

ENGINEERING NOTES

***** CONTINUED *****

TO EARTH ONLY VIA THE GROUND WINDOW MAIN GROUND BUS. THE GROUND WINDOW MAY BE LOCATED A MAXIMUM OF ONE FLOOR AWAY FROM THE ANS SYSTEM.

TO PREVENT, OR AT LEAST REDUCE THE MAGNITUDE OF FOREIGN CURRENTS FROM TRAVELING THROUGH THE SYSTEM, ANY FOREIGN GROUND BEING INTRODUCED INTO THE ISOLATED GROUND PLANE MUST PASS THROUGH THE GROUND WINDOW AND BE BONDED TO THE GROUND WINDOW MAIN GROUND BUS (GWMGB).

- 54.3 GROUNDING CONDUCTORS:
GROUNDING CONDUCTOR SIZES ARE GIVEN IN THIS DRAWING. GROUNDING CONDUCTOR INSULATION SHALL BE GREEN, UNLESS OTHERWISE INDICATED BY CUSTOMER.
- 54.4 GROUNDING CONDUCTORS ROUTING:
TO REDUCE GROUND PATH IMPEDANCE, GROUNDING CONDUCTORS SHOULD BE RUN AS STRAIGHT AS POSSIBLE WITH LARGE RADIUS BEND. AVOID RUNNING DC GROUNDING CONDUCTORS THROUGH A CONDUCTIVE CLOSED LOOP I.E. A FLOOR OR WALL CABLE HOLE WITH A STEEL SLEEVE OR FRAME, OR TOTALLY SURROUND THE CONDUCTOR WITH STEEL CLAMPS.

RUN FRAME GROUNDING CONDUCTORS ON SAME LADDER RACK AS POWER FEEDERS. BUT, KEEP THEM SEGREGATED BY RUNNING THEM ALONG THE EDGE OF THE LADDER RACK.
- 54.5 PROXIMITY GROUNDING:
IF POSSIBLE INSTALL ALL COMPONENTS (CABINETS, RACKS, ETC.) OF THE ISOLATED GROUND PLANE GREATER THEN 7 FEET FROM ANY CONDUCTIVE SURFACES I.E. STORAGE CABINETS, EXPOSED BUILDING STEEL, AIR DUCTS, OTHER ELECTRONIC SYSTEMS. OTHERWISE GROUND ANY CONDUCTIVE SURFACE THAT IS WITHIN 7 FEET OF ANY COMPONENT OF THE ANS SYSTEM ISOLATED GROUND PLANE TO THE GWMGB.

55. DC POWER:

- 55.1 DC POWER SOURCE:
THE POWER SOURCE MAY BE DEDICATED FOR THE ANS SYSTEM OR SHARED WITH OTHER SYSTEMS. IF A SHARED POWER PLANT IS POWERING A SYSTEM THAT IS MULTIGROUNDED OR OF AN UNKNOWN GROUNDING METHOD, THE FOLLOWING SHOULD BE DONE TO ENSURE THE RELIABILITY OF THE ANS SYSTEM:

SELECT THE RETURN (DISCHARGE BAR) OF THE POWER PLANT TO BE THE GROUND WINDOW MAIN GROUND BUS (GWMGB).

IF A SEPARATE GROUND WINDOW EXISTS, THE RETURN FEEDERS OF THE MULTIGROUNDED SYSTEM SHALL BE ROUTED THROUGH THE GW AND BONDED TO THE GWMGB.

- 55.2 DC POWER FEEDERS:
PRIMARY POWER FEEDERS FROM THE POWER SOURCE TO THE MISC CABINET FUSE PANEL SHALL BE RED FOR BUS A AND BLUE FOR BUS B, UNLESS OTHERWISE INSTRUCTED FROM THE CUSTOMER OR LOCAL CODES.

USE APPROVED KS POWER FEEDERS OR EQUIVALENT.

SECONDARY FEEDERS FROM THE MISCELLANEOUS CABINET FUSE PANEL TO THE EQUIPMENT CABINETS ARE #10 AWG TWISTED PAIRS KS13385, L1 AND AVAILABLE FROM ED5A079-30 GROUP 40, RED, RED-BLK FOR BUS A AND GROUP 42, BLUE, BLUE/BLK FOR BUS B. SPECIFY LENGTH REQUIRED.

- 55.3 POWER FEEDER SIZE CALCULATION
----- CONTINUED ON NEXT SHEET -----

ENGINEERING NOTES

51. PURPOSE OF DRAWING:

THIS DRAWING DOCUMENTS THE DC,AC POWER AND GROUNDING REQUIREMENTS FOR THE ANS SYSTEM. THIS DRAWING SHOULD BE USED BY THE REGIONAL ENGINEERS AS A GUIDE FOR THE PREPARATION OF DETAILED JOB DRAWINGS, AND TO OBTAIN HARDWARE ORDERING INFORMATION. THIS DRAWING SHOULD ALSO BE USED BY INSTALLATION AND QUALITY PERSONNEL AS A REFERENCE FOR METHOD OF INSTALLATION.

THE REQUIREMENTS AND PROCEDURES OUTLINED IN THIS DRAWING REFLECT RECOMMENDATIONS FOR MAXIMUM SYSTEM RELIABILITY AND PERSONNEL SAFETY. AT TIMES CUSTOMERS MAY ELECT TO DEVIATE FROM SOME OF THE RECOMMENDATIONS, AND THEY MAY DO SO AT THEIR OWN RISK.

52. DRAWING CONTENTS:

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TABLES	E1 - E9

53. LIST OF ASSOCIATED DRAWINGS AND REFERENCES:

- SD1S011-01 ANS ADVANTAGE COMPACT SERVICE NODE SCHEMATIC
- SD1S010-01 ANS APPLICATION SCHEMATIC
- ED5D805-10 5ESS POWER DISTRIBUTION AND GROUNDING (ISOLATED GROUND PLANE)
- ED4C686-70 COMMON ESS GROUNDING HARDWARE AND KITS
- ED5A079-70 POWER FEEDERS ORDERING DRAWING
- ED1S008-70 A-I-NET ANCHORING HARDWARE
- IEH570 - INSTALLATION ENGINEERING HANDBOOK 570 FOR STARSERVER SCN
- IEH571 - INSTALLATION ENGINEERING HANDBOOK 571 FOR STARSERVER SCP
- IEH572 - INSTALLATION ENGINEERING HANDBOOK 572 FOR ADVANTAGE SN OR CSN
- IEH573 - INSTALLATION ENGINEERING HANDBOOK 573 FOR ADVANTAGE SCP AT&T 803-500-410 ISOLATED GROUND PLANES ISSUE 1, 1989 TR-NWT-000295 ISOLATED GROUND PLANES ISSUE 2, BELLCORE JULY 1992 NATIONAL ELECTRICAL CODE (NEC)

54. GROUNDING:

- 54.1 ISOLATED GROUND PLANE:
THE FRAMEWORK OF THE EQUIPMENT CABINETS SHALL BE ISOLATED FROM ANY CONDUCTIVE SURFACES THAT ARE NOT PART OF THE ANS ISOLATED GROUND SYSTEM.
INSULATING BUSHINGS SHALL BE USED WITH FLOOR ANCHORS (SEE ED1S008-70). THE PURPOSE OF THIS ISOLATION IS TO PREVENT ANY FOREIGN CURRENTS FROM TRAVELING THROUGH THE SYSTEM. SEE FIG.C10 FOR ISOLATION TEST.

- 54.2 GROUND WINDOW AND MAIN GROUND BUS:
THE GROUND WINDOW IS AN IMAGINARY SPHERE OF 3 FOOT RADIUS. THE MAIN GROUND BUS IS A COPPER BAR LOCATED WITHIN THE GROUND WINDOW AND IS USED FOR MAKING PHYSICAL CONNECTIONS OF GROUND CONDUCTORS. THE ISOLATED GROUND PLANE SYSTEM IS CONNECTED TO THE BUILDING GROUND FACILITY AND EVENTUALLY
----- CONTINUED TO THE LEFT -----

ISSUE NOTES

ORIG ISS: 01/23/95 CHANGE CLASS:

DRAFT: MR ENGR: GM SUPV: GJM CERTIFIED: 01/23/95 ISSUE: 1

REISSUED TO CORRECT TITLE BOX ON SHEET B15. FIG.C1 AND C2 ADDED TO SHEET C5. SHEET NOTE 2 ADDED TO SHEET B4.
NOTE: SHEET B15, ISSUE 1, WAS NEVER OFFICIAL AND COULD NOT BE ORDERED FROM CIC BECAUSE OF THE WRONG DRAWING NUMBER.

ORIG ISS: 01/23/95 CHANGE CLASS: ME

DRAFT: MR ENGR: GM SUPV: CERTIFIED: 02/08/95 ISSUE: 2

REISSUED TO ADD POWER INFO. FOR NEW ACS CABINET, SEE TABLE E80. ALSO, ADDED FIGURES B21 AND B31. ALL FIGURES AND TABLES WERE RENUMBERED AND ENTIRE DRAWING RESTRUCTURED TO SIMPLIFY FUTURE REVISIONS AND ACHIEVE A MORE LOGICAL DRAWING LAYOUT. CHANGED NOTE 55.2 TO REMOVE REFERENCE TO SPECIFIC WIRE KS.

ORIG ISS: 01/23/95 CHANGE CLASS: ME

DRAFT: GM ENGR: GM SUPV: GJM CERTIFIED: 03/29/96 ISSUE: 3

CHANGED SYSTEM NAME FROM A-I-NET TO ANS. RENUMBERED ENGINEERING NOTE 55.4 TO 55.5. REWROTE ENGINEERING NOTES 55.3 AND 55.4. ADDED ENGINEERING NOTES 55.7 - 55.10, 57 AND 58. UPDATED LISTS OF ACRONYMS, B-FIG'S AND C-FIG'S. DA FIGS B21 AND C120. ADDED FIG B22, B100, C130 AND C140. INVERTER WP91652, LIST 20 WAS DA'D AND REPLACED BY WP91652, LIST 22. WP91652, LIST 22 IS EQUIVALENT TO WP93388, LIST 10 USED FOR 5ESS. DA TABLES E20, E30 AND E40. ADDED TABLES E71, E72 AND E73. UPDATED TABLES E50, E60 AND E80 AND ADDED POWER INFORMATION FOR THE FOLLOWING CABINETS:
ATSC, ANTC, AMC TO TABLE E80.
CHANGED DESCRIPTION "FUSE PANEL" TO "PDU" FOR CONSISTENCY WITH OTHER ANS DRAWINGS. REPLACED REFERENCE FROM AT&T TO LUCENT. CONVERTED GRAPHIC DATA FROM UNIGRAPHICS FORMAT TO PRO/E.

ORIG ISS: 01/23/95 CHANGE CLASS: ME

DRAFT: RCT ENGR: RCT SUPV: GJM CERTIFIED: 03/11/98 ISSUE: 4

REVISED ENGINEERING NOTES 53 AND 55.4. UPDATED TABLES FOR ACRONYMS AND LIST OF B FIGURES. ADDED AMCX, ACSN TO FIG. B22 AND TABLE E80. ADDED FIG. B110 (AMCX CABINET).

ORIG ISS: 01/23/95 CHANGE CLASS: ME

DRAFT: RCT ENGR: RCT SUPV: GJM CERTIFIED: 07/29/99 ISSUE: 5

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SHT NBR	E1	E2	E3	E4	E5	E6	E7	E8	E9		
ISSUE	4	4	4	4	4	4	4	5	5		
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RT13

ADVANCE NETWORK SERVER
(ANS)
SPECIFICATIONS FOR
POWER DISTRIBUTION AND GROUNDING

DWG SIZE C2 ISSUE 5

LUCENT TECHNOLOGIES INC ED1S017-10

SHEET A1 OF 36

ENGINEERING NOTES

***** CONTINUED *****

DEFINITIONS:

UNPROTECTED METAL - DEFINED AS ANY OF THE FOLLOWING:

- UNPLATED COPPER
- UNPLATED COPPER ALLOY
- UNPLATED STEEL
- ALUMINUM
- LEAD OR PLATED LEAD
- ANY METAL WITH EXPOSED SURFACE OF COPPER/COPPER ALLOY PLATE

UNPROTECTED METAL COMBINATIONS - DEFINED AS ELECTRICAL CONTACT SURFACES THAT MAKE UP A SINGLE CONNECTION IN WHICH ONE OR MORE OF THE CONTACT SURFACES IS AN UNPROTECTED METAL.

PROTECTED METAL - DEFINED AS METAL CONSISTING OF OR PLATED WITH ONE OF THE FOLLOWING MATERIALS:

TIN	SOLDER	NICKEL	SILVER	GOLD
CHROMIUM	ZINC	CADMIUM	PLATINUM	

II. UNPROTECTED METAL ELECTRICAL CONNECTIONS MADE BY CRIMPED OR MECHANICAL SCREW/NUT CONNECTIONS SHALL BE PROTECTED AGAINST OXIDATION BY APPLYING ANTI-OXIDIZING COMPOUND TO THE UNPROTECTED SURFACE.

A. UNPROTECTED METAL IS CONNECTED OR FASTENED TO UNPROTECTED METAL.

B. UNPROTECTED METAL IS CONNECTED OR FASTENED TO PROTECTED METAL.

III. THE FOLLOWING ELECTRICAL CONNECTION COMBINATIONS SHALL NOT REQUIRE THE APPLICATION OF ANTI-OXIDIZING COMPOUND:

A. PROTECTED METAL IS CONNECTED OR FASTENED TO PROTECTED METAL.

III. IN ALL CASES, WHERE SOME DOUBT EXISTS, THE INHIBITING COMPOUND SHOULD BE USED.

THE FOLLOWING IS AN EXAMPLE WHICH MAY HELP TO EXPLAIN THIS REQUIREMENT:

EXAMPLE: A TIN PLATED COPPER CONNECTOR CRIMPED ON A TIN PLATED COPPER WIRE REQUIRES NO INHIBITING COMPOUND, BUT WHEN THE TIN PLATED COPPER TANG IS CONNECTED TO AN UNPLATED COPPER BAR, THIS CONNECTION REQUIRES ANTI-OXIDIZING INHIBITING COMPOUND.

THE ABOVE DOES NOT APPLY IF THE PRODUCT DOCUMENTATION SPECIFICALLY STATES ANTI-OXIDIZING COMPOUND APPLICATION REQUIREMENTS.

58. CURRENT DRAIN DEFINITIONS

1. LIST 1: REPRESENT THE AVERAGE BUSY-HOUR CURRENT AT NORMAL OPERATING VOLTAGES (-51.0V).
2. LIST 2: REPRESENT THE PEAK CURRENT FOR A CIRCUIT OR A GROUP OF CIRCUITS UNDER WORST CASE OPERATING CONDITIONS (-39.5V). FOR EXAMPLE, A CONSTANT POWER LOAD REQUIRES MAXIMUM CURRENT AT MINIMUM OPERATING VOLTAGE. LIST 2 CURRENT MAY ALSO BE GENERATED BY CIRCUIT/OPERATING VARIABILITY (TRAFFIC, TEST CONDITION, ETC.) WHILE AT NORMAL FLOAT VOLTAGE.

ENGINEERING NOTES

***** CONTINUED *****

TO THE CABINET POWER ENTRY MODULE:

1. PLACE THE CIRCUIT BREAKER ON EACH POWER ENTRY MODULE IN THE OFF POSITION.
2. CUT THE CABLES TO THE CORRECT LENGTH FOR CONNECTING TO THE TERMINAL STUD SCREWS ON THE POWER ENTRY MODULE. CUT THE GROUND CABLE LAST, MAKING CERTAIN IT IS AT LEAST 1 INCH (2.54 CM) LONGER THAN THE POWER CABLES.
3. TRIM THE INSULATION FROM THE DC POWER AND DC RETURN CABLES APPROXIMATELY 0.81 INCH (2.06 CM) AND INSTALL THE CONNECTOR LUG PROVIDED. MAKE CERTAIN THAT ALL STRANDS OF THE COPPER CONDUCTOR ARE CONTAINED WITHIN THE CONNECTOR LUG. CRIMP THE LUG TO THE CONDUCTOR USING AN APPROPRIATE CRIMPING TOOL (BURNDY Y35, Y39, Y750, Y46 OR EQUIVALENT).
4. INSTALL THE GROUND CABLE CONNECTOR LUG ON THE MIDDLE SET OF STUD SCREWS ON THE POWER ENTRY MODULE. THIS SET OF SCREW TERMINALS IS MARKED WITH A GROUND SYMBOL WITHIN A CIRCLE. USE A TORQUE WRENCH TO TIGHTEN TO A VALUE OF FROM 120 IN-LBS (13.5 NEWTON-METERS) TO 168 IN-LBS (19 NEWTON-METERS).
5. USING A TORQUE WRENCH, SECURE THE DC RETURN CABLE CONNECTOR LUG ON THE BOTTOM SET OF STUD SCREWS ON THE POWER ENTRY MODULE. TIGHTEN TO A VALUE OF FROM 120 IN-LBS (13.5 NEWTON METERS) TO 168 IN-LBS (19 NEWTON-METERS).
6. USING A TORQUE WRENCH, SECURE THE -48V DC POWER CABLE CONNECTOR LUG ON THE TOP SET OF STUD SCREWS ON THE POWER ENTRY MODULE. THIS SET OF SCREW TERMINALS IS MARKED -48V DC. TIGHTEN TO A VALUE OF FROM 120 IN-LBS (13.5 NEWTON-METERS) TO 168 IN-LBS (19 NEWTON-METERS).
7. REPEAT STEPS 1 THROUGH 6 FOR THE SECOND POWER FEED SET IN THIS CABINET.

55.7 CABINET POWER CALCULATION
 $CAB PWR = (VTYPICAL) \times (L1 AMPS)$
 $= (51.0V) \times (L1 AMPS)$

NOTE: FOR A SYSTEM POWERED BY A POWER PLANT WITH BATTERIES FLOATING AT 52.08VDC, 51.0VDC WAS CHOSEN AS THE TYPICAL VOLTAGE MEASURED AT THE CABINET POWER INPUT TERMINALS.

55.8 BTU/HRS CALCULATION

$CAB BTU/HRS = 3.41 \times (CAB PWR \text{ IN WATTS})$

55.9 POWER PLANT RECTIFIERS CALCULATIONS
 USE LIST 1 CURRENT DRAIN DATA TO CALCULATE THE NUMBER OF RECTIFIERS REQUIRED.

55.10 POWER PLANT BATTERY CALCULATIONS
 CALCULATE NUMBER OF BATTERY STRINGS REQUIRED FOR A GIVEN RESERVE TIME BASED ON LIST 2 CURRENT DRAIN DATA.

56. AC POWER:

56.1 AC SOURCE:

BOTH SCN AND SCP MODELS USE AC POWER FOR MODEMS, PRINTERS AND TERMINALS. IT IS RECOMMENDED FOR RELIABILITY REASONS THAT THE AC BE DERIVED FROM AN INVERTER. THE INVERTER DERIVED AC IS KNOWN AS PROTECTED AC. AN OPTIONAL 1KVA INVERTER MAY BE ORDERED IN THE MISCELLANEOUS CABINET, HOWEVER IF PROTECTED AC IS ALREADY AVAILABLE IN THE HOST BUILDING, IT MAY BE USED PROVIDED GROUNDING AND DISTRIBUTION REQUIREMENTS SPECIFIED IN THIS DRAWING ARE FOLLOWED.

56.2 AC DISTRIBUTION HARDWARE:
 COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND APPLICABLE LOCAL CODES. FOR ADDITIONAL PROTECTION AND RELIABILITY RIGID METALLIC CONDUIT (K55351) IS RECOMMENDED. EMT (THIN-WALL) WP91246 IS RECOMMENDED ONLY FOR SHORT RUNS WHERE PRIMARY MECHANICAL PROTECTION IS PROVIDED BY THE FRAMEWORK OF A CABINET CABLE RACK ETC.

56.3 AC DISTRIBUTION WIRES:
 USE KS22641 THWN/THHN 600V WIRES OR EQUIVALENT.

56.4 AC GROUNDING:
 ANY AC CONDUIT AND ACEG WIRE ENTERING THE ISOLATED GROUND PLANE OF THE ANS SYSTEM, SHALL BE BONDED TO THE GROUND WINDOW AND THEREAFTER ISOLATED FROM BUILDING GROUND OR ANY OTHER CONDUCTIVE SURFACE THAT IS NOT PART OF THE ISOLATED GROUND PLANE. THE #6 AWG BONDING JUMPER BETWEEN THE AC JUNCTION BOX AND THE GW SHALL BE 3 FT MAX.

57. ANTI-OXIDIZING COMPOUND

THE FOLLOWING GUIDELINES SHOULD BE USED IN DETERMINING WHEN AND IF ANTI-OXIDIZING COMPOUND SHOULD BE USED ON 5ESS SWITCH POWER AND GROUND CONNECTIONS:

----- CONTINUED TO THE LEFT -----

ENGINEERING NOTES

***** CONTINUED *****

THE SIZE OF A DC POWER FEEDER IS A FUNCTION OF ALL THE FOLLOWING:
 A) UPSTREAM OVERCURRENT PROTECTION DEVICE SIZE
 B) LOAD CURRENT
 C) MAXIMUM ALLOWED VOLTAGE DROP
 D) FEEDER LENGTH

WHEN CALCULATING FEEDER SIZE, CHOOSE THE LARGEST FEEDER RESULTING FROM THE FOLLOWING:

A) FEEDER AMPACITY BASED ON THE NEC TABLE 310-16 SHALL BE EQUAL TO OR EXCEED FUSE OR CIRCUIT BREAKER SIZE.

B) $CM = \frac{(11.1) \times (L2 AMPS) \times (LOOP FEET)}{(MAX LOOP VOLT DROP)}$

C) FEEDER AMPACITY = 1.25 X L2 AMPERES

CM = CIRCULAR MILS
 L2 = LIST 2 DRAIN (AMPS)

55.4 A) MAX FEEDER LENGTH CALCULATION
 FOR A SPECIFIED FEEDER SIZE AND VOLTAGE DROP VALUE, CALCULATE THE MAXIMUM ONE WAY FEEDER LENGTH AS FOLLOWS:

$MAX ONE WAY FEEDER LENGTH (FT) = \frac{(CM) \times (MAX LOOP VD)}{(2) \times (11.1) \times (L2AMPS)}$

CM = CIRCULAR MILS
 VD = VOLTAGE DROPS (VOLTS)
 11.1 = COPPER CONSTANT
 L2 = LIST 2 DRAIN

B) SPLICING SECONDARY POWER FEEDER
 WHEN THE MAX VOLTAGE DROP IS EXCEEDED WITH THE STANDARD NO.10 AWG WIRE, A LARGER SIZE WIRE SHALL BE SPLICED.

SPLICES SHALL BE LOCATED IN CABLE RACKS TO ALLEVIATE CONGESTION IN THE CABINETS, AND SHALL BE STAGGERED TO ALLEVIATE CONGESTION IN CABLE RACKS. ALL SPLICES SHALL BE LOCATED WITHIN 6 FT OF THE CABINET CABLE ACCESS POINT.

IF NO.8 AWG WIRE IS REQUIRED, SPLICE THE WIRES AT THE EQUIPMENT CABINET END ONLY. AT THE PDF END, THE WIRES CAN BE DIRECTLY CONNECTED TO THE FUSE PANEL. ORDER THE #8 AWG TERMINATION HARDWARE FROM J86334E-1 IF NECESSARY.

IF NO.6 AWG OR LARGER WIRE IS REQUIRED, SPLICE THE WIRES AT BOTH EQUIPMENT CABINET AND PDF ENDS.

55.5 DC POWER FEEDERS ROUTING (OVERHEAD DISTRIBUTION):
 ROUTE PRIMARY FEEDERS ON OPEN CABLE TRAYS, USUALLY LADDER TYPE CABLE RACKS. KEEP THE -48V CONDUCTOR AND ITS ASSOCIATED RETURN CONDUCTOR PAIRED THROUGHOUT THE ENTIRE PATH. A BUS AND B BUS FEEDERS MAY GO ON THE SAME CABLE TRAY BUT SHOULD BE IN SEPARATE BUNDLES AND OPPOSITE SIDES OF CABLE RACK. IF TWO SEPARATE RACKS ARE AVAILABLE PLACE A AND B BUS CABLES ON TWO SEPARATE RACKS. ROUTE SECONDARY POWER FEEDERS IN POWER COMPARTMENT OF LINEUP CABLE RACK MOUNTED OVER EQUIPMENT CABINETS.

55.6 DC POWER FEEDERS INSTALLATION PROCEDURE:

INSTALLING DC POWER AND GROUND CABLES FOR THE STARSERVER COMPUTER CABINETS:

INSTALL THE THREE CABLES IN EACH POWER FEED SET IN THE FOLLOWING ORDER:
 1. CHASSIS GROUND (ONLY ONE PER CABINET REQUIRED)
 2. -48V DC RETURN
 3. -48V DC POWER

FOR EACH SET OF DC POWER AND GROUND CABLES, PERFORM THE FOLLOWING STEPS TO INSTALL THE DC POWER AND GROUND CABLES
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ADVANCE NETWORK SERVER
 (ANS)
 SPECIFICATIONS FOR
 POWER DISTRIBUTION AND GROUNDING

DWG SIZE C2 ISSUE 5

LIST OF FIGURES IN B-SHEETS			
FIG.	STATUS	INTRODUCED IN DWG ISSUE	DESCRIPTION
B10	DA	1	SCN HIGH LEVEL POWER DIAGRAM
B20	DA	1	SCP HIGH LEVEL POWER DIAGRAM
B21	DA	4	SCN/SCP HIGH LEVEL POWER DIAGRAM
B22	ACTIVE	4	SCN/SCP, ASN, ASCP OR ACSN HIGH LEVEL POWER DIAGRAM
B30	ACTIVE	1	-48V CIRCUIT DIAGRAM (STANDARD)
B31	ACTIVE	3	-48V CIRCUIT DIAGRAM (NON STANDARD)
B40	DA	1	STARSERVER SC AND MSC -48V INPUTS
B50	ACTIVE	1	GROUNDING DIAGRAM
B60	ACTIVE	1	GROUNDING DIAGRAM
B70	ACTIVE	1	GROUNDING DIAGRAM
B80	ACTIVE	1	GROUNDING DIAGRAM
B90	ACTIVE	1	GROUNDING DIAGRAM
B100	ACTIVE	4	AMC CIRCUIT DIAGRAM
B110	ACTIVE	5	AMCX CIRCUIT DIAGRAM

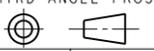
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TABLE	STATUS	INTRODUCED IN DWG ISSUE	DESCRIPTION
E10	ACTIVE	1	VOLTAGE LIMITS
E20	DA	4	-48V DC POWER REQUIRED BY SCN E/W THE STARSERVER COMPUTER
E30	DA	4	-48V DC CURRENT REQUIRED FROM FUSE PANEL MOUNTED IN THE MISC CABINET
E40	DA	4	NUMBER OF FUSES REQUIRED AT THE MISC CABINET FUSE PANEL
E50	ACTIVE	1	PROTECTED 120V AC LOADS
E60	ACTIVE	1	ESSENTIAL 120V AC LOADS
E70	ACTIVE	1	GROUND CONDUCTORS REQUIRING 0.010 OHM IMPEDANCE
E71	ACTIVE	4	AWG AND CORRESPONDING METRIC SIZE
E72	ACTIVE	4	RESISTANCE OF COPPER WIRE @ 25°C
E73	ACTIVE	4	METHOD OF SIZING A FRAME GROUNDING CONDUCTOR
E80	ACTIVE	4	-48V DC POWER DISTRIBUTION REQUIREMENT

LIST OF FIGURES IN C-SHEETS			
FIG.	STATUS	INTRODUCED IN DWG ISSUE	DESCRIPTION
C10	ACTIVE	1	ISOLATION AND INSULATION TEST
C20	ACTIVE	1	EQUIPMENT FRAME GROUND ON RAISED FLOORS
C30	ACTIVE	1	EQUIPMENT FRAME GROUND ON SLAB
C40	ACTIVE	1	5E-2000 CABINETS, METHOD OF CABLING
C50			RESERVED
C60	ACTIVE	1	MISC CABINET, METHOD OF CABLING
C70	ACTIVE	1	FUSE ASSIGNMENT LABEL
C80	ACTIVE	1	MFFU EQL LAYOUT
C90	ACTIVE	1	METHOD OF CONNECTING #6 AWG WIRE TO A BUS BAR
C100	ACTIVE	1	METHOD OF CONNECTING FRAME GROUND CABLE
C110	ACTIVE	1	METHOD OF INSTALLING A C-TAP
C120	DA	4	INVERTER, 1KVA WP91652, L20 WIRING DIAGRAM
C130	ACTIVE	4	INVERTER, 1KVA WP91652, L22 WIRING DIAGRAM
C140	ACTIVE	4	METHOD OF INSTALLING A H-TAP

ACRONYMS	DEFINITION
ACEG	AC EQUIPMENT GROUND
ACS	ADVANTAGE CONTROL SERVER
ACSC	ADVANTAGE CONTROL SERVER CABINET
ACSNC	ADVANTAGE COMPACT SERVICE NODE CABINET
AMC	ADVANTAGE MISCELLANEOUS CABINET
AMCX	ADVANTAGE MISCELLANEOUS CABINET EXPORT
ANTC	ADVANTAGE NETWORK TERMINATION CABINET
ASCP	ADVANTAGE SERVICE CONTROL POINT
ASN	ADVANTAGE SERVICE NODE
ATSC	ADVANTAGE TELECOM SERVER CABINET
AWG	AMERICAN WIRE GAUGE
COG	CENTRAL OFFICE GROUND
COGB	CENTRAL OFFICE GROUND BAR
CSCC	COMMON SERVICE CIRCUIT CABINET
FG	FRAME GROUND
FGB	FRAME GROUND BAR
GW	GROUND WINDOW
GWMGB	GROUND WINDOW MAIN GROUND BUS
INV	INVERTER
LUC	LINE UNIT CABINET
MSC	MASS STORAGE CABINET
PCFD	POWER CONTROL FUSED DISTRIBUTION
PDU	POWER DISTRIBUTION UNIT
SC	STARSERVER CABINET
SCN	SERVICE CIRCUIT NODE
SCP	SERVICE CONTROL POINT
SFC	SWITCH FABRIC CABINET
SN	SERVICE NODE

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 5
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B1

MODEL NAME

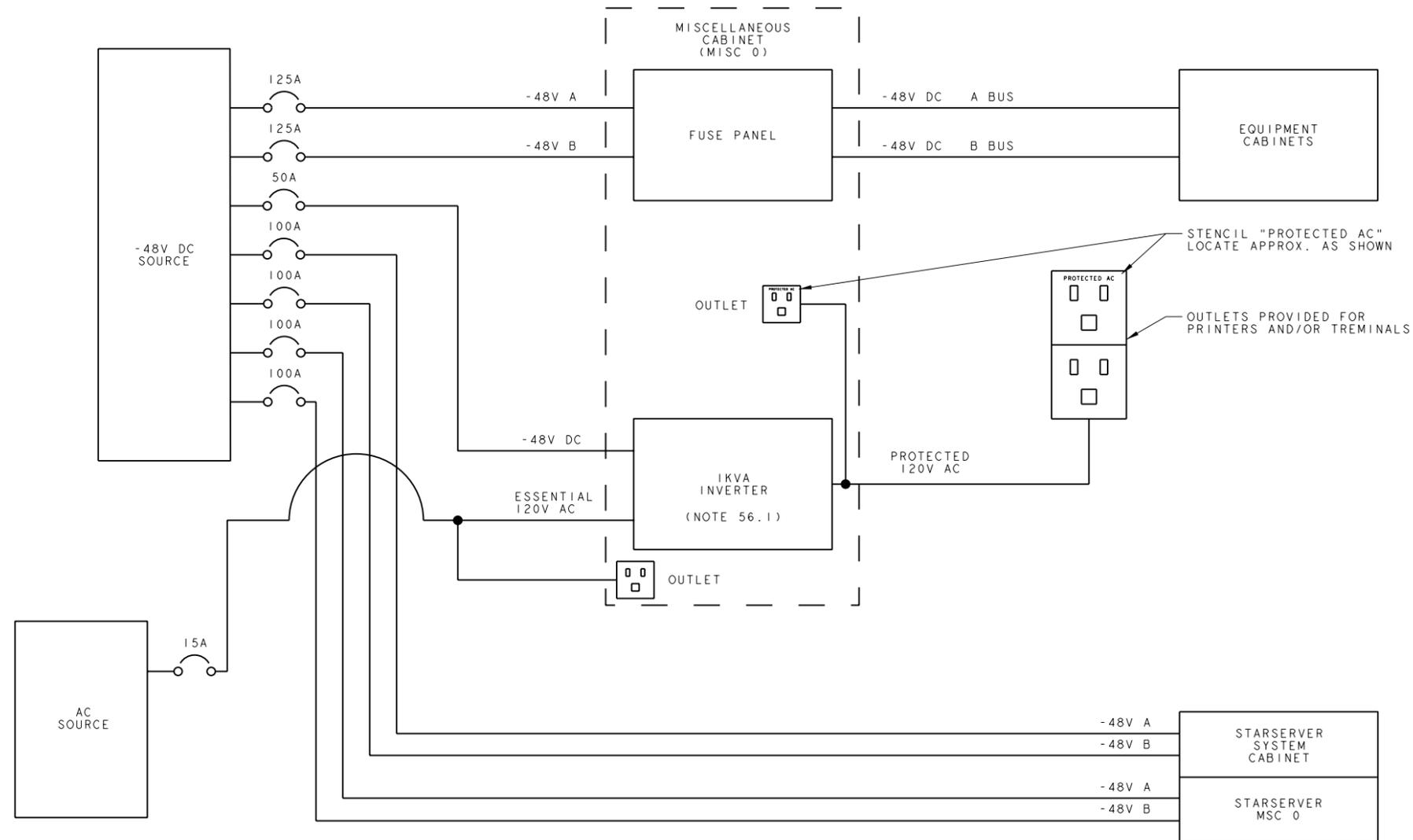


FIG. B10
 HIGH LEVEL DIAGRAM
 OF AC AND DC POWER
 DISTRIBUTION
 (SCN ONLY)
 (DA)
 REPLACED BY FIG. B21

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B2
MODEL NAME		

EDIS017-10

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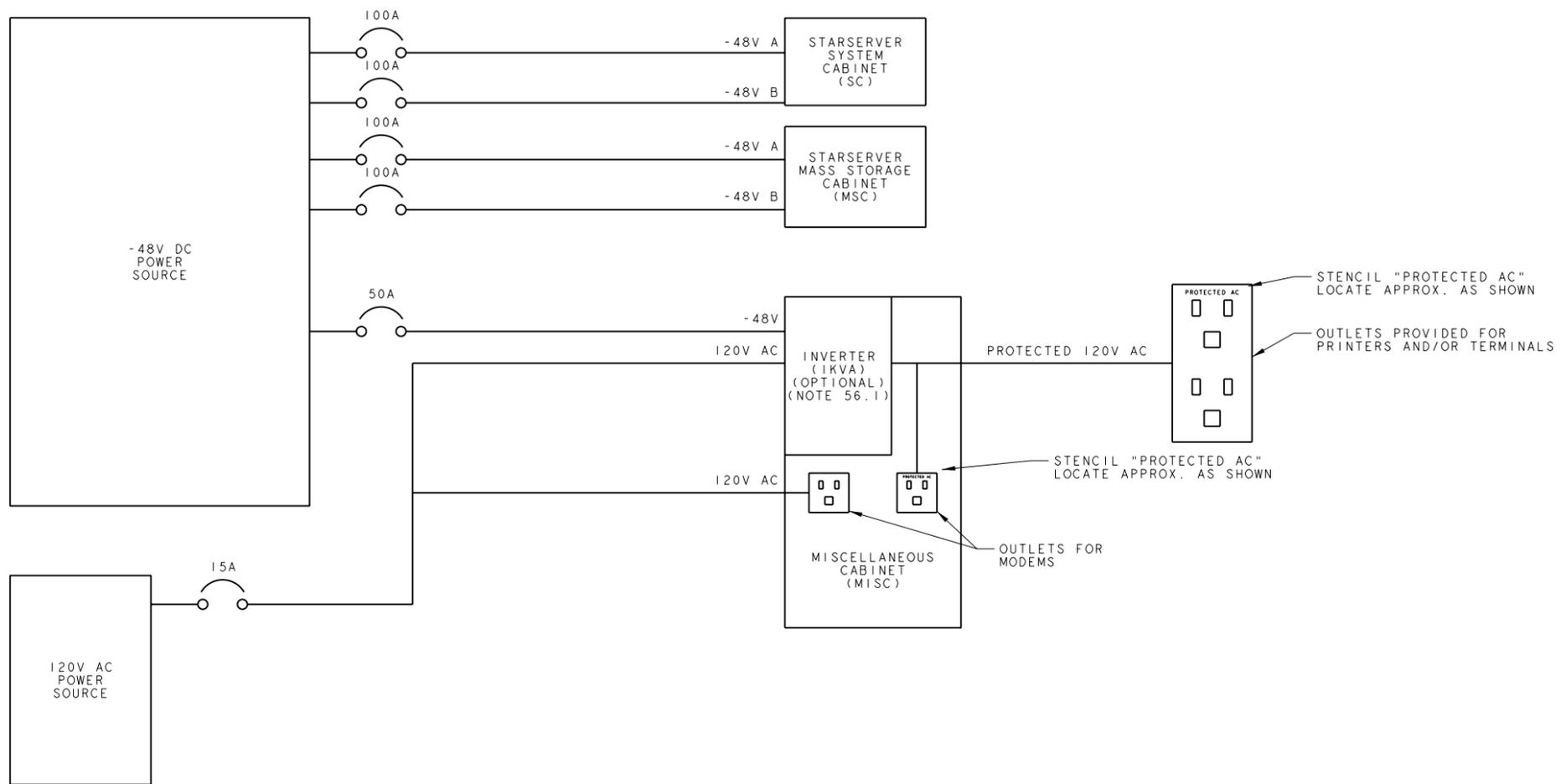


FIG. B20
 HIGH LEVEL DIAGRAM
 OF AC AND DC POWER
 DISTRIBUTION
 (SCP ONLY)
 (DA)
 REPLACED BY FIG. B21

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10 MODEL NAME	SHEET NO. B3

SHEET NOTES:

- 1. THE FUSE PANEL IS EQUIPPED WITH A TOTAL OF 48 FUSE POSITIONS, 24 FOR THE A-BUS AND 24 FOR THE B-BUS.
- 2. SEE FIG. B31 IF PDU IS NOT USED.

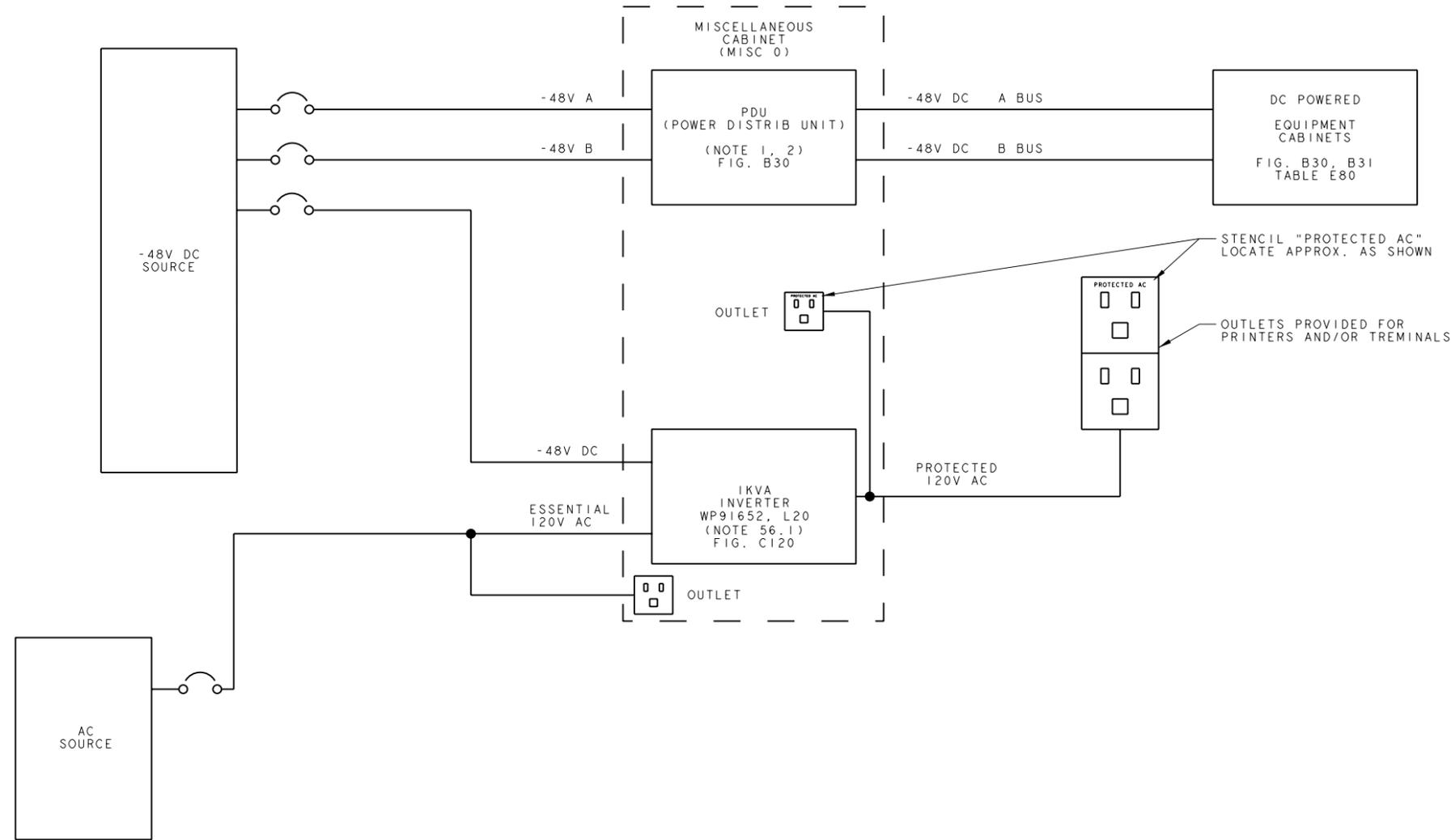


FIG. B21
 HIGH LEVEL DIAGRAM
 OF AC AND DC POWER
 DISTRIBUTION FOR
 ANS OR SCP
 CONFIGURATIONS
 (DA)
 REPLACED BY FIG. B22

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B4

EDIS017-10

SHEET NOTES:

- 1. THE PDU IS EQUIPPED WITH A TOTAL OF 48 FUSE POSITIONS, 24 FOR THE A-BUS AND 24 FOR THE B-BUS.
- 2. SEE FIG. B31 IF PDU IS NOT USED.

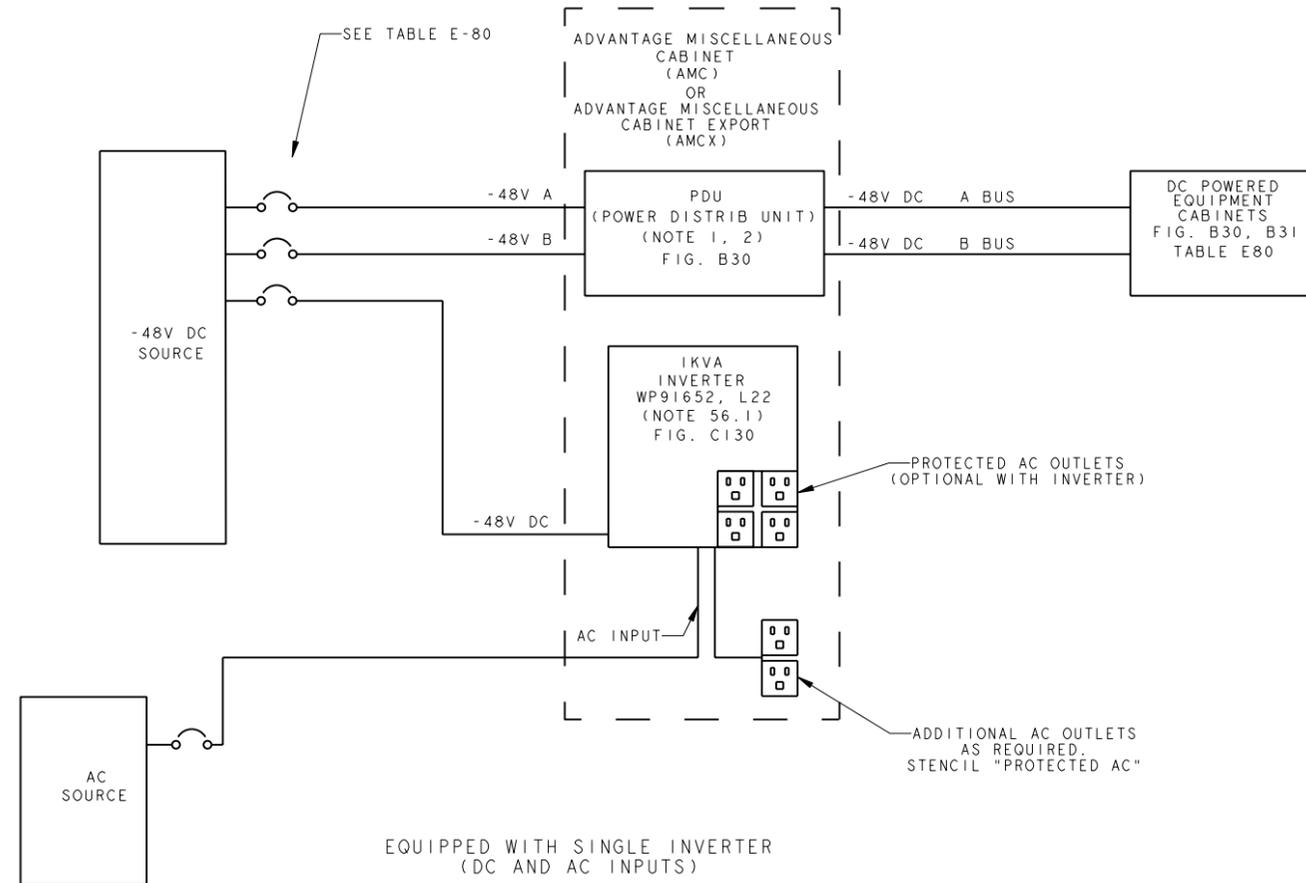


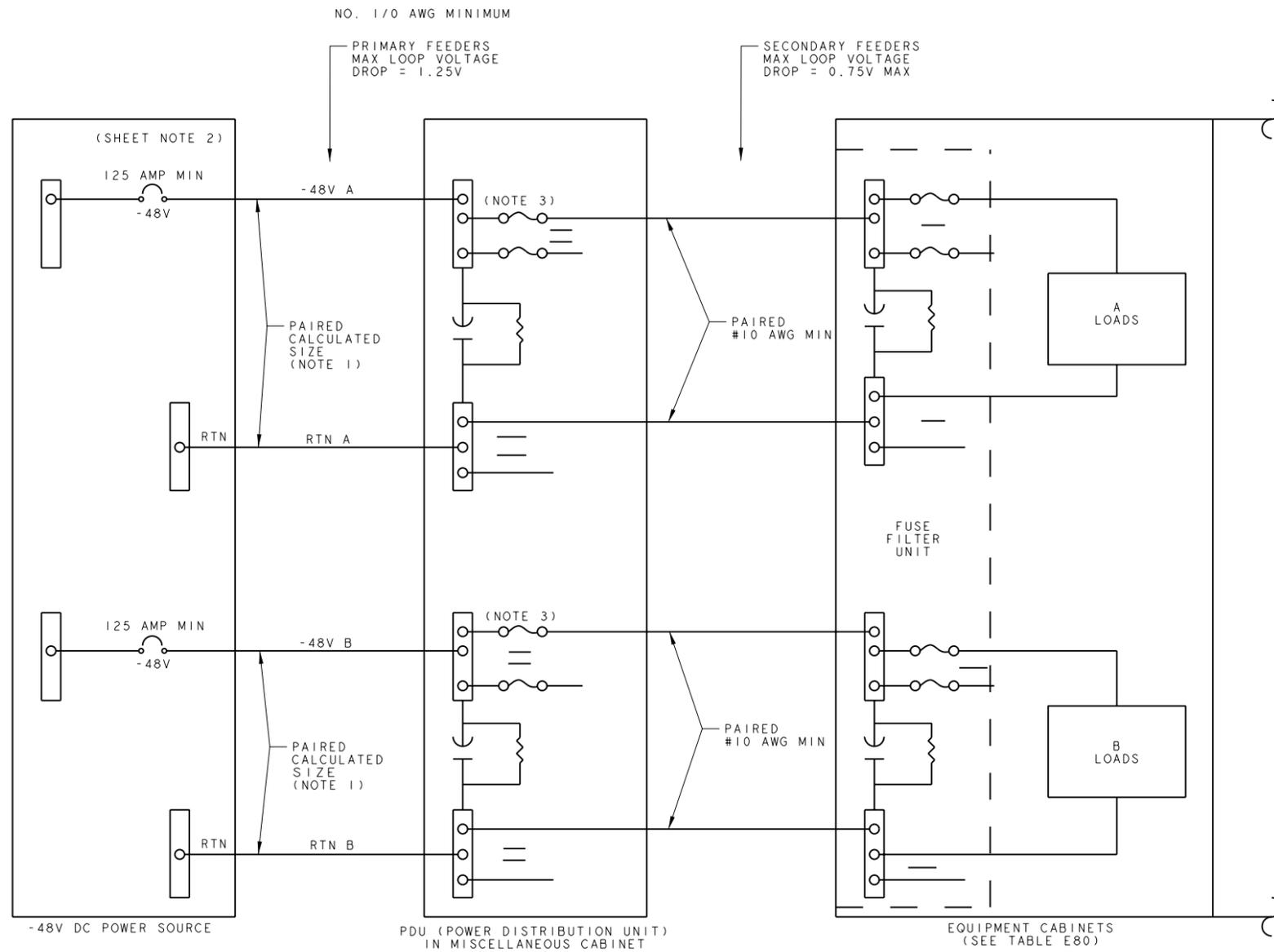
FIG. B22
 HIGH LEVEL DIAGRAM OF AC AND DC POWER
 DISTRIBUTION FOR
 SCN AND SCP
 OR
 ASN, ASCP AND ACSN
 CONFIGURATIONS

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 5
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B5

MODEL NAME



SHEET NOTES:

1. THE PDU INPUT FEEDERS MINIMUM SIZE SHALL BE 1/0 AWG. THE FUSE PANEL CAN TERMINATE UP TO A 350 KCMIL. CALCULATE ACTUAL WIRE SIZE AS A FUNCTION OF DISTANCE, VOLTAGE DROP AND CURRENT DRAIN, SEE NOTE 55.3.
2. THE CIRCUIT BREAKER SIZE SHOWN IN THIS FIGURE WAS SELECTED TO HANDLE A MAXIMUM CURRENT OF 77.5 AMPS (LIST 1), 100 AMPS (LIST 2). IF A LARGER LOAD IS ANTICIPATED, CHOOSE A CIRCUIT BREAKER 125% OF LIST 2 CURRENT AND SIZE FEEDERS ACCORDINGLY.
3. FUSE SIZE = 20AMP IF PCFD (J86334D-1) TYPE FUSE PANEL ARE USED. FUSE SIZE = 25AMP IF GPFD (J86334E-1) TYPE FUSE PANEL ARE USED.

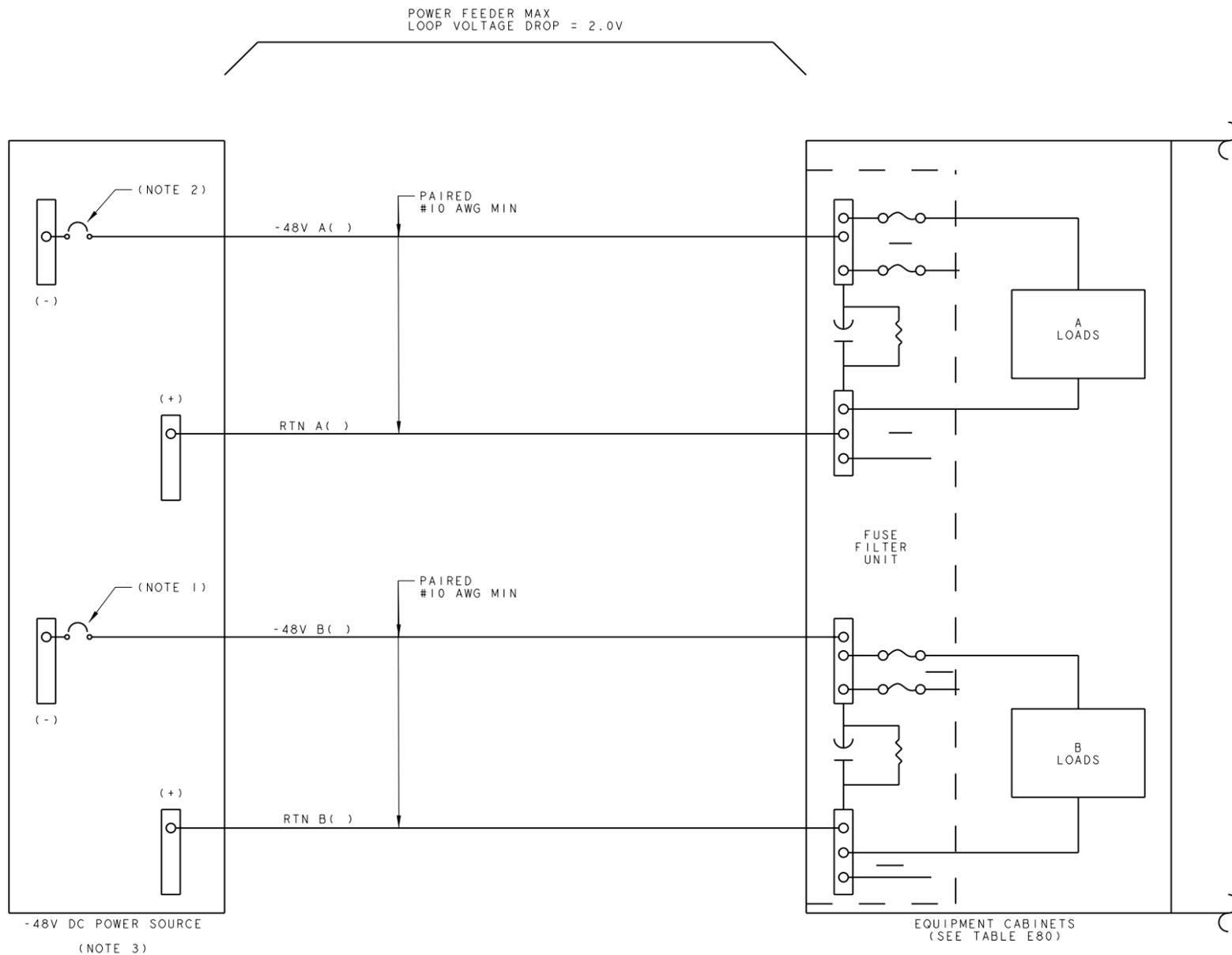
FIG. B30
 SIMPLIFIED EQUIVALENT CIRCUIT FOR
 TYPICAL -48V DC DISTRIBUTION TO
 EQUIPMENT CABINETS
 STANDARD - METHOD

PROJ-EOEDFORM.FRM-FEB 96

EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B6

MODEL NAME



SHEET NOTES:

1. THIS IS A NON-STANDARD CONFIGURATION POWER TO THE EQUIPMENT CABINET(S) IS CABLED DIRECTLY FROM THE DISTRIBUTION CABINET OF THE POWER SOURCE. IN THIS CASE THE PDU USUALLY LOCATED IN THE MISCELLANEOUS CABINET IS NOT USED.
2. CIRCUIT BREAKER OR FUSE SIZE SHALL BE 20 AMP MINIMUM - 30 AMP MAXIMUM.
3. THE DC POWER SOURCE MUST BE EQUIPPED WITH A CHARGE CIRCUIT OR BE ABLE TO WITHSTAND THE INRUSH CURRENT GENERATED BY THE LOAD CAPACITANCE. INRUSH CURRENT INFORMATION IS DOCUMENTED IN SD-5D005-01.

FIG. B31
SIMPLIFIED EQUIVALENT CIRCUIT FOR
TYPICAL -48V DC DISTRIBUTION TO
EQUIPMENT CABINETS

(NOTE 1)
NON-STANDARD METHOD

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		 DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B7	
MODEL NAME			

SHEET NOTES:

1. A AND B FEEDERS ARE ORED AND THEY SHARE LOAD CURRENT. BUT IF ONE FEEDER IS OPEN, THE REMAINING FEEDER WILL CARRY THE TOTAL CURRENT.

CABINET	FEEDER	L1 AMP	L2 AMP	L1 FAULT ONE FEEDER OPEN AMP	L2 FAULT ONE FEEDER OPEN AMP
SC	A	20.9	27.2	41.8	54.4
	B	20.9	27.2	41.8	54.4
MSC	A	14.2	18.5	28.4	37
	B	14.2	18.5	28.4	37

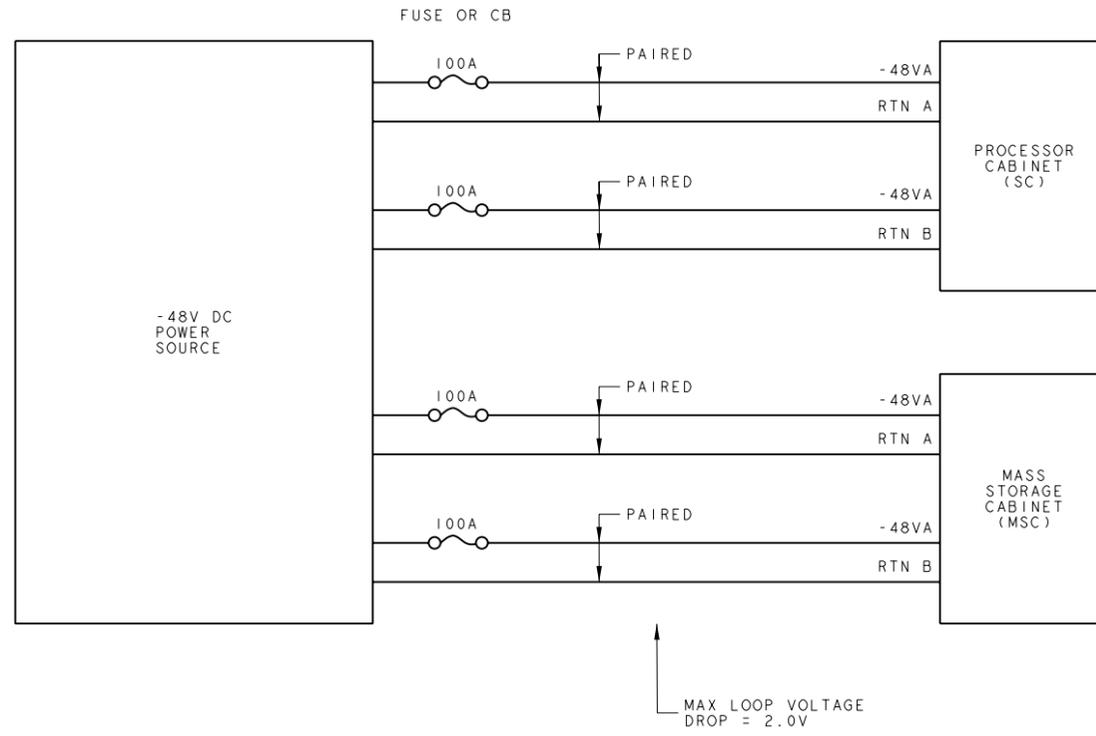
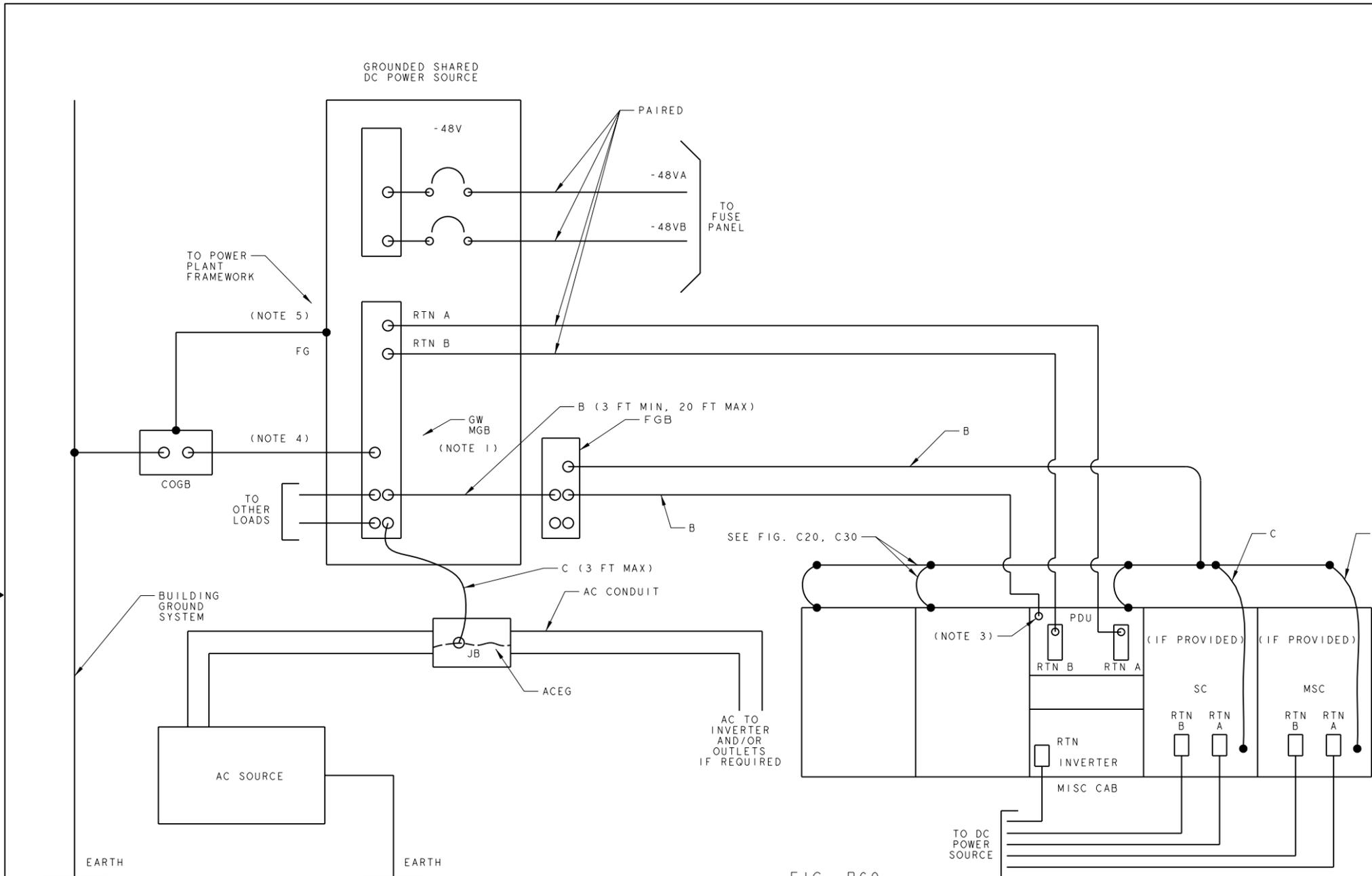


FIG. B40
 STARSERVER COMPUTER
 AND
 MASS STORAGE CABINET
 -48V DC INPUT CIRCUIT
 (DA)

FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B8	
MODEL NAME			



- SHEET NOTES:
1. IN THIS CASE THE RETURN BUS OF THE POWER PLANT, TYPICALLY REFERRED TO AS THE DISCHARGE BUS, IS THE GROUND WINDOW MAIN GROUND BUS.
 2. ALL EQUIPMENT CABINETS ARE INSULATED FROM THE FLOOR AND ANY CONDUCTIVE SURFACES NOT ON THE ISOLATED GROUND PLANE.
 3. THIS GROUND CONNECTION IS REQUIRED ONLY WHEN THE MISCELLANEOUS CABINET IS EQUIPPED WITH A PDU.
 4. SIZE THIS CONDUCTOR ACCORDING TO THE POWER PLANT REQUIREMENTS AND EXPECTED CURRENT ON THIS CONDUCTOR FROM MULTI-GROUNDED LOADS, IF ANY. AINET REQUIRES A CONDUCTOR 1/0 MIN OR 0.010 OHM MAX.
 5. SIZE POWER PLANT FRAMEWORK GROUND CONDUCTOR ACCORDING TO POWER PLANT REQUIREMENTS.

FIG. B60
SINGLE POINT GROUNDING
GENERAL DIAGRAM FOR
SHARED POWER PLANT

NOTE: -48V CONDUCTORS NOT SHOWN.

(NOTE 2, 54.1)
SEE FIG. C20 AND C30

GROUND CONDUCTORS SIZE	
ITEM	DESCRIPTION
A	NO. 6 AWG BARE TINNED STRANDED COPPER (7 STRANDS)
B	NO. 0 AWG MIN., INSULATED GREEN TINNED STRANDED COPPER OR 0.010 OHM MAX.
C	NO. 6 AWG INSULATED GREEN TINNED STRANDED COPPER (7 STRANDS)

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B10	
MODEL NAME			

SHEET NOTES:
1. SEE FIG. C20, C30 FOR GROUNDING DETAILS.

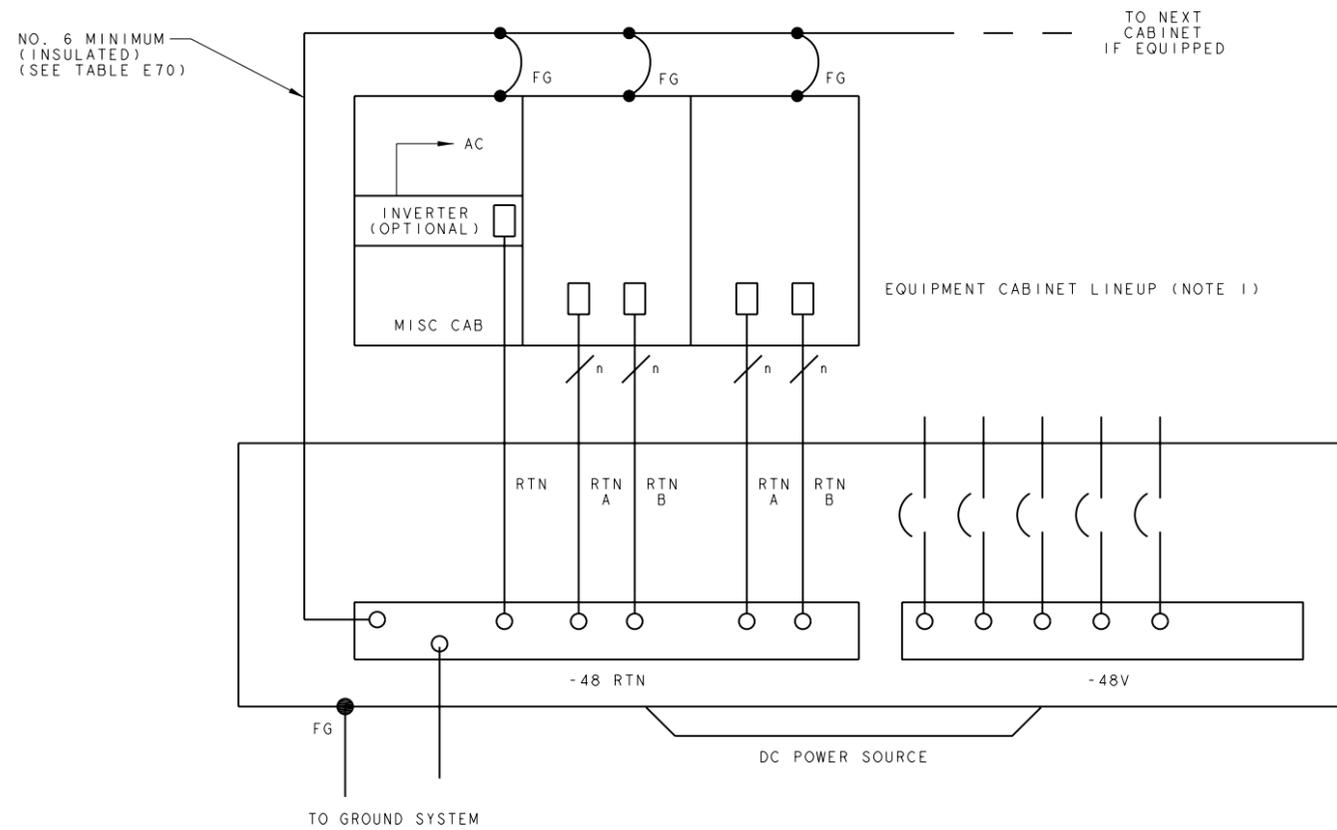


FIG. B70
GROUNDING DIAGRAM FOR SYSTEM WITH
NO COMMERCIAL AC INPUT AND NO PDU.

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B11
MODEL NAME		

SHEET NOTES:

- 1. SIZE PER POWER PLANT REQUIREMENTS OR #1/0 MIN, 0.010 OHM MAX WHICHEVER RESULTS IN THE LARGEST WIRE SIZE.
- 2. SEE FIG. C20, C30 FOR GROUNDING DETAILS.

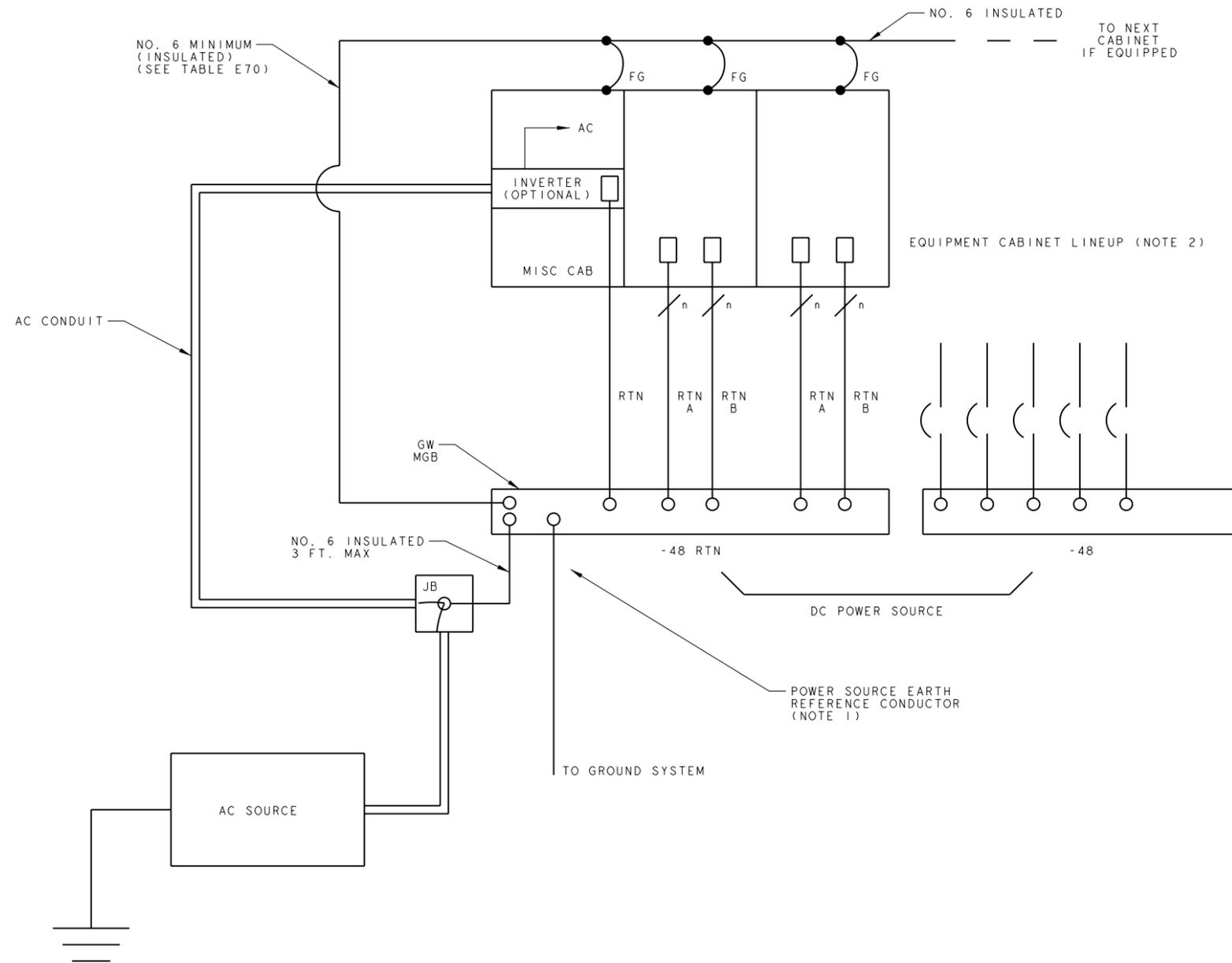


FIG. B80

GROUNDING DIAGRAM FOR SYSTEM WITH COMMERCIAL AC, GROUND POWER SOURCE AND NO PDU.

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B12
MODEL NAME		

SHEET NOTES:

- 1. SIZE PER POWER PLANT REQUIREMENTS OR #1/0 MIN., 0.10 OHM MAX WHICHEVER RESULTS IN THE LARGEST WIRE SIZE.
- 2. SEE FIG. C20, C30 FOR GROUNDING DETAILS.

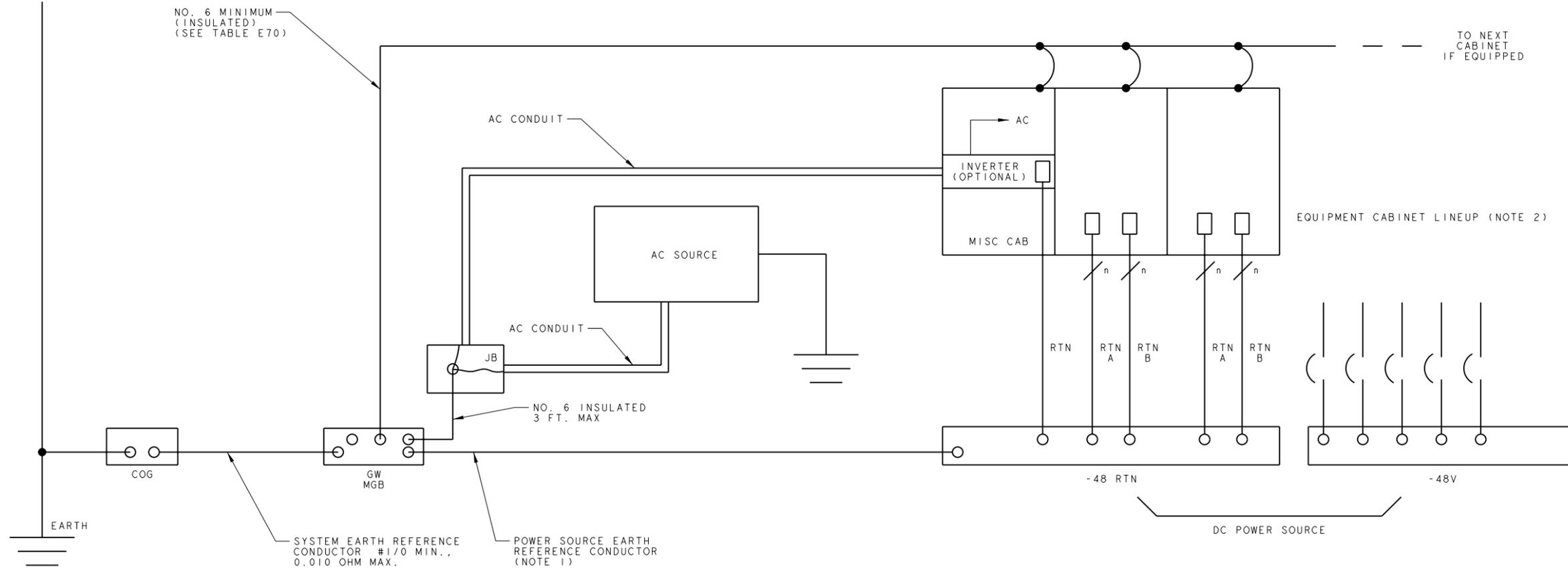
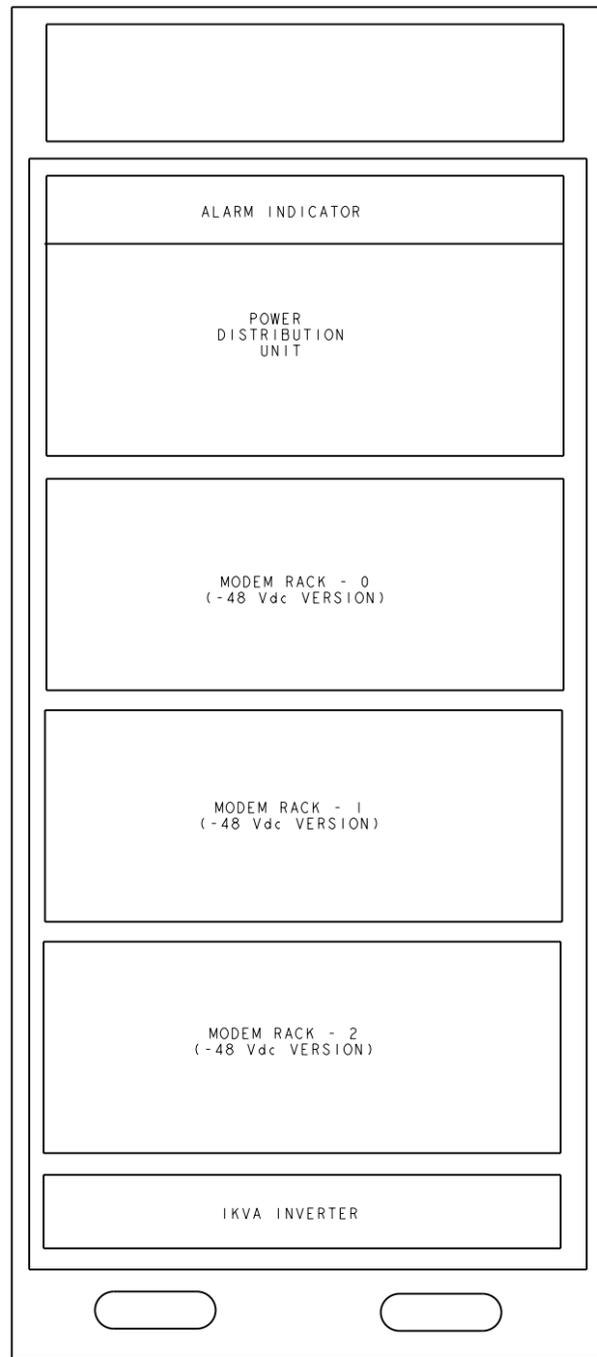


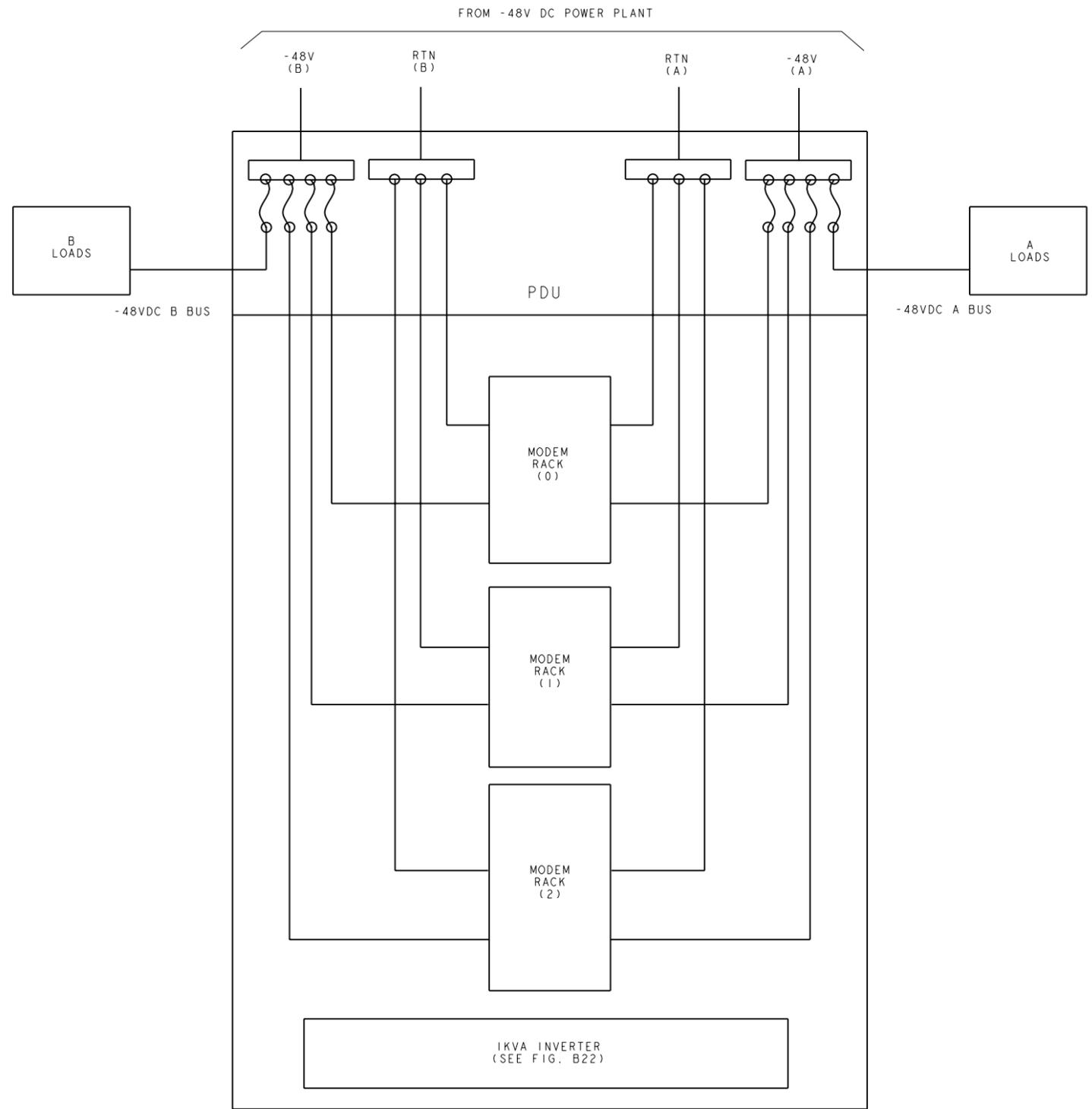
FIG. B90
 GROUNDING DIAGRAM FOR SYSTEM WITH
 COMMERCIAL AC AND REMOTE GROUND WINDOW

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B13
MODEL NAME		



AMC

(a)
TYPICAL AMC LAYOUT (EDIS019-10)
(SHOWN WITH THREE MODEM RACKS MAXIMUM)



(b)

SIMPLIFIED EQUIVALENT CIRCUIT
OF AMC POWER DISTRIBUTION

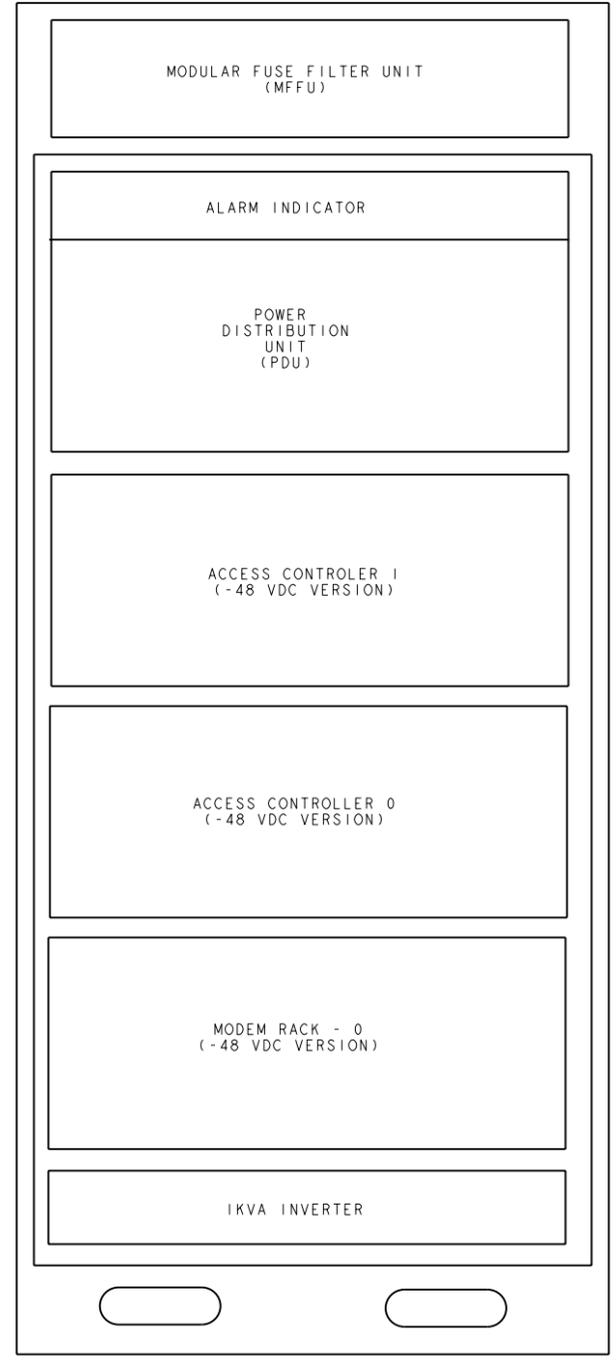
FIG. B100

FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B14	

MODEL NAME

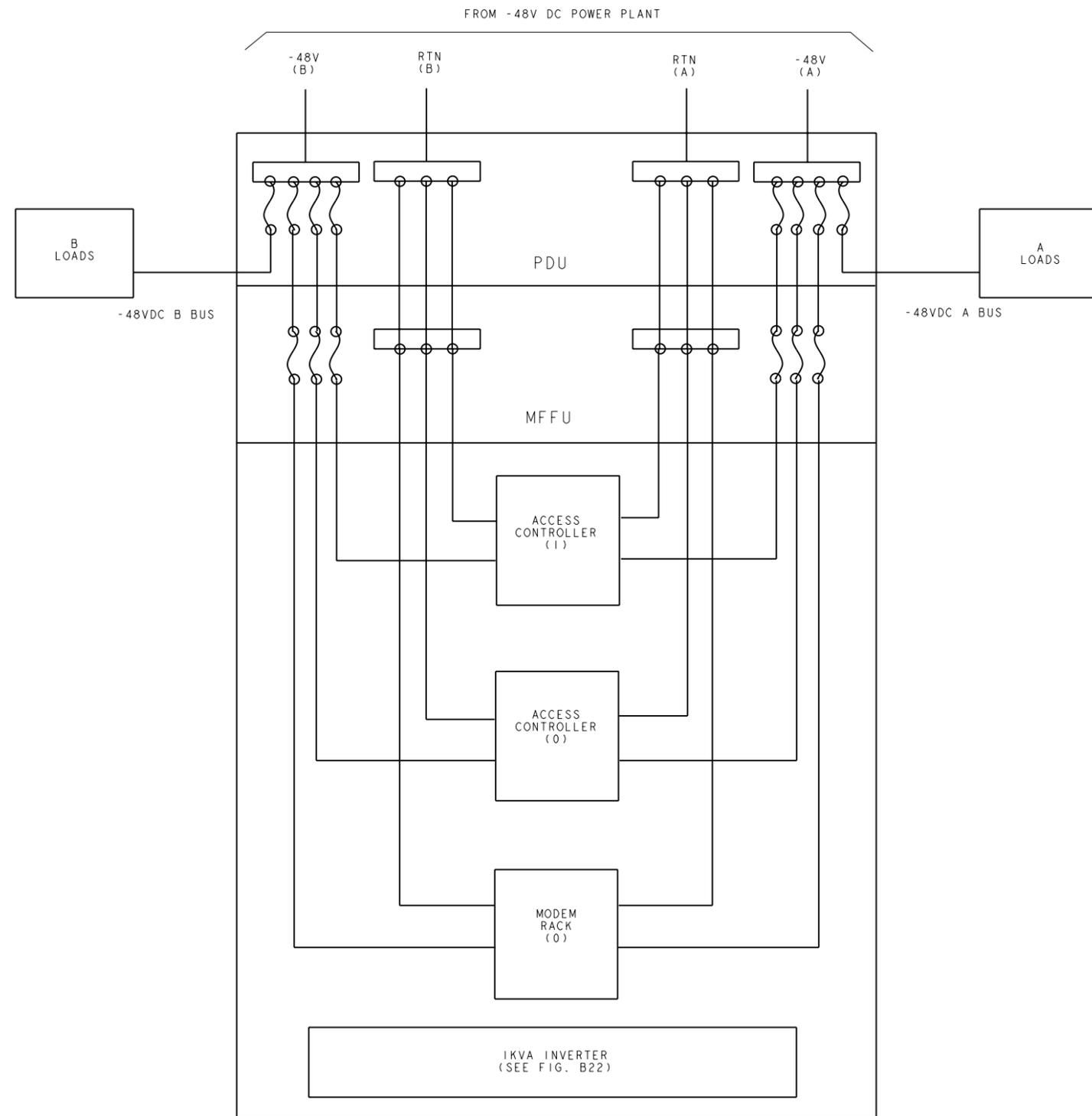
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AMCX

(a)
TYPICAL AMCX LAYOUT (EDIS023-10)
(SHOWN WITH THREE MODEM RACKS MAXIMUM)



(b)

SIMPLIFIED EQUIVALENT CIRCUIT
OF AMCX POWER DISTRIBUTION

FIG. B110

FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		DWG SIZE C2	ISSUE 5
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. B15	

MODEL NAME

SHEET NOTES:

1. DURING INITIAL OFFICE INSTALLATION OR GROWTH IN AN EXISTING OFFICE THE FRAME GROUND INTEGRITY (TEST 1) AND INSULATION RESISTANCE OF THE INSULATING SLEEVES IN THE HOLD DOWN FASTENING HARDWARE (TEST 2) SHALL BE MADE AFTER THE CABINETS ARE FASTENED TO THE FLOOR BUT BEFORE THE CABINET GROUND WIRE IS CONNECTED TO THE CABINET AND BEFORE ANY METALLIC RACEWAY IS ATTACHED.

TEST NO. 1 FRAME GROUND ISOLATION (LOW VOLTAGE TEST)

THE TEST SET SHALL BE CONNECTED BETWEEN THE CABINET BEING TESTED AND C. O. GROUND OR BUILDING GROUND. MINIMUM ACCEPTABLE RESISTANCE IS 100K OHMS.

TEST NO. 2 INSULATION RESISTANCE (500 VOLT TEST)

THE MINIMUM ACCEPTABLE INSULATION RESISTANCE IS 100K OHMS.

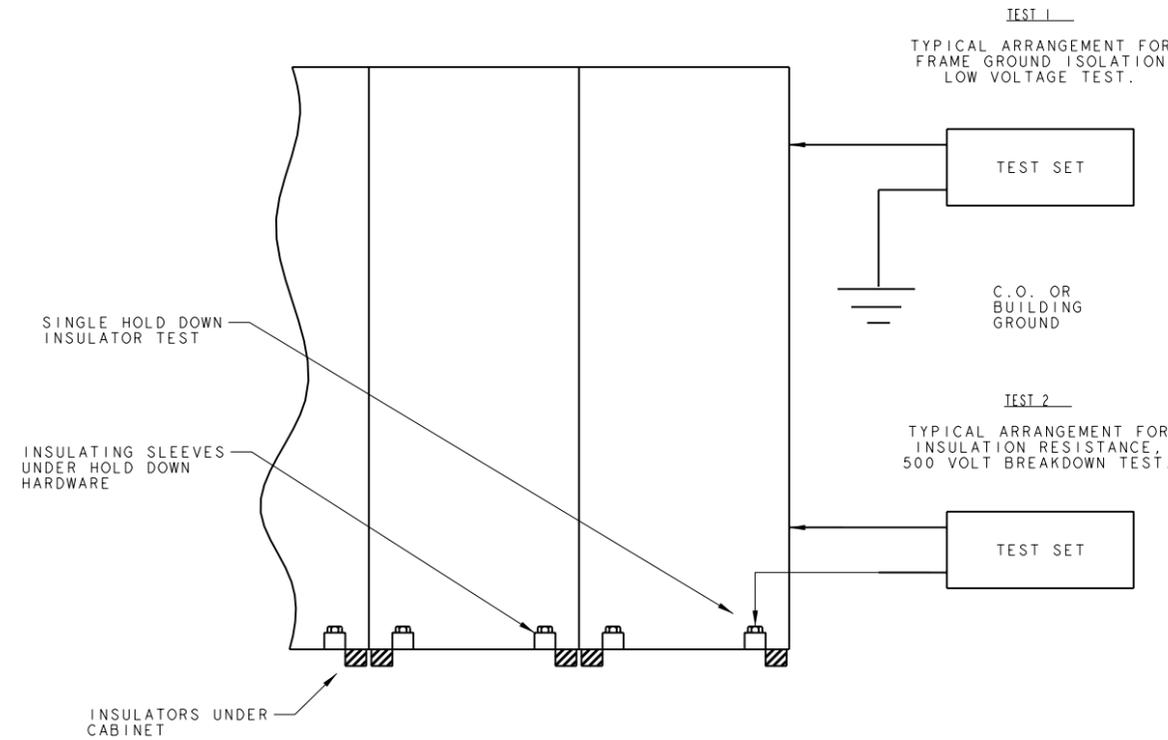
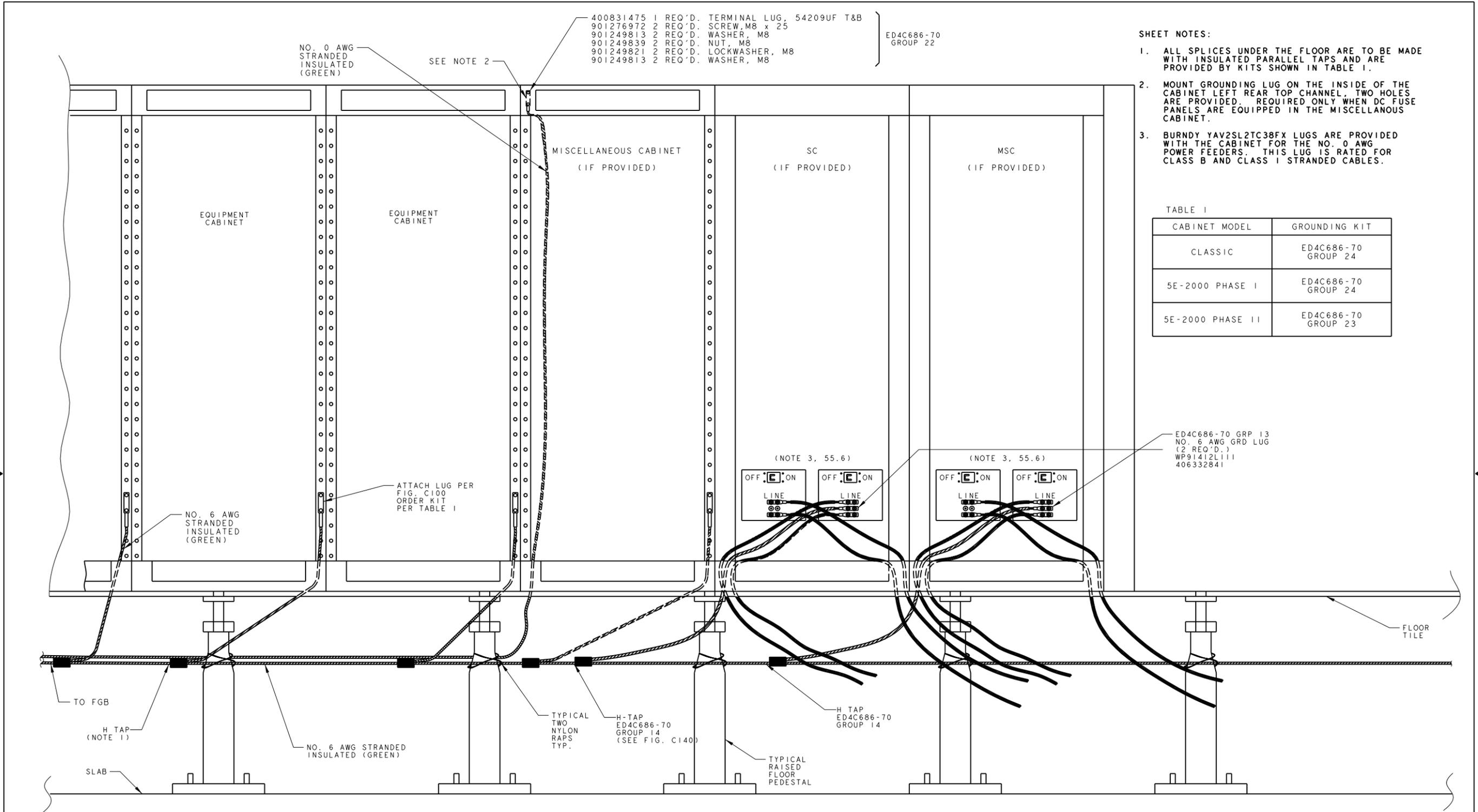


FIG. C10
 ISOLATION AND INSULATION RESISTANCE TEST.
 SEE INSTALLATION ENGINEERING HANDBOOK (IEH)
 570 SECTION 151 FOR
 DETAILED TEST PROCEDURE FOR SCN.
 FOR SCP SEE IEH 571 SECTION 151.

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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C1
MODEL NAME		



- 400831475 1 REQ'D. TERMINAL LUG, 54209UF T&B
- 901276972 2 REQ'D. SCREW, M8 x 25
- 901249813 2 REQ'D. WASHER, M8
- 901249839 2 REQ'D. NUT, M8
- 901249821 2 REQ'D. LOCKWASHER, M8
- 901249813 2 REQ'D. WASHER, M8

ED4C686-70
GROUP 22

- SHEET NOTES:**
1. ALL SPLICES UNDER THE FLOOR ARE TO BE MADE WITH INSULATED PARALLEL TAPS AND ARE PROVIDED BY KITS SHOWN IN TABLE 1.
 2. MOUNT GROUNDING LUG ON THE INSIDE OF THE CABINET LEFT REAR TOP CHANNEL. TWO HOLES ARE PROVIDED. REQUIRED ONLY WHEN DC FUSE PANELS ARE EQUIPPED IN THE MISCELLANEOUS CABINET.
 3. BURNDY YAV2SL2TC38FX LUGS ARE PROVIDED WITH THE CABINET FOR THE NO. 0 AWG POWER FEEDERS. THIS LUG IS RATED FOR CLASS B AND CLASS I STRANDED CABLES.

TABLE 1

CABINET MODEL	GROUNDING KIT
CLASSIC	ED4C686-70 GROUP 24
5E-2000 PHASE I	ED4C686-70 GROUP 24
5E-2000 PHASE II	ED4C686-70 GROUP 23

ED4C686-70 GRP 13
NO. 6 AWG GRD LUG
(2 REQ'D.)
WP91412L111
406332841

FIG. C20
TYPICAL METHOD OF CONNECTING
EQUIPMENT GROUND CONDUCTORS
FOR RAISED FLOOR INSTALLATIONS.
REAR (WIRING SIDE) VIEW.

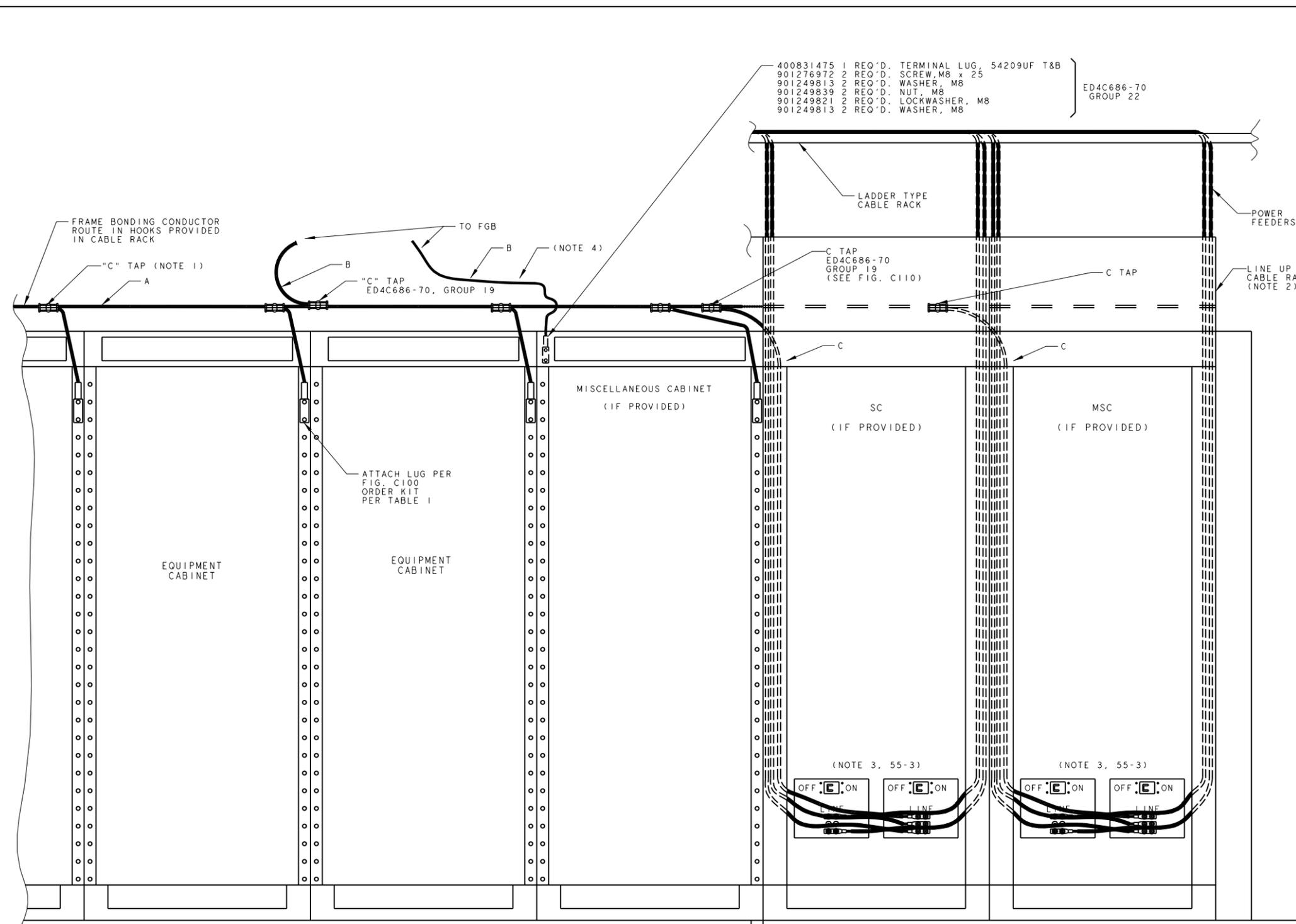
FOR PROPRIETARY NOTICE SEE SHEET A1

ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C2

MODEL NAME

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SHEET NOTES:

1. ALL MOUNTING HARDWARE IS PROVIDED WITH THE FRAME GROUND KIT. INCLUDING ONE "C" TAP.
2. LINE UP CABLE RACK OVER REST OF CABINETS IS NOT SHOWN FOR CLARITY.
3. ONE WP91412L111 COMCODE 406332841 GROUNDING LUG PER SC AND MSC CABINET SHOULD BE ORDERED FROM ED4C686-70 GRP 13. THE LUGS FOR THE POWER FEEDERS ARE PROVIDED, (BURNDY YAV2SL2TC38FX) AND RATED FOR BOTH CLASS B AND CLASS 1 (FLEX) CABLES.
4. MOUNT GROUNDING LUG ON THE INSIDE OF THE CABINET LEFT REAR TOP CHANNEL. TWO HOLES ARE PROVIDED. REQUIRED ONLY WHEN DC FUSE PANELS ARE EQUIPPED IN THE MISCELLANEOUS CABINET.

TABLE 1

CABINET MODEL	GROUNDING KIT
CLASSIC	ED4C686-70 GROUP 17A
5E-2000 PHASE I	ED4C686-70 GROUP 17A
5E-2000 PHASE II	ED4C686-70 GROUP 18A

GROUND CONDUCTOR SIZE	
ITEM	DESCRIPTION
A	NO. 6 AWG BARE STRANDED TINNED COPPER
B	NO. 0 AWG TINNED STRANDED COPPER INS. GREEN
C	NO. 6 AWG TINNED STRANDED COPPER INS. GREEN

FIG. C30
TYPICAL METHOD OF CONNECTING
EQUIPMENT GROUND CONDUCTORS
FOR SLAB INSTALLATIONS
(REAR VIEW)

FOR PROPRIETARY NOTICE SEE SHEET A1

ADVANCED NETWORK SERVER (ANS)
SPECIFICATIONS FOR POWER
DISTRIBUTION AND GROUNDING

THIRD ANGLE PROJN

DWG SIZE C2

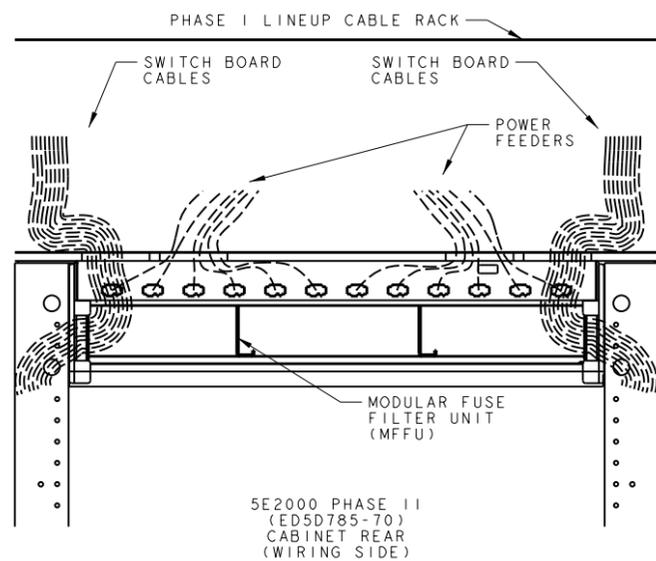
ISSUE 4

SHEET NO. C3

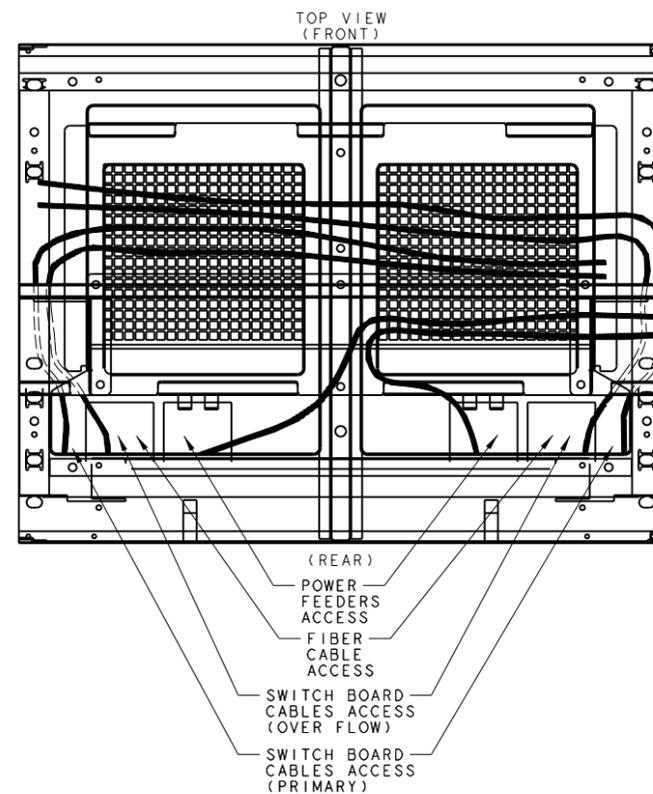
MODEL NAME

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(a)



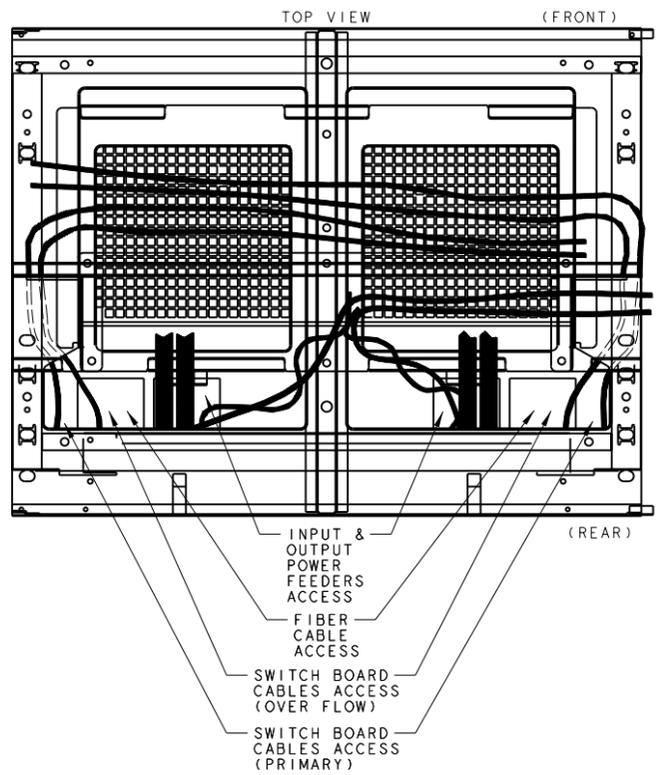
(b)

FIG. C40
METHOD OF CABLING
POWER AND SWITCH BOARD CABLES
TO A 5E2000 PHASE II CABINET
EQUIPPED WITH A PHASE I
CABLE RACK

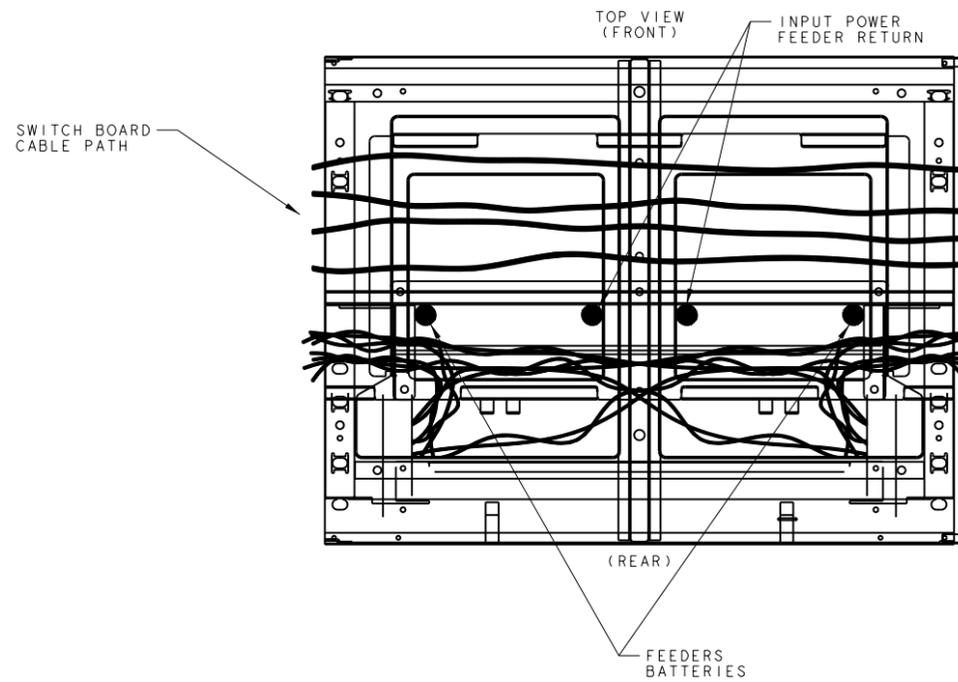
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EDIS017-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C4
MODEL NAME		



(A) ED5D785-70, GROUP IA FRAME
(5E-2000 PHASE II)



(B) ED5D785-70, GROUP IB FRAME
(5E-2000 PHASE II)

FIG. C60
TOP VIEW OF PHASE I CABLE RACK
OVER MISCELLANEOUS CABINET EQUIPPED WITH
A DC DISTRIBUTION FUSE PANEL AND USED AS
A POWER DISTRIBUTION CABINET,
CABLE ROUTING IS SHOWN.

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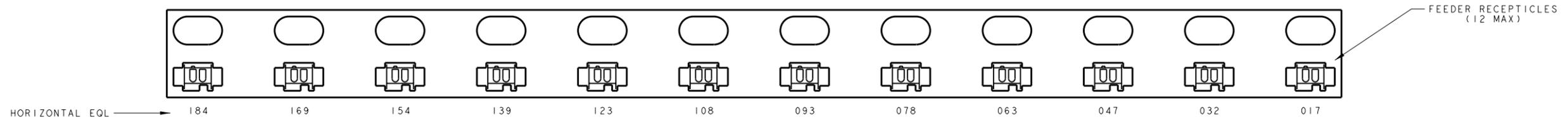
FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10 MODEL NAME	SHEET NO. C5

A-BUS FUSE ASSIGNMENTS		
NO.	TYPE	EQUIPMENT
F1		SFC0 A0 017
F2		SFC0 A1 032
F3		
F4		
F5		
F6		
F7		
F8		
F9		CSCC0 A0 017
F10		CSCC0 A1 063
F11		
F12		
F13		
F14		
F15		
F16		
F17		LUC0 A0 017
F18		LUC0 A1 032
F19		
F20		
F21		
F22		
F23		
F24		

↑ ↑ ↑ MFFU EQL IDENTIFICATION
 - - - -48V BUS IDENTIFICATION (i.e. A0, A1, A2, B0, B1 ...)
 - - - -CABINET IDENTIFICATION

FIG. C70

EXAMPLE OF RECOMMENDED LOAD IDENTIFICATION STAMPING ON FUSE ASSIGNMENTS LABEL PROVIDED WITH POWER DISTRIBUTION FUSE PANEL LOCATED IN THE MISCELLANEOUS CABINET.



REAR VIEW

FIG. C80

EQL NUMBERS STAMPED ON THE MODULAR FUSE FILTER UNIT (MFFU) J5D003FJ-1 LOCATED AT TOP OF EQUIPMENT CABINETS (DOES NOT APPLY TO STARSERVER CABINETS)

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FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10 MODEL NAME	SHEET NO. C6

- SHEET NOTES:
1. THE MOUNTING HARDWARE MAY BE OBTAINED BY KIT NO. 407040914 (BURNDY TMH267). TORQUE TO 240 IN-LBS. ED4C686-70 GROUP 12.
 2. APPLY NO-OX COMPOUND.

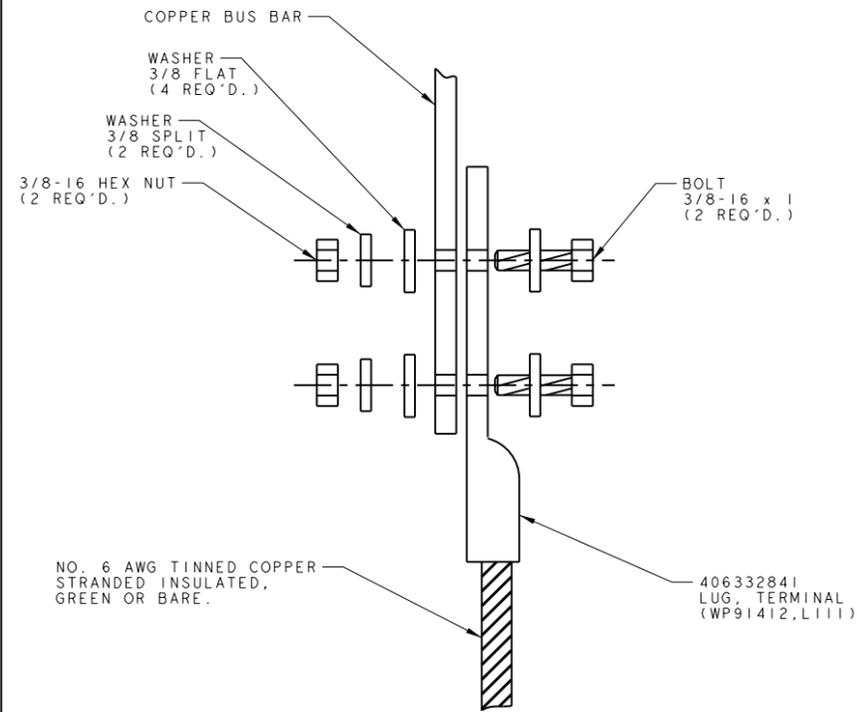


FIG. C90
TYPICAL METHOD OF CONNECTING NO. 6 AWG
GROUNDING CONNECTOR TO A COPPER BUS BAR
SEE NOTE 1

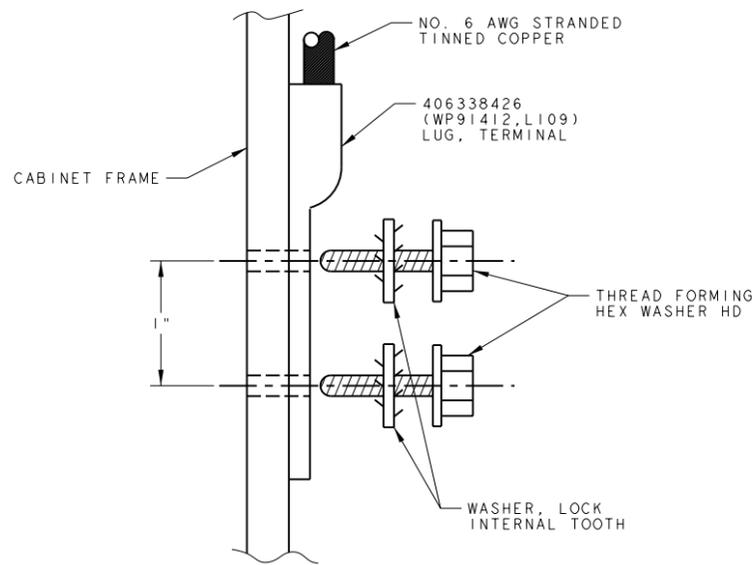


FIG. C100
METHOD OF INSTALLING
FRAME GROUND CABLE

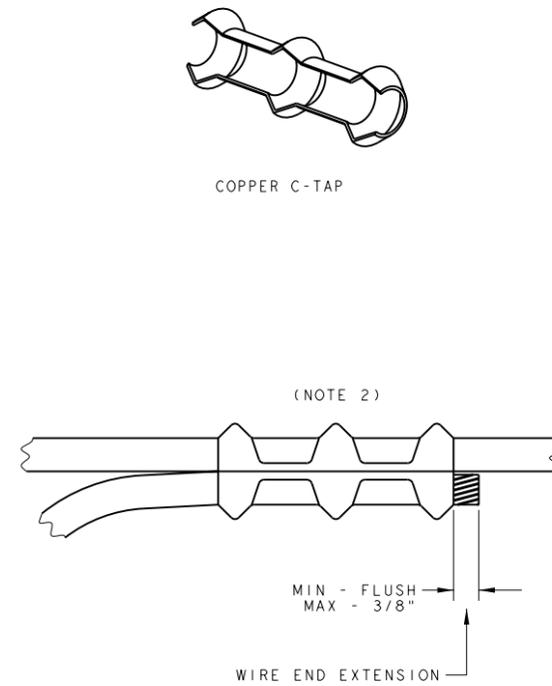
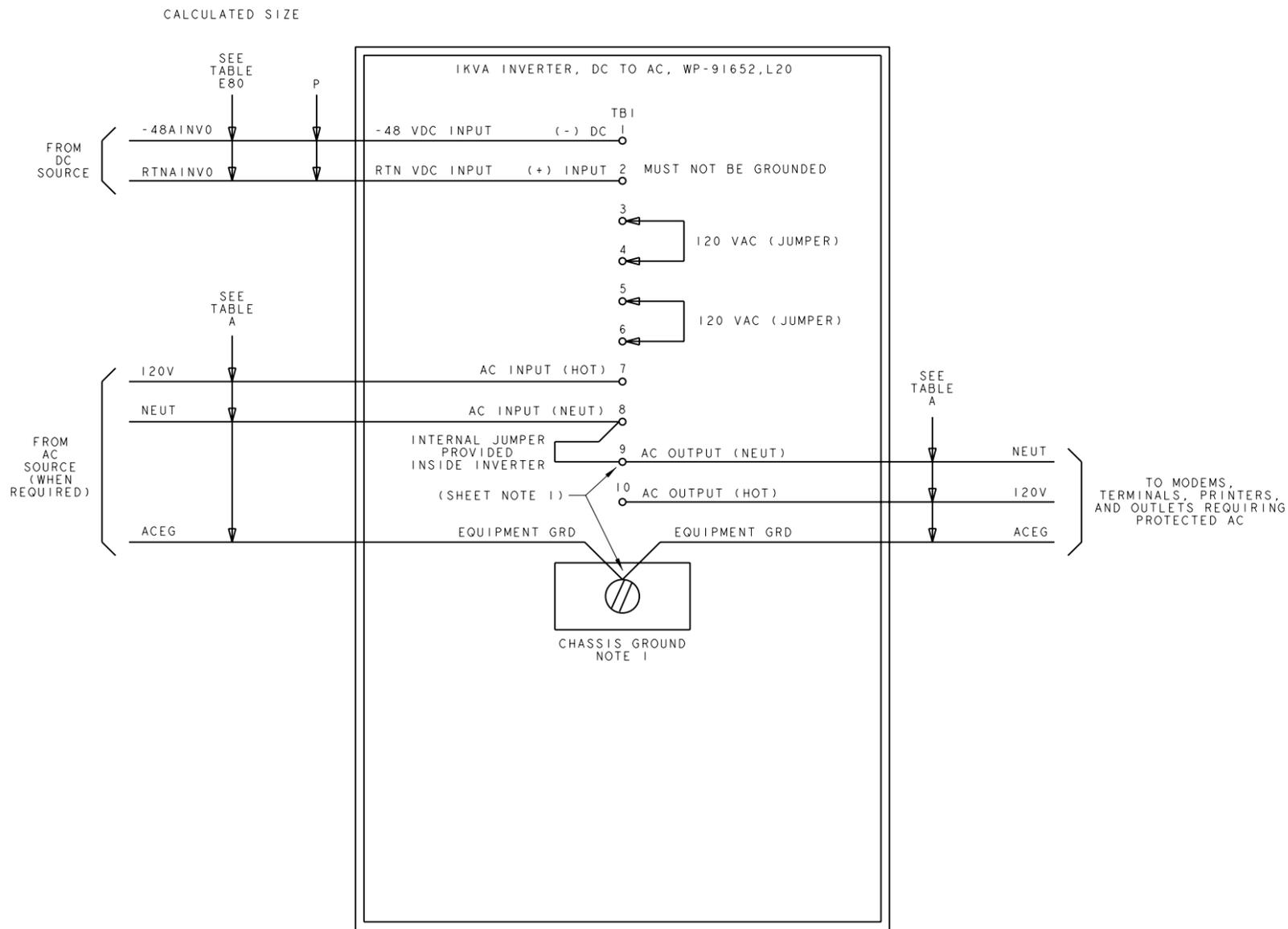


FIG. C110
METHOD OF INSTALLING
C-TAP

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C7
MODEL NAME		



SHEET NOTES:

1. CHASSIS GROUND TERMINAL WILL BE USED AS EQUIPMENT GROUND (EG) FOR AC OUTPUT CIRCUIT IN ALL CASES WHERE AC INPUT WIRES TO INVERTER ARE PROVIDED. THE NEUTRAL LEAD (NEUT) MUST NOT BE CONNECTED TO CHASSIS GROUND.

FOR DC INPUT ONLY APPLICATION, THE INVERTER IS USED AS A SEPARATELY DERIVED SOURCE AND TERMINAL 9 (AC OUTPUT NEUTRAL) MUST BE CONNECTED TO THE CHASSIS GROUND TERMINAL.
2. THE SCREW-TYPE CONNECTIONS FURNISHED ON THE T.B. 1 ARE ACCEPTABLE FOR THIS APPLICATION IN LIEU OF STUDS AND COMPRESSION LUGS.
3. MAXIMUM TERMINAL CAPACITY IS 4 GAUGE. FOR LOOP LENGTH GREATER THAN 208 FEET SPLICE A LARGER GAUGE WIRE TO THE 4 GAUGE USING COMPRESSION PARALLEL TAPS.
4. AC AND DC INPUT CIRCUIT BREAKERS ARE LOCATED AT THE POWER SOURCE.

TABLE A

AC INPUT		
TERM CAP	RECM WIRE SIZE	RECM CKT BREAKER
22-8 GA	12 GA	15 AMP
AC OUTPUT		
TERM CAP	RECM WIRE SIZE	RECM CKT BREAKER
22-8 GA	12 GA	NONE

FIG. C120
1KVA INVERTER MOUNTED
IN THE MISCELLANEOUS CABINET
(DA)
REPLACED BY FIG. C130

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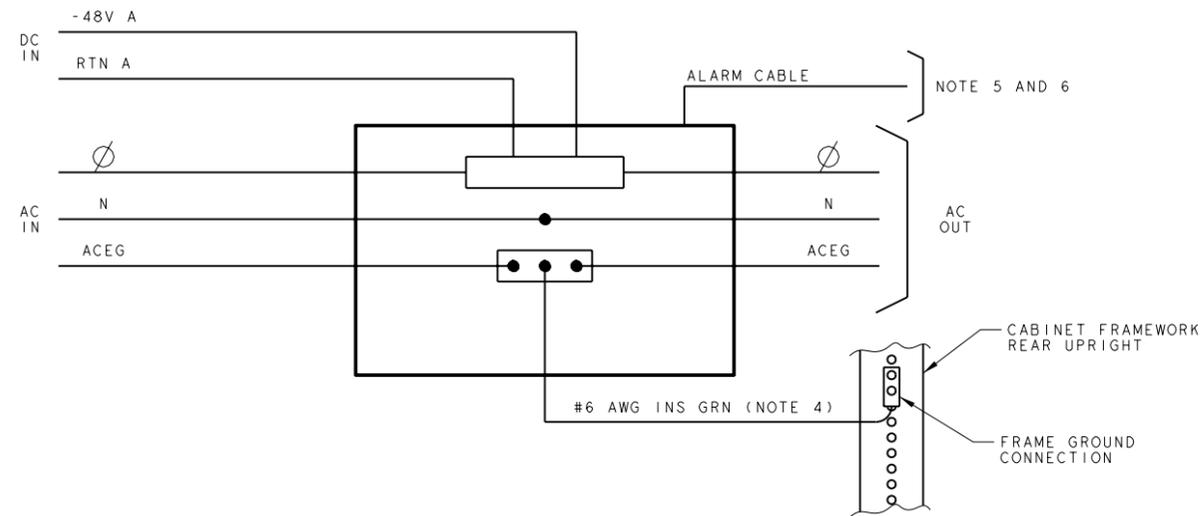
FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C8
MODEL NAME		

MANUFACTURING NOTES

1. USE INVERTER INSTALLATION MANUAL FOR ADDITIONAL WIRING AND INSTALLATION INSTRUCTIONS.
2. UNLESS OTHER ARRANGMENTS ARE MADE, THE INVERTER(S) ARE MOUNTED IN THE MISCELLANEOUS CABINET. SEE FOR ORDERING AND INSTALLATION INFORMATION.
3. WIRING INFORMATION:

	WIRE SIZE (AWG)	FUSE OR CB SIZE
AC INPUT	12	15 AMP
AC OUTPUT	12	NONE
DC INPUT	SEE TABLE E60	

4. ORDER FRAME GROUND KIT FROM ED4C686-70 GROUP 23.
5. 22 AWG TWISTED PAIR CABLE (2 WIRES) FOR ALARMS TO BE PROVIDED OF A JOB BASIS BY REGIONAL ENGINEER.
6. ALARM CABLE IS ROUTED TO THE OFFICE ALARM UNIT (OAU) VIA MDF.
7. THE INVERTER ALARM INTERFACE IS AN ISOLATED CONTACT (FORM-C) TYPE.



SINGLE INVERTER CONFIGURATION
DC AND AC INPUTS

FIG. C130

1KVA INVERTER (WP-91652, L22)

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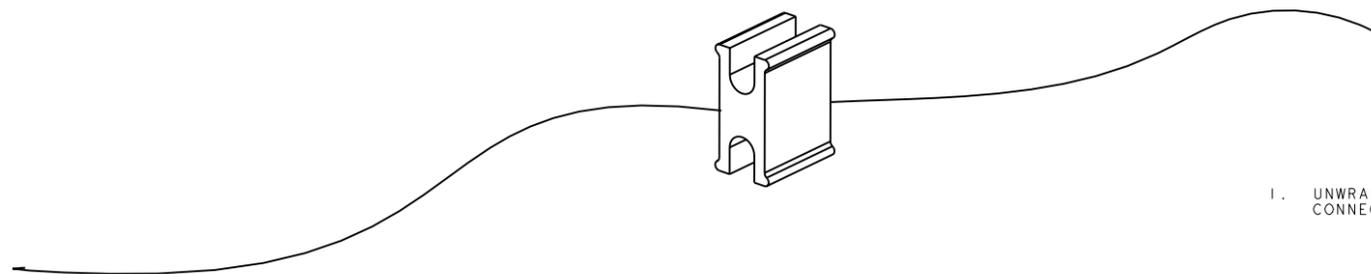
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FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C9

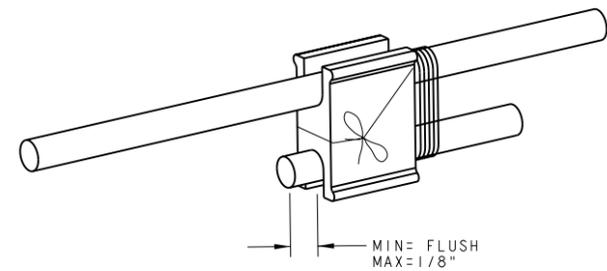
MODEL NAME

SHEET NOTES:

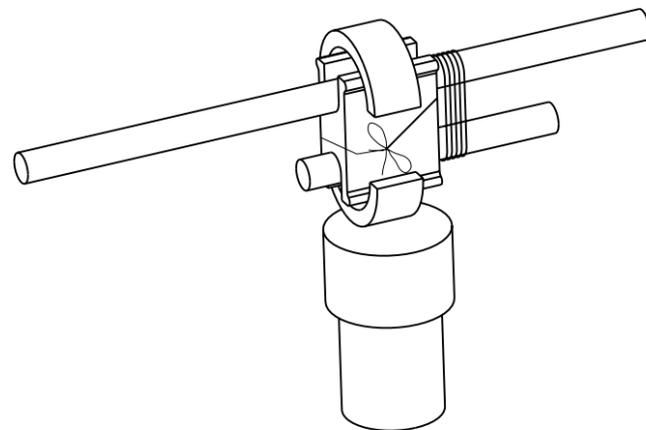
- 1. ANTI-OXIDIZING COMPOUND IS NOT REQUIRED WITH TIN PLATED COPPER AND TIN PLATED COPPER H-TAP. IT IS REQUIRED WITH BARE COPPER.



- 1. UNWRAP STRING FROM CONNECTOR.



- 2. WRAP STRING TIGHTLY AROUND CONDUCTOR, KEEPING THE STRING OUTSIDE OF THE CONDUCTOR AREA.



- 3. POSITION CONNECTOR IN TOOL, USING RECOMMENDED DIE, MAKE CRIMP(S).
- 4. STRING MAY BE REMOVED AFTER CRIMPING IS COMPLETE.
- 5. INSTALL THE INSULATING COVER.

FIG. C140
METHOD OF INSTALLING
PARALLEL TAPS

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. C10

SHEET NOTES:

1. LINE UNIT CABINETS (LUC) ARE EQUIPPED WITH ONE OR TWO ISLU UNITS DEPENDING ON THE A-I-NET MODEL. FOR CURRENT DRAIN CALCULATIONS, MULTIPLY THE NO. OF LUC BY THE NO. OF ISLUs PER LUC, TIMES THE AMPS PER ISLU;
 $LUC\ AMPS = (LUC) \times (ISLU) \times (12\ AMPS)$ FOR LIST 1 DRAINS.
 $LUC\ AMPS = (LUC) \times (ISLU) \times (15\ AMPS)$ FOR LIST 2 DRAINS.
2. THIS VOLTAGE IS MEASURED AT THE INPUT SIDE OF THE SYSTEM POWER DISTRIBUTION PANEL MOUNTED IN THE MISCELLANEOUS CABINET. THE MINIMUM OPERATING VOLTAGE MEASURED THE BACKPLANE OF THE LOAD EQUIPMENT IS -39.5V DC.
3. THE CURRENT DRAIN PER BUS IS FOR BALANCED LOADS. CONFIG. 1, WITH ONE ISLU, SHOULD HAVE THE FOLLOWING LOAD PER BUS:
 $LIST\ 1\ A = 39\ B = 27\ AMPS$
 $LIST\ 2\ A = 50.7\ B = 35.1$
 IF BUS A IS USED FOR THE ISLU.
4. USE TABLE E80 TO OBTAIN CURRENT DRAIN AND FUSING INFORMATION. TOTAL THE REQUIRED AMPERES AND FUSES BASED ON THE INFORMATION IN TABLE E80 AND THE NUMBER OF CABINETS REQUIRED IN A SPECIFIC SYSTEM CONFIGURATION.

TABLE - E10

DC VOLTAGE LIMITS		REMARKS
NOMINAL	-48V	NOTE 2
NOMINAL VOLTAGE RANGE	-51.0V TO -55V	NOTE 2
EMERGENCY RANGE DURING BATTERY OPERATION	-40.5V TO -48V	NOTE 2

TABLE - E30 (DA) NOTE 4

-48V DC CURRENT REQUIRED FROM MISC CABINET FUSE PANEL ONLY				
FOR TOTAL NO. OF CABINETS IN A GIVEN MODEL	CONFIG. 1		CONFIG. 2	
	L1 AMPS	L2 AMPS	L1 AMPS	L2 AMPS
CSCC	29.8	38.7	59.6	77.4
SFC	22.5	29	22.5	29
LUC	12.0	15.6	24.0	31.2
TOTAL BUS A+ BUS B	64.3	83.3	106.1	137.6
EACH BUS	NOTE 3	NOTE 3	53.3	68.8

TABLE - E20 (DA) NOTE 4

-48V DC POWER REQUIRED BY SCN (TOTAL)					REMARKS
CABINET	NO. OF CABINETS REQUIRED IN A GIVEN CONFIGURATION		AMPS PER CAB		
	CONFIG. 1	CONFIG. 2	L1	L2	
MISC	1	1	0	0	
CSCC	1	2	29.8	38.7	
SFC	1	1	22.5	39	
LUC ISLUs	1	2	12.0	15.6	NOTE 1
1KVA INVERT.	1	1	23.5	30.6	
SC	1	1	41.8	54.4	
MSC	1	1	28.4	37	
TOTAL AMPS PER MODEL	157.7	199.8	LIST 1		
	205.3	262.1	LIST 2		

TABLE - E40 (DA) NOTE 4

NO. OF FUSES REQD.				
CONFIG.	1		2	
	A	B	A	B
CSCC	2	2	4	4
SFC	4	4	4	4
LUC	4	0	4	4
TOTAL	10	6	12	12

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FOR PROPRIETARY NOTICE SEE SHEET A1			
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING		THIRD ANGLE PROJN	
		DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E1	
MODEL NAME			

SHEET NOTES:

- IF A 1KVA INVERTER IS USED FOR PROTECTED AC, THE 1KVA (120V) INVERTER SHALL BE LOADED TO A MAXIMUM OF 90 (NINETY) CAPACITY. THIS ALLOWS A MAXIMUM AVAILABLE CURRENT OF 7.50 AMPS FOR 120V LOADS. IF THIS LOAD IS EXCEEDED, USE ESSENTIAL/COMMERCIAL AC FOR NONCRITICAL LOADS OR PROVIDE A LARGER INVERTER.

TABLE - E50

PROTECTED 120VAC LOADS (SEE SHEET NOTE 1)						
EQUIPMENT	AMPS	VOLT-AMPS	WATTS	CIRCUIT BREAKER SIZE (AMPS)	REMARKS	STATUS
BOUNDLESS TECH MONITOR SET 3530	3.6	120	—	15	—	—
NCR 3415 VIDEO DISPLAY	1.2	120	—	15	—	—
NCR 557 PRINTER	3.0	120	30(STE) 140(ACT)	15	—	—
AT&T 615 COLOR MONITOR TERMINAL	1.0	120	—	15	—	DA
AT&T 580 PARALLEL PRINTER	1.5	180	—	15	—	DA
ARU (ALARM RELAY UNIT)	0.04	4.8	—	15	—	DA
A/B SWITCH INMAC 814160	0.1	12	—	15	—	DA
MODEM 3811	0.1	12	—	15	EACH	DA
9 TRACK TAPE DRIVE	2.08	249.6	—	15	—	DA
NCR 6427 PARALLEL PRINTER	2.0	240	—	15	—	DA
PARADYNE DATA SET SHELF	2.6	312	264	15	FULLY EQUIPPED	DA

TABLE - E60

ESSENTIAL 120VAC LOADS						
EQUIPMENT	AMPS	VOLT-AMPS	WATTS	CIRCUIT BREAKER SIZE (AMPS)	REMARKS	STATUS
SECOND PARADYNE (SCN) DATA SET SHELF	2.6	312	264	15	FULLY EQUIPPED	DA

TABLE - E70

GROUND CONDUCTORS REQUIRING A 0.010 OHM MAX RESISTANCE	
GROUND CONDUCTOR LENGTH FEET (METERS)	GROUND CONDUCTOR SIZE AWG
0 - 25 (0 - 8)	6
26 - 100 (9 - 30)	1/0
101 - 120 (31 - 37)	2/0
121 - 160 (38 - 49)	3/0
161 - 200 (50 - 61)	4/0

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FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E2

MODEL NAME

TABLE - E71 AWG AND CORRESPONDING METRIC SIZE

AWG	AREA AT 20 DEGREES C	
	C MILS	MM SQUARE
16	2580	1.31
15	3260	1.65
14	4110	2.08
13	5180	2.63
12	6530	3.31
11	8230	4.17
10	10380	5.26
9	13090	6.63
8	16510	8.36
7	20820	10.55
6	26240	13.30
5	33090	16.77
4	41740	21.15
3	52620	26.67
2	66360	33.62
1	83690	42.41
1/0	105500	53.49
2/0	133100	67.43
3/0	167800	85.01
4/0	211600	107.26
	350000	177.39
	500000	253.35
	750000	380.13

THE FOLLOWING FORMULAS WERE TAKEN FROM THE 1996 NEC HANDBOOK (CHAPTER 9, PAGE 886), AND MAY BE USED TO APPROXIMATE THE CONVERSION BETWEEN CIRCULAR MIL AREA AND MM SQUARE:

- 1) $C \text{ MILS} = (MM \text{ SQ}) \times (1973.53)$
- 2) $MM \text{ SQ} = \frac{(C \text{ MIL})}{1973.53}$

TABLE - E72 RESISTANCE OF COPPER WIRE @25° C

AWG C mils	MILLIOHMS PER FOOT	
	TINNED	UNTINNED
10	1.08	1.04
8	0.678	0.652
6	0.427	0.411
4	0.269	0.258
3	0.213	0.205
2	0.169	0.162
1	0.134	0.129
1/0	0.106	0.102
2/0	0.084	0.081
3/0	0.0644	0.0642
4/0	0.052	0.051
250K	0.0432	0.0431
350K	0.032	0.031
500K	0.022	0.021
750K	0.0148	0.0144

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E3
MODEL NAME		

TABLE - E73 METHOD OF SIZING A FRAME GROUNDING CONDUCTOR

TO SELECT THE PROPER CONDUCTOR SIZE FOR A DCEG CONDUCTOR, APPLY THE FOLLOWING 3 TESTS AND CHOOSE THE RESULTING LARGEST SIZE CONDUCTOR:

1. #6 AWG MINIMUM
2. MATCH WIRE SIZE TO OPDR (OVERCURRENT PROTECTION DEVICE RATING) LISTED BELOW:

LARGEST OPDR UPSTREAM OF FRAME TO BE GROUNDED (AMPERES)	MINIMUM DCEG COPPER CONDUCTOR SIZE (AWG)
UP TO 200	6
300	4
400	3
500	2
600	1
800	1/0
1000	2/0
1200	3/0
1600	4/0

3. THE FOLLOWING FORMULA TAKES GROUNDING PATH LENGTH INTO CONSIDERATION AND ENSURES A LOW RESISTANCE PATH FOR FAULT CURRENT -

$$R_{max} = \frac{(0.9) \times (V_{nom})}{(10) \times (OPDR)}$$

WHERE: R_{max} = MAXIMUM GROUND PATH RESISTANCE

V_{nom} = POWER SOURCE NOMINAL VOLTAGE e.g. 24, 48, 140 etc.

OPDR = RATING OF OVERCURRENT PROTECTION DEVICE UPSTREAM OF FRAMEWORK TO BE GROUNDED.

EXAMPLE:

GROUNDING WIRE LENGTH = 100 FT
 OPDR = 200 AMP CIRCUIT BREAKER
 $V_{nom} = 48V$

$$R_{max} = \frac{(0.9) \times (V_{nom})}{(10) \times (OPDR)} = \frac{43.2V}{(10) \times (200A)} = \frac{43.2V}{2000A} = 0.022 \text{ OHMS}$$

THUS, THE MAX RESISTANCE FOR THE TOTAL LENGTH IS 0.022 OHMS, OR 22 MILLIOHMS.

$$\frac{0.022 \text{ OHM}}{100 \text{ FEET}} = 0.00022 \text{ OHM/FOOT}$$

$$= 0.22 \text{ MILLIOHM/FOOT}$$

FROM TABLE E30 SELECT A WIRE WITH A RESISTANCE OF 0.22 MILLIOHM PER FOOT OR LESS.

FROM TABLE E30 A #3 AWG WIRE IS SUFFICIENT FOR THIS APPLICATION. HOWEVER IT IS NOT A STANDARD SIZE, THEREFORE A #2 AWG MAY BE NECESSARY.

FOR PROPRIETARY NOTICE SEE SHEET A1		
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING	THIRD ANGLE PROJN 	
	DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E4
MODEL NAME		

SHEET NOTES:

1. "A" FEEDERS FOR CSCC(0), "B" FEEDERS FOR CSCC(1).

TABLE E80 - -48V DC POWER DISTRIBUTION REQUIREMENTS

ITEM	PROVIDE -48V DC TO:		FEEDER INFORMATION				CURRENT DRAIN (NOTE 58)		VOLTAGE DROP AND FEEDER LENGTH		POWER CONSUMPTION PER CABINET				POWER SOURCE		ADDITIONAL INFORMATION		
	EQUIPMENT CABINETS		FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EOL	MINIMUM FEEDER AWG SIZE	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		SECONDARY FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH FOR MINIMUM FEEDER SIZE (FT) NOTE 55.4	TOTAL CABINET AMPS		TOTAL L1 POWER (WATTS) NOTE 55.7	TOTAL L1 BTU/HRS NOTE 55.8	POWER SOURCE EQUIPMENT	MAX FUSE SIZE		FIG.	REMARKS
	DESIG	DESCRIPTION					L1	L2			L1	L2				MIN.	MAX.		
1	SFC (0)	JIS001B-1 (DA)	-48A 0	017	10	AMP	5.6	7.2	0.75	48	22.5	29	1147	3911	MISCELLANEOUS CABINET FUSE PANEL OR EQUIVALENT	10	30		
			-48A 1	032	10		1.3	1.7	0.75	206						3	30		
			-48A 2	108	10		2.5	3.2	0.75	109						5	30		
			-48A 3	123	10		1.7	2.2	0.75	159						3	30		
			-48B 0	063	10		5.6	7.2	0.75	48						10	30		
			-48B 1	078	10		1.3	1.7	0.75	206						3	30		
			-48B 2	154	10		2.5	3.2	0.75	109						5	30		
			-48B 3	169	10		2.0	2.6	0.75	134						5	30		
2	CSCC (0) OR (1)	JIS001D-1 (DA)	-48() 0	017	10	AMP	7.5	9.7	0.75	36	30.0	38.8	1530	5217	MISCELLANEOUS CABINET FUSE PANEL OR EQUIVALENT	15	30	NOTE 1	
			-48() 1	063	10		7.5	9.7	0.75	36						15	30		
			-48() 2	108	10		7.5	9.7	0.75	36						15	30		
			-48() 3	154	10		7.5	9.7	0.75	36						15	30		
3	LUC (0)	JIS001C-1 (ISLU0) (DA)	-48A 0	017	10	AMP	3	3.9	0.75	90	12	15.6	612	2087	MISCELLANEOUS CABINET FUSE PANEL OR EQUIVALENT	5	30		
			-48A 1	032	10		3	3.9	0.75	90						5	30		
			-48A 2	063	10		3	3.9	0.75	90						5	30		
			-48A 3	078	10		3	3.9	0.75	90						5	30		
	(ISLU1) (DA)	-48B 0	108	10	3		3.9	0.75	90	12	15.6	612	2087	MISCELLANEOUS CABINET FUSE PANEL OR EQUIVALENT	5	30			
		-48B 1	123	10	3		3.9	0.75	90						5	30			
		-48B 2	154	10	3		3.9	0.75	90						5	30			
		-48B 3	169	10	3		3.9	0.75	90						5	30			

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING			
DWG SIZE C2	ISSUE 4		
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E5	MODEL NAME

SHEET NOTES:

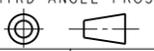
1. INVERTER CURRENT DRAIN WAS DERIVED FROM WP-91652 SPECIFICATIONS AT MAX OUTPUT LOAD OF 90 PERCENT CAPACITY. 80 PERCENT EFFICIENCY IS ASSUMED.
2. MAXIMUM TERMINAL CAPACITY IS 4 GAUGE. FOR ONE WAY LENGTH GREATER THAN 124 FEET, SPLICE A LARGER GAUGE WIRE TO THE 4 GAUGE USING COMPRESSION PARALLEL TAPS.
3. INVERTER WP-91652, L20 IS REPLACED BY WP-91652, L22 (ITEM NO. 13)

TABLE E80 - (CONT.) -48V DC POWER DISTRIBUTION REQUIREMENTS

PROVIDE -48V DC TO:		FEEDER INFORMATION				CURRENT DRAIN (NOTE 58)		VOLTAGE DROP AND FEEDER LENGTH		POWER CONSUMPTION PER CABINET				POWER SOURCE		ADDITIONAL INFORMATION			
ITEM	EQUIPMENT CABINETS		FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EQL	MINIMUM FEEDER AWG SIZE	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		SECONDARY FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH FOR MINIMUM FEEDER SIZE (FT) NOTE 55.4	TOTAL CABINET AMPS		TOTAL L1 POWER (WATTS) NOTE 55.7	TOTAL (L1) BTU/HR NOTE 55.8	POWER SOURCE EQUIPMENT	FUSE SIZE (AMPS)		FIG.	REMARKS
	DESIG	DESCRIPTION					L1	L2			L1	L2				MIN.	MAX.		
4	SC	STARSERVER COMPUTER (DA)	-48A	FIG. C20, C30	0	WP91412L56	20.9	27.0	2.0	352	41.8	54.0	2132	7270	DC POWER PLANT	40	100	B10 B20	A/B FEEDERS ARE ORED
			-48B	FIG. C20, C30	0	WP91412L56	20.9	27.0	2.0	352									
5	MSC	MASS STORAGE CABINET (DA)	-48A	FIG. C20, C30	0	WP91412L56	14.2	18.3	2.0	528	28.4	36.6	1448	4938	DC POWER PLANT	30	100		A/B FEEDERS ARE ORED
			-48B	FIG. C20, C30	0	WP91412L56	14.2	18.3	2.0	528									
6	INV	WP91652, L20 1KVA INVERTER (NOTE 1,3) (DA)	-48A	FIG. C120	8	PROVIDED	23.5	30.3	2.0	49	23.5	30.3	1199	4089	DC POWER PLANT	40	50	B20	MOUNTED IN MISC CABINET (DA)
					6	PROVIDED				78									
					4	PROVIDED				124 (NOTE 2)									
7	MISC	JIS001E-1 MISCELLANEOUS CABINET (SCN) (DA)	N/A																
8	MISC	JIS002B-1 MISCELLANEOUS CABINET (SCP) (DA)	N/A																

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING			
DWG SIZE C2	ISSUE 4		
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E6	

MODEL NAME

SHEET NOTES:

- 1. DISTRIBUTION PANEL MUST BE EQUIPPED WITH A CHARGE CIRCUIT OR ABLE TO WITHSTAND INRUSH CURRENT GENERATED BY LOAD CAPACITANCE. SEE INRUSH REQUIREMENTS IN SD-5D005-01.

TABLE E80 - (CONT.) -48V DC POWER DISTRIBUTION REQUIREMENTS

ITEM	LOAD EQUIPMENT		FEEDER INFORMATION				CURRENT DRAIN NOTE 58		VOLTAGE DROP AND FEEDER LENGTH		POWER CONSUMPTION PER CABINET				POWER SOURCE		ADDITIONAL INFORMATION		
	DESIG	DESCRIPTION	FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EQL	MINIMUM FEEDER SIZE (AWG)	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		SECONDARY FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH FOR MINIMUM FEEDER SIZE (FT) NOTE 55.4	TOTAL CABINET AMPS		TOTAL (L1) POWER (WATTS) NOTE 55.7	TOTAL (L1) BTU/HRS NOTE 55.8	POWER SOURCE EQUIPMENT	SIZE (AMP)		FIG.	REMARKS
							L1	L2			L1	L2				MIN.	MAX.		
9	ACSC	EDIS015-61 EDIS015-60 (DA) ADVANTAGE CONTROL SERVER CABINET	-48VA0	017	10	AMP MATE-N-LOK P/O ED5A079-30	4.4	5.7	0.75	61	15.4	19.8	785	2,677	GPDF J86339E-1 TYPE FUSE PANEL OR POWER PLANT DISTRIBUTION PANEL (NOTE 1)	10	30	B30 B31	
			-48VA1	032	10		1.8	2.3	0.75	152						3	30		
			-48VA2	063	10		1.5	1.9	0.75	184						3	30		
			-48VA3	078	10		0	0	0.75	N/A						3	30		
			-48VB0	108	10		4.4	5.7	0.75	61						10	30		
			-48VB1	123	10		1.8	2.3	0.75	152						3	30		
			-48VB2	154	10		1.5	1.9	0.75	184						3	30		
			-48VB3	169	10		0	0	0.75	N/A						3	30		
10	ATSC (0/1)	EDIS018-61 EDIS018-60 (DA) ADVANTAGE TELECOM SERVER CABINET	-48VA0	017	10	AMP MATE-N-LOK P/O ED5A079-30	3.8	4.9	0.75	71	20.8	26.9	1061	3617	GPDF J86339E-1 TYPE FUSE PANEL OR POWER PLANT DISTRIBUTION PANEL (NOTE 1)	10	30	B30 B31	
			A1	032	10		3.8	4.9	0.75	71						10	30		
			A2	063	10		3.8	4.9	0.75	71						10	30		
			A3	078	10		0.9	1.2	0.75	292						3	30		
			-48VB0	108	10		3.8	4.9	0.75	71						10	30		
			B1	123	10		3.8	4.9	0.75	71						10	30		
			B2	154	10		0.9	1.2	0.75	292						3	30		
			B3	169	10		NC	-	0.75	N/A						3	30		

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING			
		DWG SIZE C2	ISSUE 4
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E7	

MODEL NAME

- SHEET NOTES:
1. MAX 3 DC MODEM UNITS PER AMC CABINET.
 2. MODEM UNITS D OR E OR ED POWERED. CURRENT DRAIN SHOWN IS MAX EXPECTED PER FEEDER IF ONE SOURCE (A OR B) FAILS.
 3. AMC AND AMCX CABINETS ARE EQUIPPED WITH A PDU, WHICH RECEIVES POWER FROM A DC POWER PLANT AND DISTRIBUTES POWER TO ALL DC LOADS IN THE SYSTEM AS WELL AS THE UNITS LOCATED IN THE AMC/AMCX CABINET. AMCX ALSO HAS A MFFU THAT DISTRIBUTES POWER TO ALL DC LOADS WITHIN THE CABINET.
 4. MAX. 1 DC MODEM AND 2 DC ACCESS CONTROL UNITS PER AMCX CABINET.

TABLE E80 - (CONT.) -48V DC POWER DISTRIBUTION REQUIREMENTS

I T E M	LOAD EQUIPMENT		FEEDER INFORMATION				CURRENT DRAIN NOTE 58		VOLTAGE DROP AND FEEDER LENGTH		POWER CONSUMPTION PER CABINET				POWER SOURCE		ADDITIONAL INFORMATION		
	DESIG	DESCRIPTION	FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EQL	MINIMUM FEEDER SIZE (AWG)	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		SECONDARY FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH FOR MINIMUM FEEDER SIZE (FT) NOTE 55.4	TOTAL CABINET AMPS		TOTAL (L1) POWER (WATTS) NOTE 55.7	TOTAL (L1) BTU/HR NOTE 55.8	POWER SOURCE EQUIPMENT	SIZE (AMP)		FIG.	REMARKS
							L1	L2			L1	L2				MIN.	MAX.		
11	ANTC	EDIS020-60 ADVANTAGE NETWORK TERMINATION CABINET	-48VA0		10	AMP MATE-N-LOK P/O ED5A079-30	0.1	0.1	0.75	3506	0.8	0.8	41	140	GPDF J86339E-1 TYPE FUSE PANEL OR POWER PLANT DISTRIBUTION PANEL	3	30	B30 B31	
			-48VA1		10		0.1	0.1	0.75	3506						3	30		
			-48VA2		10		0.1	0.1	0.75	3506						3	30		
			-48VA3		10		0.1	0.1	0.75	3506						3	30		
			-48VB0		10		0.1	0.1	0.75	3506						3	30		
			-48VB1		10		0.1	0.1	0.75	3506						3	30		
			-48VB2		10		0.1	0.1	0.75	3506						3	30		
			-48VB3		10		0	0	0.75	3506						3	30		
12	AMC	EDIS019-10 E/W -48V MODEM RACKS AND GPDF FUSE PANEL	-48VA0		10	AMP MATE-N-LOK P/O ED5A079-30	0.9	1.2	0.75	292	5.4	7.2	275	939	NOTE 3	3	30	B100	NOTE 1 NOTE 2
			-48VA1		10		0.9	1.2	0.75	292						3	30		
			-48VA2		10		0.9	1.2	0.75	292						3	30		
			-48VB0		10		0.9	1.2	0.75	292						3	30		
			-48VB1		10		0.9	1.2	0.75	292						3	30		
			-48VB2		10		0.9	1.2	0.75	292						3	30		
13	AMCX	EDIS023-10 E/W -48V MODEM RACKS AND -48V ACCESS CONTROL UNITS AND GPDF FUSE PANEL	-48VA0		10	AMP MATE-N-LOK P/O ED5A079-30	2.5	3.2	0.75	109	11.8	15.2	602	2053	NOTE 3	5	30	B110	NOTE 2 NOTE 4
			-48VA1		10		2.5	3.2	0.75	109						5	30		
			-48VA2		10		0.9	1.2	0.75	292						3	30		
			-48VB0		10		2.5	3.2	0.75	109						5	30		
			-48VB1		10		2.5	3.2	0.75	109						5	30		
			-48VB2		10		0.9	1.2	0.75	292						3	30		

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING			
		DWG SIZE C2	ISSUE 5
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E8	

MODEL NAME

SHEET NOTES:

- CURRENT DRAIN FOR WP-91652, L22 INVERTER WAS MEASURED AT 100 LOAD (8.3A, 840W, 0.84 POWER FACTOR).
- OVERALL VOLTAGE DROP FROM POWER PLANT TO INVERTER.

TABLE E80-(CONT.) -48V DC POWER DISTRIBUTION REQUIREMENTS

LOAD EQUIPMENT		FEEDER INFORMATION				CURRENT DRAIN NOTE 58		VOLTAGE DROP AND FEEDER LENGTH		POWER CONSUMPTION PER CABINET			POWER SOURCE		ADDITIONAL INFORMATION				
ITEM	DESIG	DESCRIPTION	FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EQL	MINIMUM FEEDER SIZE (AWG)	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		SECONDARY FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH FOR MINIMUM FEEDER SIZE (FT) NOTE 55.4	TOTAL CABINET AMPS		TOTAL (L1) POWER (WATTS) NOTE 55.7	TOTAL (L1) BTU/HRS NOTE 55.8	POWER SOURCE EQUIPMENT	FUSE SIZE (AMP)		FIG.	REMARKS
							L1	L2			L1	L2				MIN.	MAX.		
14	ACSN 0/1	EDIS022-10 ADVANTAGE COMPACT SERVICE NODE CABINET	-48VA0	017	10	AMP MATE-N-LOK P/O ED5A079-30	10.7	13.8	0.75	25	55.7	71.8	2841	9688	GPDF J86339E-1 TYPE FUSE PANEL OR POWER PLANT DISTRIBUTION PANEL	20	30	B30 B31	
			-48VA1	032	10		10.7	13.8	0.75	25						20	30		
			-48VA2	063	10		10.7	13.8	0.75	25						20	30		
			-48VA3	078	10		0.39	0.50	0.75	701						3	30		
			-48VB0	108	10		10.7	13.8	0.75	25						20	30		
			-48VB1	123	10		10.7	13.8	0.75	25						20	30		
			-48VB2	154	10		1.38	1.78	0.75	197						3	30		
			-48VB3	169	10		0.39	0.50	0.75	701						3	30		
15	INV	WP-91652, L22 1KVA INVERTER SINGLE CONFIG.	-48VA	FIG. C130	8	PROVIDED	19.7	25.4	2.25 (NOTE 2)	58	19.7	25.4	1005	3427	DC POWER PLANT	35	50	C130	NOTE 1
					6					93									
					4					148									
					2					235									
					1/0					374									

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FOR PROPRIETARY NOTICE SEE SHEET A1		THIRD ANGLE PROJN	
ADVANCED NETWORK SERVER (ANS) SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING			
DWG SIZE C2	ISSUE 5		
LUCENT TECHNOLOGIES	EDIS017-10	SHEET NO. E9	MODEL NAME