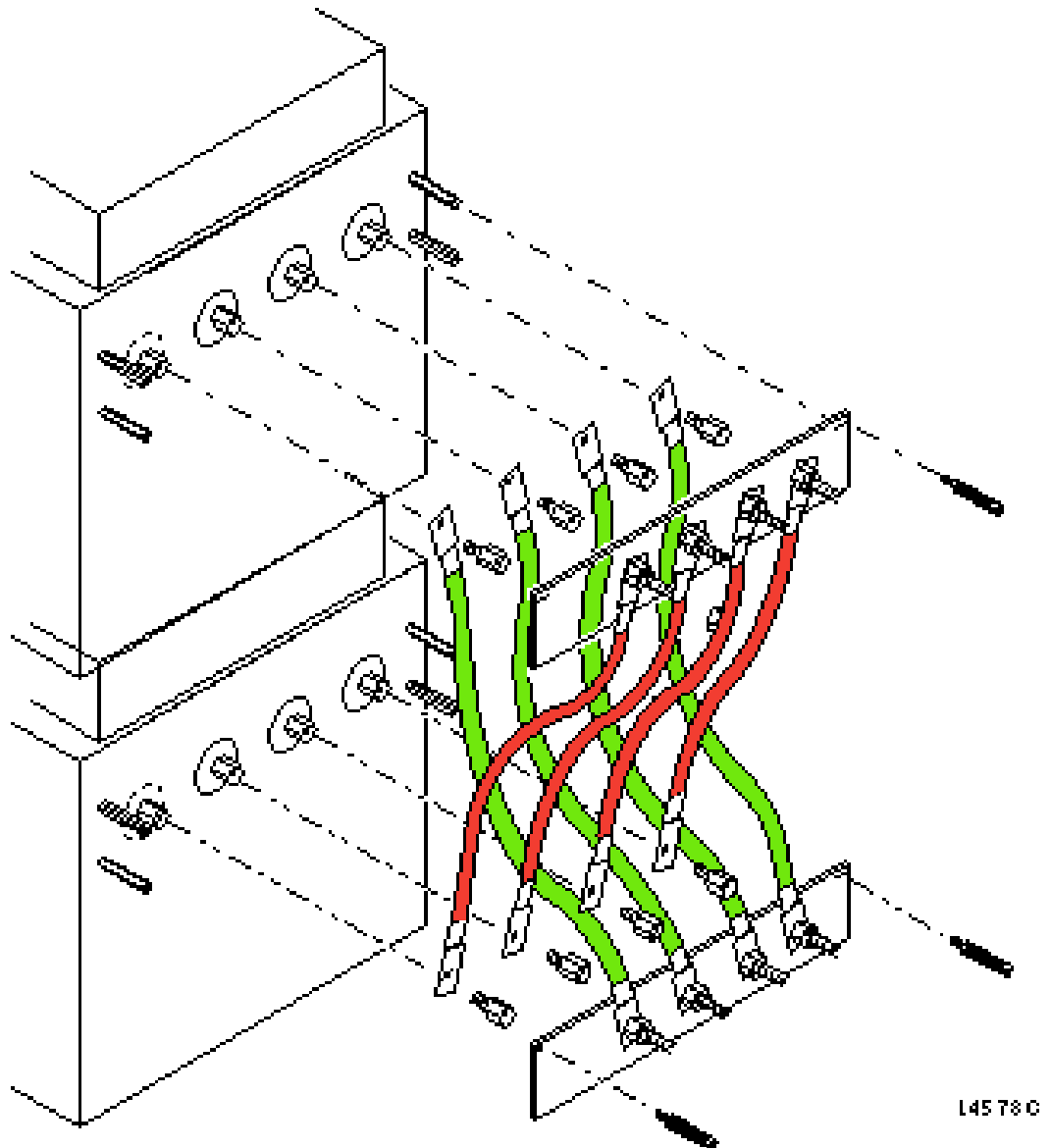
3. Remove the input and output bolts and cables for each GRAM. See Illustration L4578B.



L4578 B

GRAM SWAPPING: REMOVE INPUT AND OUTPUT BOLTS AND CABLES
ILLUSTRATION L4578B

The next four steps prepare the GRAM to swap input and output connections by connecting the harness to the opposite connections. Use Illustration L4578C as a reference for all four steps.



GRAM SWAPPING: CONNECT UPPER AND LOWER HARNESSES
ILLUSTRATION L4578C

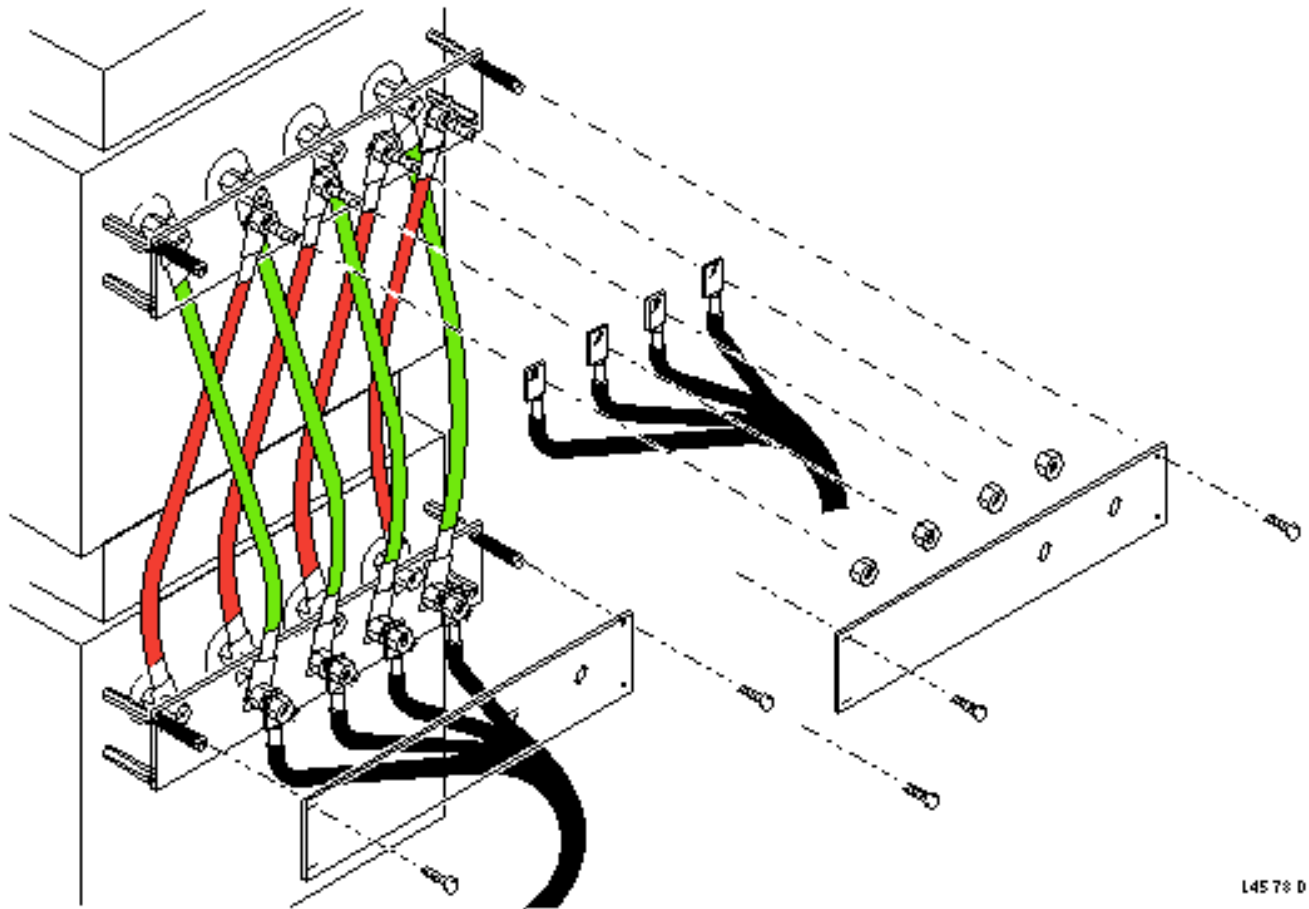
4. Take the yellow GRAM Troubleshooting Harness from the kit, unbolt it, and connect the protective cover to the top GRAM of interest.
5. Connect the loose end of the yellow harness cables to the bottom GRAM inputs and outputs.

Note

GRAM hex caps torque values - Using a standard torque wrench, tighten all hex bolts on the GRAM leads to 35 ft lbs.

6. Connect the orange GRAM Troubleshooting Harness from the kit, unbolt it, and connect the protective cover to the bottom GRAM of interest.

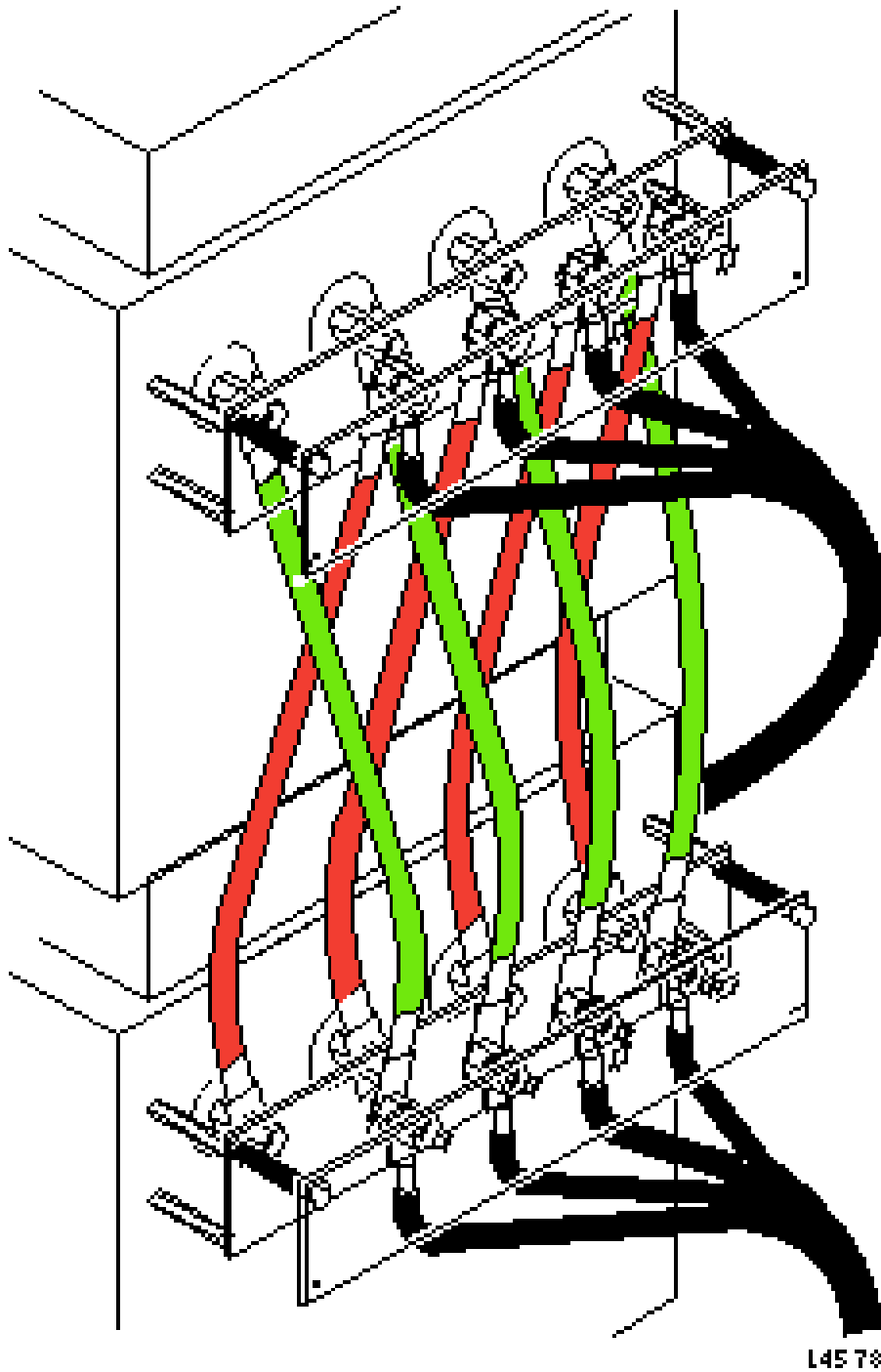
7. Connect the loose end of the orange harness cables to the top GRAM inputs and outputs.
8. Connect the GRAM Module input and output cables to the GRAM Troubleshooting Harness input and output lugs for each GRAM. See Illustration L4578D.



L4578 D

GRAM SWAPPING: CONNECT INPUT AND OUTPUT CABLES TO HARNESS
ILLUSTRATION L4578D

9. Place the original protective panel on the GRAM Troubleshooting Harness using the standoffs. See Illustration L4578E.



GRAM SWAP: ATTACH PROTECTIVE PANELS
ILLUSTRATION L4578E

Note

Missing bolts - There are only three bolts left to connect. The fourth standoff has intentionally been left off to avoid the possibility of cables or lugs shorting with it.

10. Run the Gradient Driver Tests from the IPG Test set on the Diags Menu to troubleshoot this configuration. See procedure for Gradient Driver Tests.

4- SYSTEM RESTORATION

Note

GRAM hex caps torque values - Using a standard torque wrench, tighten all hex bolts on the GRAM leads to 35 ft lbs,

1. Reconfigure the system by removing the GRAM Troubleshooting Harness. Remember to place the quick reference cards back in the kit.
2. Restore the appropriate data and control cables at the GRAM Cabinet Interface to their original configuration.
3. Always perform a head or body scan to ensure system functionality.

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	May 28, 1998	J. Saperstein	Initial conversion from Toolbook to Word format.
1	May 21, 1999	SM Atladottir	Updated Procedure References for New GUI
2	October 13, 1999	K. Keshena	Changed to proprietary header.