HARRIS

Remote Measurement Unit (RMU) 3400

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REGULATORY INFORMATION:

WARNING: This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the installation manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15, Subpart J of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Contents

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1

Contents

About This Guide

This guide is to assist the technician with installation of the Remote Measurement Unit (RMU) 3400. Please note that this document covers only the installation of the RMU in the test network. Additional information required to configure the RMU at the Remote Terminal and in the Loop Maintenance Operating System (LMOS)/MLT database is in the following documents:

■ CMU/RMU MLT Configuration Manual, Document Number 0II-726028-001. This document covers the configuration required on the MLT/LMOS Front End.

Information covered in this manual and the above-referenced manual cover all versions of the CMU, and only versions 3400 or later of the RMU.

Any questions regarding this, or the above noted documentation or the information or practices or procedures described within, should be referred to the Harris Technical Support Department.

General Description

Remote Measurement Unit

The Harris Remote Measurement Unit (RMU) 3400 is a general purpose testing instrument which performs metallic analog tests on telephone loops. The RMU 3400 has no accessing capability of its own, and therefore expects the pair under test to be connected to its import terminals by some external means. It can be connected to and test only one line at a time. The RMU 3400 is capable of measuring or deriving AC and DC voltage, current, and resistance, as well as capacitance between Tip and Ground, Ring and Ground, and Tip and Ring. Other features include the capability for test personnel to alternately monitor, apply ringing, and talk over the loop. The RMU is controlled by commands sent over the dial-up data link, and test results are returned via this link through a built-in modem.

The RMU 3400 is used as a testing arm of the Loop Maintenance Operations System (LMOS). It complements the testing capability provided by the Mechanized Loop Testing-2 (MLT-2) and MLT-3 systems, and allows testing of the loops that are currently not reachable by MLT. The RMU 3400 is applied to testing lines that are served by those Digital Loop Carrier Systems (DLCs) in situations where the use of metallic bypass test pair is not practical. The RMU 3400 is installed at the Remote Terminal location of these carrier systems, and is designed to withstand the temperature and humidity extremes found in such environments.

RMU 3400 Test Network

The RMU 3400 handles almost all MLT tests that can be done by the Loop Test System (LTS) over metallic bypass pairs (see Figure 1-1). Repair Service Attendants (RSAs) and Maintenance Administrators (MAs) will see little difference between tests done using an RMU and those done by an LTS over metallic bypass pairs, except for a slightly longer response time. The RMU Test Network consists of four major parts:

■ The existing LMOS/MLT system, including the Front End Controller (FE), Data Communications Network (DCN), Directly Connected Test Unit (DCTU), and the Loop Test System (LTS). The LTS and the LMOS/MLT system provide the loop access and CO testing functions that are currently used for loop carrier systems having metallic by-pass pairs.
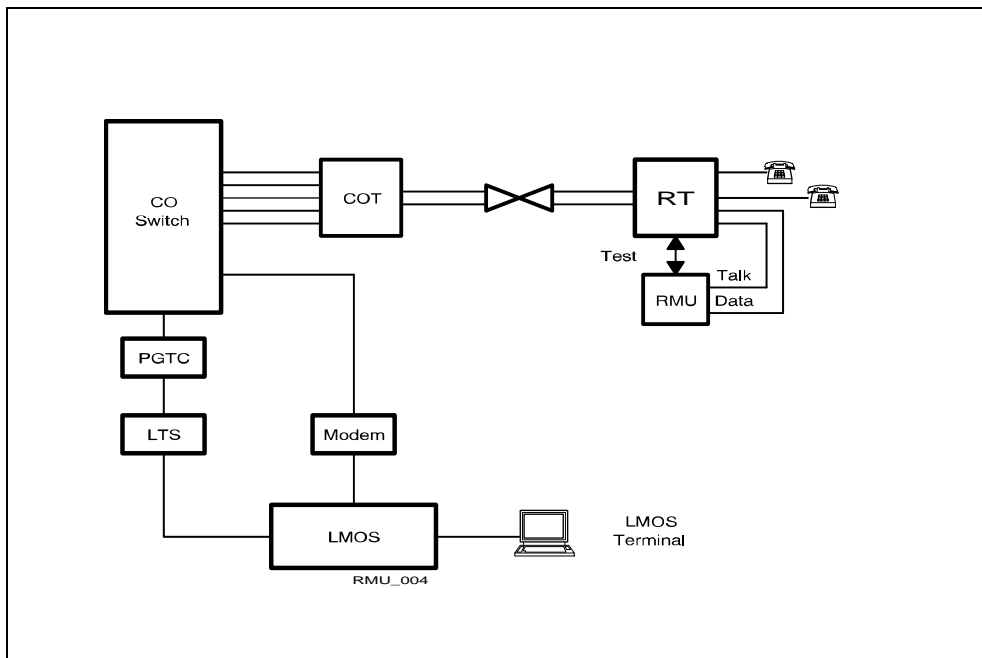

Figure 1-1. RMU 3400 Architecture

■ The Communications Gateway, which is part of the FE processor, is incorporated in MLT Generic 4 (and later) software. The Communications Gateway dials the RMU over a standard POTS telephone line, establishes data communications, and handles the transport of messages between the FE and the RMU 3400.

- The RMU 3400 itself, which provides all testing functions for the remote end of the line under test. Access to the line is provided by the LTS and the Pair Gain Test Controller (PGTC) or Extended Test Controller (XTC).

- The RMU 3400 control software, which is also part of the FE processor and is incorporated in MLT Generic 4 (and later) software, and which provides coordination between the various other components of the system.

Contents of This Package

The RMU 3400 package contains the following:

- Remote Measurement Unit 3400 (RMU 3400) (see Figure 1-2).
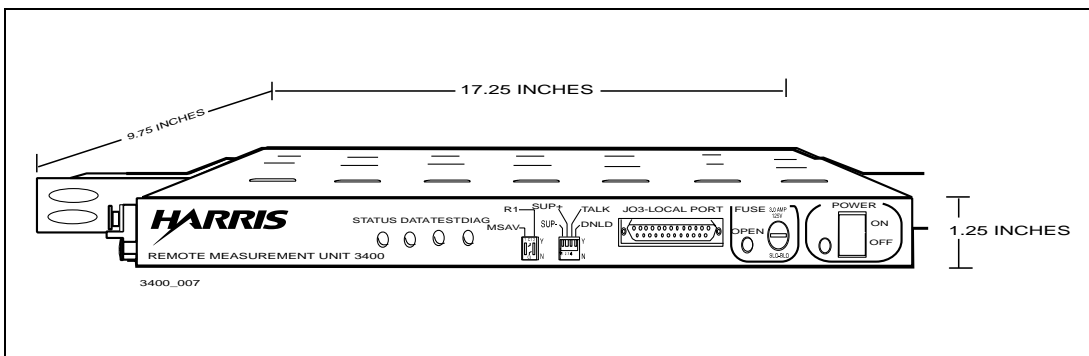
- RMU 3400 Installation Manual.

Figure 1-2. RMU 3400

Pre-Installation

This installation manual gives information on pre-installation requirements, mounting, and connection of the RMU 3400.

Parts and Tools Required

The following equipment and components are required for installing the RMU 3400:

■ Remote Measurement Unit 3400 (RMU 3400).

■ RMU 3400 Installation Kit containing:

   ■ Connectorized Cable Assemblies

   ■ Wires

   ■ Terminals

   ■ Spare Fuses

   ■ Mounting Hardware

   ■ RMU 3400 Installation Guide

   ■ AC Power Cord (convertible to DC power cord)

   ■ Alarm Plug

Installation Instructions

The front of the RMU 3400 (see Figure 1-3) has the power switch, fuse, logo, and indicator lights. When facing the front, the RMU 3400 should have the power cord extending from its right side.

The RMU 3400 must be installed so the ventilation openings on the top of the unit are not obstructed. Blocking the ventilation openings could cause overheating of the unit.
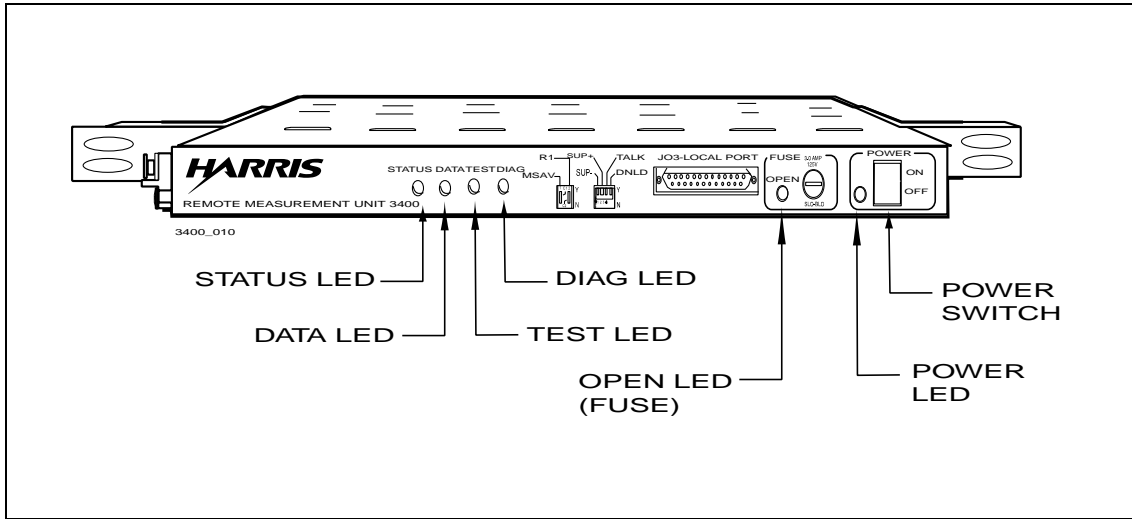
Figure 1-3. Front of the RMU 3400

Attach Mounting Brackets to RMU 3400

The shorter, 1 inch brackets are to be used when mounting the RMU 3400 in a 19 inch rack (see Figure 1-4). When mounting in a 23 inch cabinet, place the 5 inch bracket on the left, and the 1 inch bracket on the right side. If a pair of 3 inch brackets are provided, both are to be used when mounting in a 23 inch rack. Use the 8x32 screws (supplied) to secure the brackets to the unit. Do not mount the RMU 3400 at this point. You will be instructed to do so later in this manual.
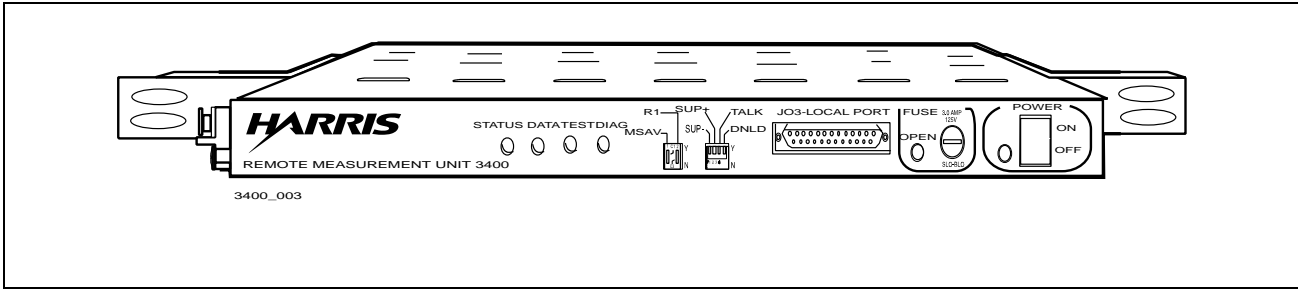
Figure 1-4. RMU with Mounting Brackets

Attach Ground Wires to RMU

1. Strip both ends of the 16 AWG (black) ground wire (supplied in kit).

2. Strip the end of the 24 AWG (black) stranded wire coming from the jack cable (J1) assembly (the ringing cable shield ground wire) and crimp it to the appropriate spade tongue terminal. Figure 1-5 illustrates the RMU with cables connected.

3. Connect both spade tongue terminals to the insulated ground lug on the RMU 3400 (on the left side of the RMU 3400 near the J01 and P01 connectors).

Figure 1-5. RMU 3400 with Cables Connected

Mount RMU 3400 in Rack

Mount the RMU 3400, with bracket assembly already attached, to the rack with a panel screw on each side (see Figure 1-6). There must be at least 1¼ inches of vertical rack space available for mounting. Do not plug connectors J01 and P01 in at this point.
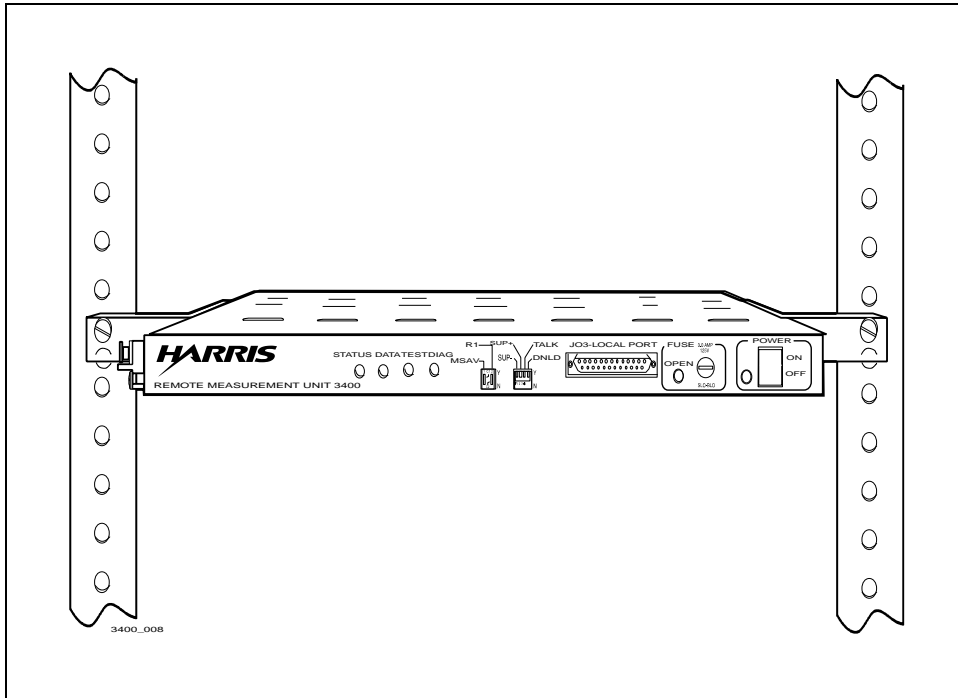
Figure 1-6. RMU 3400 Mounted in Rack

Attach Ground Wire to the Principal Office Ground Point
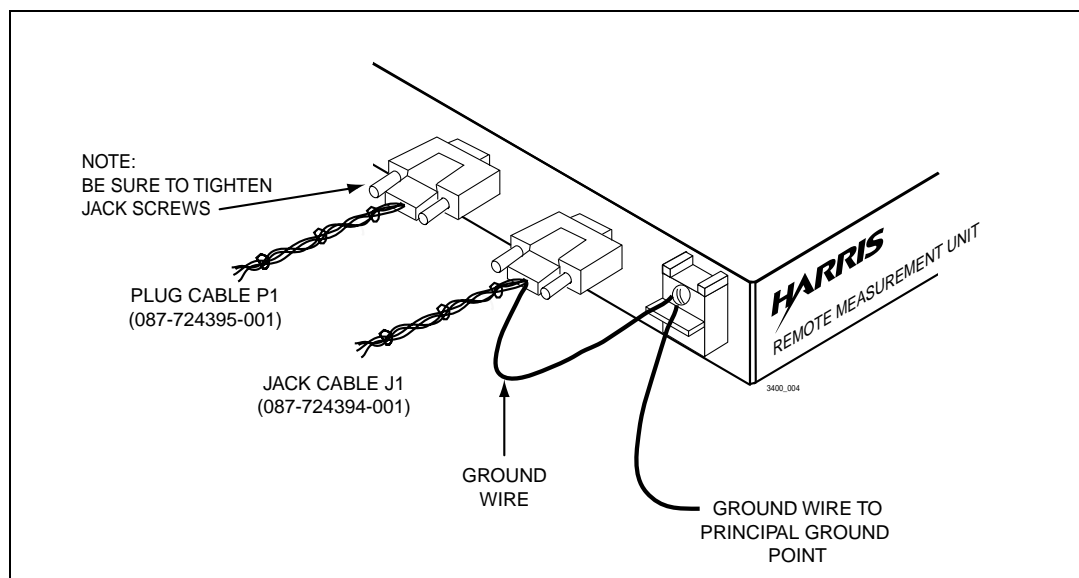
Note: For SLC-Series 5 in an 80 type cabinet, there may not be an enclosure ring ground. In these cases the rack will be of unpainted aluminum and will serve as the carrier system ground. Ground the insulated 16 AWG wire to the rack near the place where the carrier system is grounded.

1. Run the 16 AWG grounding wire from the RMU to the principal office ground point.

2. Connect (crimp) the appropriate, insulated, ring tongue terminal.

3. Connect the ring tongue terminal to the hut/cabinet ring ground (see Figure 1-6).

Connect Ringing, Battery and Test Pair

Connect Ringing

1. Run the RMU 3400's shielded Ring Cable (5 foot black wire to the carrier system's Ring Generator.

2. Cut to the appropriate length and strip cable shield exposing the black, red, and bare wires.

3. Strip the black and red wires and attach (crimp or screw down) the red wire to the carrier system's negative Super Imposed (Sup -) ringing voltage.

4. Attach (crimp or screw down) the black wire to the carrier system's positive Super Imposed (Sup +) ringing voltage. Refer to Figure 1-7.

Connecting Battery

1. Run the RMU 3400's battery wires (orange and orange-black wires) to the carrier system's power supply.

2. Cut the appropriate length and strip to expose wire.

3. Attach (crimp or screw down) the -48 Volt orange wire to the battery.

4. Attach (crimp or screw down) the -48 Volt return (orange-black wire) to the battery return (see Figure 1-7 and Table 1-1).

Connecting Test Pair

1. Run the RMU 3400's Test Pairs (green and green-white wires) to the carrier system's DC test pair location.

2. Cut the wires to the appropriate length.

3. Attach (crimp or screw down) the green wire to the Tip side of the DC Test Pair.

4. Attach (crimp or screw down) the green-white wire to the Ring side of the DC Test Pair (see Figure 1-7 and Table 1-1).
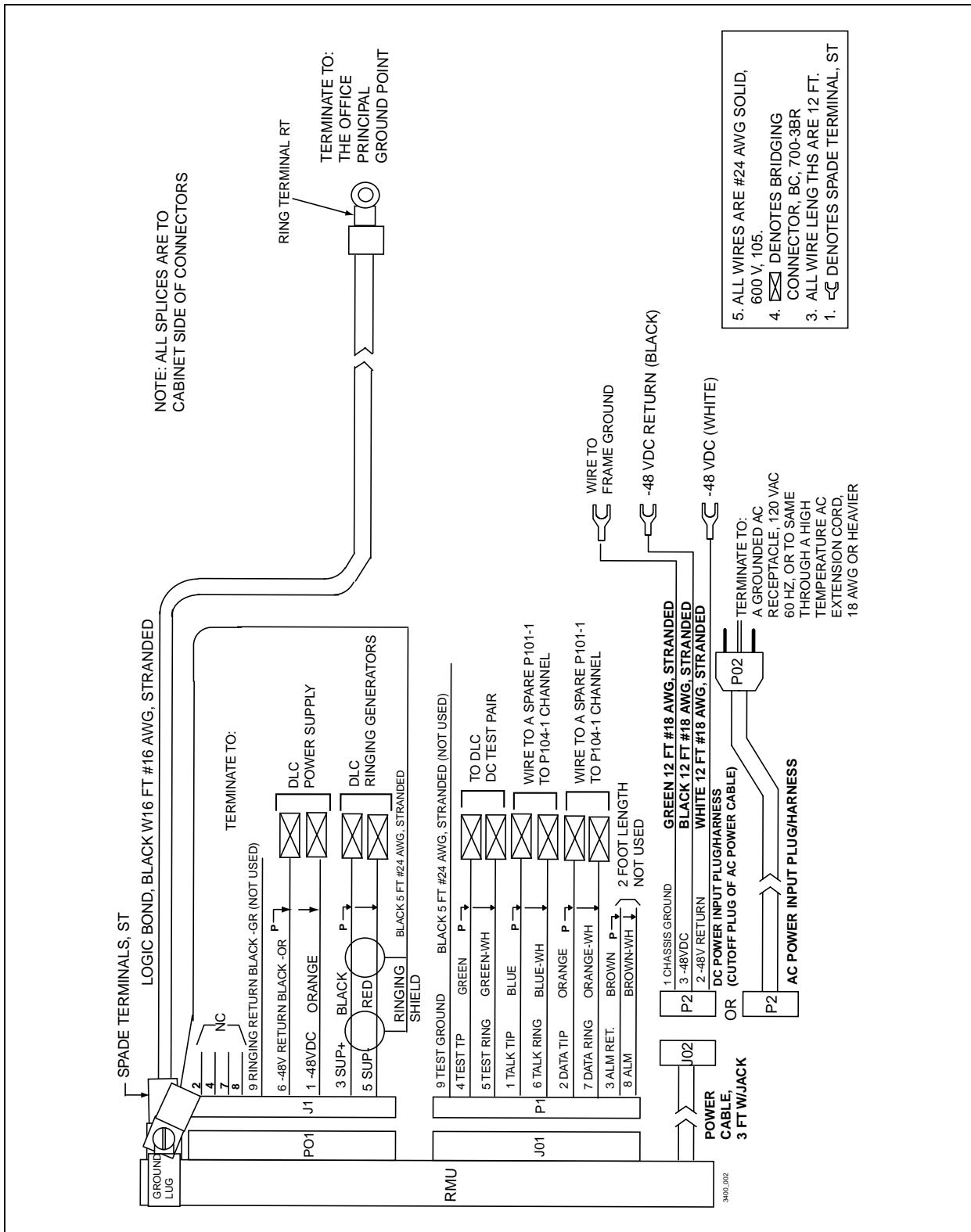
Figure 1-7. Universal Wiring Diagram

Table 1-1. RMU 3400's Ring, Battery and Test Pair

Name	Jack or Plug Wire ID	Color	Voltage
Test Tip (test pair)	P1, Pin 4	GR	0 V
Test Ring (test pair)	P1, Pin 4	GR-WH	0 V
Positive Ringing Supply	J1, Socket 3	BK	86-105 VAC/+48 VDC
Negative Ringing Supply	J1, Socket 5	R	86-105 VAC/-48 VDC
Common Ringing Return	J1, Socket 9	BK-GR	0 VDC

Connect Data and Talk POTS Lines from Carrier System to Channel Bank to RMU 3400

Connect Talk Pair

1. Run the RMU 3400's Talk Pair (blue and blue-white wires) to the location of the assigned Talk Telephone Channel Unit.

2. Cut the wire to the appropriate length and strip the end.

3. Attach (crimp or punch down) the Talk Tip (blue wire) to the Channel Unit's Tip side.

4. Attach (crimp or punch down) the Talk Ring (blue-white wire) to the Channel Unit's Ring side (see Figure 1-7 and Table 1-2).

Table 1-2. RMU 3400's Data Pair

Name	Wire IDs	Color
Talk Tip	P1, Pin 1	BL
Talk Ring	P1, Pin 6	BL-WH
Data Tip	P1, Pin 2	OR

Connect Data Pair	1.	Run the RMU 3400's Data Pair (orange and orange-white wires) to the location of the assigned Data Telephone Channel Unit.
	2.	Cut the wire to the appropriate length and strip the end.
	3.	Attach (crimp or punch down) the Data Tip (orange wire) to the Channel Unit's Data side.
	4.	Attach (crimp or punch down) the Data Ring (orange-white wire) to the Channel Unit's Data side (see Table 1-2).

Connect P1 and J1 Cable Connectors to RMU 3400

Once the Data and Talk POTS lines from carrier system channel bank to the RMU 3400 are connected, connect the cable connectors. Connect P1 and J1 plug and jack cable assemblies (supplied) to the J01 and P01 ports, respectively, on the RMU 3400 (see Figure 1-5). Tighten jack screws.

Connecting Power to the RMU 3400

The RMU can be either AC or DC powered. The following describes both processes.

AC Powering

Note: Do not use a Ground Fault Interruption (GFI) AC outlet.

To power the RMU 3400 with AC power, simply use the AC cable supplied and connect the 3-pin Amp connector of the AC cable to the power cord of the RMU 3400. Plug the 3-prong connector to the AC outlet.

DC Powering

To power the RMU 3400 with DC power:

1. Cutting off the plug end of the AC cable (supplied), stripping back the jacket.

2. Connect the white, black, and green to -48 VDC from the carrier system's power supply, (see Figure 1-7) as well as the -48 VDC return and ground, respectively. Figure 1-7 shows a general wiring diagram for all RMU 3400 installations.

RMU 3400 Power Up and Verification

To power up the RMU:

1. Turn the RMU power switch to the **ON** position (see).

2. Verify that the GREEN Power LED is **ON**. If the GREEN POWER LED is off:

   a. Verify that the RED Fuse Open LED is ON. If it is ON, power down the RMU 3400 and replace the fuse.

   b. Using a voltage meter, verify that the appropriate voltages are present on the power input harness. If you are powering the unit with DC, there should be a range of 46 to 54 VDC. If you are using AC power, there should be a range of 105 to 135 VAC.

   c. If the above does not remedy the problem, contact the Harris Technical Support Department.

4. Verify that the green STATUS LED is flashing. If it is not flashing, then contact the Harris Technical Support Department.

5. Wait for approximately 1 minute or until the RMU 3400 stops clicking (end of self diagnostics).

6. Verify that the DIAG LED is **OFF**, If it is ON, then verify that all wiring is correct and the proper voltages are present. If all wiring is correct, then contact the Harris Technical Support Department.

7. The unit is powered up and installed properly.

RMU Acceptance Procedures

1. Request the MLT Administrator change the baud rate in the MLT database to 1200 baud in order to fully use the RMU 3400 capabilities and speed advantages that will be available at that baud rate.

2. Contact the MLT Administrator to DOWNLOAD the RMU 3400 with the MLT database information.

3. Run a MLT FULL test on the RMU 3400's TALK telephone line to obtain the OFFSET value.

4. Access the RMU 3400 and set the OFFSET value to the value obtained in Step 3 above.

5. Run a minimum of one FULL test on a working number in each system in the Remote Terminal.

6. If all tests are completed with no problems, full testing capabilities are available. If problems are encountered, contact the Harris Technical Support Department.

RMU 3400 LEDs and DIP Switches

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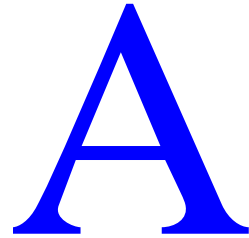
The LEDs and their possible states are described in Table A-1. The bold highlighting on Table A-1 indicates idle powered states.

The DIP Switches and settings are described in Table A-2. The bold highlighting on Table A-2 indicates default settings.

Table A-1. RMU 3400 LED States

Label	State	Description
POWER	OFF	Indicates that the RMU 3400 is NOT receiving any power, or power switch is off.
	ON	Indicates that the RMU 3400 is receiving power.
OPEN	**OFF**	Indicates that the fuse is NOT blown, power is applied and switch is on.
	ON	Indicates that the fuse is blown.
DIAG	**OFF**	Indicates that the RMU 3400 is PASSING diagnostics.
	ON	Indicates that the RMU 3400 has FAILED the diagnostics run.
TEST	**OFF**	Indicates that a test process is NOT active.
	FLASHING	Indicates that a test process is active.
DATA	**OFF**	Indicates that no data connection is established (modem on-hook).
	FLASHING	Indicates that the RMU 3400 is receiving a call on the DATA line and is off-hook to begin data link.
	ON	A valid log-in has occurred through the RMU modem.
STATUS	ON	Indicates that a data link is established.
	OFF	Indicates that the RMU processor is not functioning.
	FLASHING	Indicates that the RMU 3400 is running.

Table A-2. RMU 3400 DIP Switch Switches

Label	Setting	Description
DNLD	**Y**	Not operational on the RMU 3400.
	N	Not operational on the RMU 3400.
TALK	**Y**	Indicates that diagnostics will test for Talk line dialtone.
	N	Indicates that diagnostics will NOT test for Talk line dialtone.
SUP+	**Y**	Indicates that diagnostics will test for SUP+ ringing.
	N	Indicates that diagnostics will NOT test for SUP+ ringing.
SUP-	**Y**	Indicates that diagnostics will test for SUP- ringing.
	N	Indicates that diagnostics will NOT test for SUP- ringing.
R1	**Y**	Reserved for future use.
	N	Reserved for future use.
MSAV	**Y**	Indicates Battery Backup Memory is enabled.
	N	Indicates Battery Backup Memory is disabled.

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