

**Please do not upload this copyright pdf document to any other website. Breach of copyright may result in a criminal conviction.**

This Acrobat document was generated by me, Colin Hinson, from a document held by the Henlow Signals Museum, believed to be out of copyright. It is presented here (for free) and this pdf version of the document is my copyright in much the same way as a photograph would be. If you believe the document to be under other copyright, please contact me.

The document should have been downloaded from my website <https://blunham.com/Radar>, or any mirror site named on that site. If you downloaded it from elsewhere, please let me know (particularly if you were charged for it). You can contact me via my Genuki email page: <https://www.genuki.org.uk/big/eng/YKS/various?recipient=colin>

**You may not copy the file for onward transmission of the data nor attempt to make monetary gain by the use of these files. If you want someone else to have a copy of the file, point them at the website. (<https://blunham.com/Radar>). Please do not point them at the file itself as it may move or the site may be updated.**

It should be noted that most of the pages are identifiable as having been processed by me.

---

I put a lot of time into producing these files which is why you are met with this page when you open the file.

In order to generate this file, I need to scan the pages, split the double pages and remove any edge marks such as punch holes, clean up the pages, set the relevant pages to be all the same size and alignment. I then run Omnipage (OCR) to generate the searchable text and then generate the pdf file.

Hopefully after all that, I end up with a presentable file. If you find missing pages, pages in the wrong order, anything else wrong with the file or simply want to make a comment, please drop me a line (see above).

It is my hope that you find the file of use to you personally – I know that I would have liked to have found some of these files years ago – they would have saved me a lot of time !

Colin Hinson

In the village of Blunham, Bedfordshire.

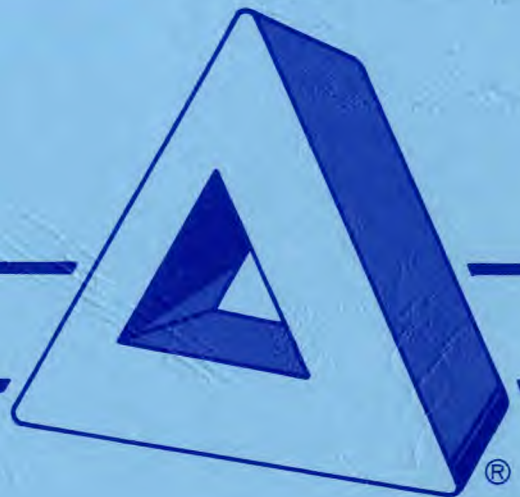
INSTRUCTIONS  
FOR  
ANTENNA GROUND FIELD MODIFICATION KIT  
MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
SERIAL NUMBER 315

---

**DELTA ELECTRONICS**

---

DELTA ELECTRONICS, INC.  
5730 GENERAL WASHINGTON DRIVE  
ALEXANDRIA, VIRGINIA 22312



REVISIONS

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

INSTRUCTIONS

FOR

ANTENNA GROUND FIELD MODIFICATION KIT

MODEL SLS-4M (20 X 10) STRIP LINE SWITCH

SERIAL NUMBER 315

DELTA ELECTRONICS, INC.  
 5730 GENERAL WASHINGTON DRIVE  
 ALEXANDRIA, VIRGINIA 22312

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

**DELTA ELECTRONICS, INC.**  
 ALEXANDRIA, VIRGINIA  
 CODE IDENT. NO. 19482

DR.	D. Petree 3/13/98	DWG. NO	1D42-98	REV. A
APPD.	<i>W. Fox</i> 3/13/98	USED ON	SLS-4	SHEET 1 OF 10

**REVISIONS**

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

and auxiliary equipment technical manuals to support operation and maintenance of the switch upon installation of the field modification kit. This revised manual replaces the original manual, Technical Manual Number D93-116C(M47/315) dated October 12, 1992, in its entirety.

**SPECIAL TOOLS AND TEST EQUIPMENT:**

No special test equipment is required. A 1/16" Allen wrench is supplied with this kit.

**MODIFICATION INSTRUCTIONS:**

The modification process requires the removal of certain switch components, installation of RF components on the antenna ground crosspoints, and operational tests of the antenna grounding crosspoints. Components to be installed are identified in these instructions by item numbers which are used also on the list of material included with the instructions. References are also made to components and procedures described in the Model SLS-4 Technical Manual supplied with this kit.

**WARNING**

*Remove all AC power and all RF power from the Strip Line Switch and all AC power from the Matrix Control Unit prior to beginning the modification. Attempting to maintain active RF circuits through the switch will subject installation personnel to risk of contact with hazardous RF voltages.*

**A. Kit Inspection**

Prior to beginning the modification, compare the contents of the kit against the list of material to determine that all required items are present.

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

**DELTA ELECTRONICS, INC.**  
 ALEXANDRIA, VIRGINIA  
 CODE IDENT. NO. 19482

DR. D. Petree 3/13/98

DWG. NO 1D42-98

REV. A

APPD. *W. Ferguson* 3/13/98

USED ON SLS-4

SHEET 3 OF 10

**REVISIONS**

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

**NOTE**

**This Field Modification Kit enables grounding of an antenna by connecting the antenna port to the switch ground. This connection is made with a Front Crosspoint Ground Contact Assembly which is to be installed at each antenna ground crosspoint. To provide maximum protection, an antenna should be grounded as physically close to the antenna connection on the matrix as possible. Since the antenna connections to the switch are located on the top of the switch, the antenna ground crosspoints are to be installed in Row A. As Row A provides the antenna ground capability, this row cannot be used for transmitter/antenna switching. Thus, the transmitter assigned to Row A must be disconnected and reassigned.**

**B. Switch Preparation**

1. Remove the top front panel and the bottom front panel. Remove the terminal cover from the input end of Row A. Save all hardware for use in reinstalling this cover.
2. Rotate all Row A crosspoints to the Thru position (reference Figure 3-2A in the SLS-4 Technical Manual). Using the 1/16" Allen wrench, Item 7, remove all manual operation knobs, MP10, from the Row A crosspoints by loosening the two #6-32 set screws securing each knob. Save the knobs for reinstallation.

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

<b>DELTA ELECTRONICS, INC.</b> ALEXANDRIA, VIRGINIA CODE IDENT. NO. 19482	DR. <i>D. Petree</i> 3/13/98	DWG. NO 1D42-98	REV. A
	APPD. <i>W. Fox</i> 3/13/98	USED ON SLS-4	SHEET 4 OF 10

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

3. Disconnect and remove the transmitter coaxial cable terminated on Row A. Disconnect and remove the Row A transmitter interlock circuit connected to TB2-1 and TB3-1 of the Model IIK-10D Interlock Isolation Assembly. To remove the Row A/Column 1 long row terminal contact assembly, E8, first remove the 3/8"-16 silver-plated brass jam hex nut and the 3/8" silver plated phosphor bronze splitlock washer securing the row terminal contact assembly to the 7/8" EIA bullet, E13 (reference Figure 7-4 in the SLS-4 Technical Manual). Remove the row terminal contact assembly by gently sliding the assembly to the left until the contact assembly springs clear the mounting plate of the right adjacent Row A/Column 2 contact assembly and then by gently pulling the contact assembly away from the switch until the contact assembly clears the front shaft of the rotor contact, E1. Remove the 3/8"-16 silver-plated brass jam hex nut and the 3/8" silver plated brass flat washer securing the 7/8" EIA bullet to the bullet insulator, E20. Remove the 7/8" EIA bullet and the bullet insulator. Remove the four 5/16"-18 x 1/2" hex bolts and the four 5/16" splitlock washers securing the 7/8" adapter plate, MP8, to the row connector plate. Save the row terminal contact assembly, 7/8" EIA connector components and mounting hardware for spare parts.
4. Remove the hardware securing the Row A/Column 2 front crosspoint contact assembly, E2. Remove this contact assembly by gently sliding the assembly to the left toward Column 1 until the contact assembly springs clear the mounting plate of the right adjacent Row A/Column 3 contact assembly and then by gently pulling the contact assembly away from the switch until the contact assembly clears the front shaft of the rotor contact, E1.
5. Repeat step B4 to remove all front crosspoint contact assemblies from Row A/Column 3 through Row A/Column 20. Ensure that each crosspoint is in the Thru position before

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

**DELTA ELECTRONICS, INC.**  
 ALEXANDRIA, VIRGINIA  
 CODE IDENT. NO. 19482

DR. D. Petree 3/13/98  
 APPD. *W. For* 3/13/98

DWG. NO 1D42-98  
 USED ON SLS-4

REV. A  
 SHEET 5 OF 10

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVAL

removing the contact assembly. Save the standard front crosspoint contact assemblies for spare parts.

6. Remove and save the angle plate end contact assembly, E6, installed at the end of Row A.

**C. Rotor Contact Lubrication**

1. Apply a light coating of conductive lubricant, Item 5, to the front conductive shoulders of each rotor contact, E1, installed on Row A. Be very careful not to allow the lubricant to be deposited on the insulators of the rotor contact.
2. Apply a light coating of general purpose white grease, Item 6, to the bearing surfaces on the front shaft of each Row A rotor contact.

**D. Front Crosspoint Ground Contact Assembly Installation**

**NOTE**

The front crosspoint ground contact assemblies, Item 2, are to be installed on all crosspoints of Row A. The front crosspoint ground contact assemblies are identical to the front crosspoint contact assemblies removed in steps B4 and B5 except that the front crosspoint ground contact assembly uses a grounding standoff instead of a contact insulator to support the contact springs. Exercise caution when installing these assemblies to insure that the ground assembly is installed on the Row A antenna grounding crosspoints.

ANTENNA GROUND FIELD MODIFICATION KIT  
MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
SERIAL NUMBER 315

<b>DELTA ELECTRONICS, INC.</b> ALEXANDRIA, VIRGINIA CODE IDENT. NO. 19482	DR. D. Petree 3/13/98	DWG. NO 1D42-98	REV. A
	APPD. <i>W. Fox</i> 3/13/98	USED ON SLS-4	SHEET 6 OF 10

**REVISIONS**

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

1. Insert the contact spreader tool, Item 1, into the front crosspoint ground contact assembly, Item 2, to spread the spring fingers. Install this assembly on Column 1 of Row A by sliding the contact spring over the front shaft of the existing rotor contact. Align and secure the assembly with four #6-32 x 5/16" screws with captive lockwashers, Item 4.
2. Insert the second contact spreader tool into the next front crosspoint ground contact assembly. Install this assembly on Column 2 of Row A by sliding the contact springs over the existing rotor contact. Ensure the grounding standoff is positioned between the spring fingers of the left adjacent contact assembly. Align and secure the assembly with four #6-32 x 5/16" screws with captive lockwashers.
3. Remove the contact spreader tool from the front crosspoint ground contact assembly installed on Column 1 and install the tool in the next front crosspoint ground contact assembly. Install this assembly on Column 3 of Row A as described above ensuring the grounding standoff is positioned between the spring fingers of the left adjacent contact assembly. Align and secure the assembly with four #6-32 x 5/16" screws with captive lockwashers.
4. Repeat step D3 to complete the installation of front crosspoint ground contact assemblies on all twenty columns of Row A.

**E. Angle Plate End Contact Assembly Removal**

1. Rotate all Column 20 crosspoints in Rows B through K to the Turn position (rear slot horizontal as shown in Figure 3-2B of the SLS-4 Technical Manual).
2. Remove and save the angle plate end contact assembly, E6, installed at the end of Rows B through K.

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

<b>DELTA ELECTRONICS, INC.</b> ALEXANDRIA, VIRGINIA CODE IDENT. NO. 19482	DR. <i>D. Petree</i> 3/13/98	DWG. NO 1D42-98	REV. A
	APPD. <i>W. Fox</i> 3/13/98	USED ON SLS-4	SHEET 7 OF 10



REVISIONS

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

- 2. Install the manual operation knob, MP10, removed in step B2 on each Row A crosspoint rotor contact. Check that the white line on the knob is vertical. Secure the knob by tightening the two #6-32 cup point set screws using the 1/16" hex allen wrench, Item 7.

**CAUTION**

*The motor actuator ratchet does not permit clockwise rotation of the front panel knob. Forcing clockwise rotation will cause damage to the rotor contact or the motor actuator.*

- 3. Manually rotate the crosspoint knob in the counterclockwise direction 360° and check for any binding or improper operation.
- H. Refer to Section 6.2 in the SLS-4 Technical Manual to perform continuity checks on the new transmission lines. Verify grounding of each antenna port when the associated Row A crosspoint is operated to the Turn position. Verify grounding of each transmitter port when all crosspoints in the associated row are in the Thru position.
- I. Install the long terminal cover on the left end of Row A with the hardware retained from cover removal in step B1. Install the 1-5/8" EIA hole cluster cover, Item 8, on the Row A connector plate. Secure the cover with four 5/16"-18 x 1/2" stainless steel hex head bolts, Item 9, and four 5/16" stainless steel splitlock washers, Item 10. Install top front panel and bottom front panel.

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

**DELTA ELECTRONICS, INC.**  
 ALEXANDRIA, VIRGINIA  
 CODE IDENT. NO. 19482

DR. D. Petree 3/13/98

DWG. NO 1D42-98

REV. A

APPD. *W. For* 3/13/98

USED ON SLS-4

SHEET 9 OF 10

**REVISIONS**

SYM.	DESCRIPTION	DATE	APPROVAL
------	-------------	------	----------

**J. Initial Tests**

1. Apply AC power to the MCU-8B Local Matrix Control Unit and to the IIK-10D Interlock Isolation Assembly. Check that all crosspoints are in the Thru position. Check that all interlock keylock switches are closed.
2. Verify that the MCU-8B display indicates no transmitter/antenna connections, indicates all interlocks open (refer to Section 5 of the MCU-8 Technical Manual), indicates no antennas grounded, and displays the antenna ground fault message.
3. Manually operate the Row A/Column 1 (Antenna 1 ground) crosspoint to the Turn position. Verify that the MCU-8 indicates grounding of Antenna 1.
4. Manually operate the Row A/Column 2 crosspoint to the Turn position. Verify that the MCU-8 indicates grounding of Antenna 2.
5. Repeat step J4 for the Row A/Column 3 through Column 20 crosspoints verifying that the MCU-8 indicates the grounding of the associated Antennas 3 through 20.
6. Verify that the lockout memory programming of the MCU-8B Local Matrix Control Unit corresponds to the assignment of motorized crosspoints and antenna ground crosspoints on the switch (refer to Section 5.3.6 of the MCU-8 Technical Manual).
7. Apply AC power to the actuator power supply by operating the pushbutton switch on the Actuator Interface Unit.
8. Operate each motorized crosspoint to the Turn position using the MCU-8 Unit and verify status display and clearing of the grounded antenna. Operate each motorized crosspoint to the Thru position and verify status display and automatic antenna grounding operation. Repeat test for all motorized crosspoints. Verify proper operation in both the local and remote control modes.

ANTENNA GROUND FIELD MODIFICATION KIT  
 MODEL SLS-4M (20 X 10) STRIP LINE SWITCH  
 SERIAL NUMBER 315

**DELTA ELECTRONICS, INC.**  
 ALEXANDRIA, VIRGINIA  
 CODE IDENT. NO. 19482

DR. D. Petree 3/13/98

DWG. NO 1D42-98

REV. A

APPD. *W. Fed* 3/

USED ON SLS-4

SHEET 10 OF 10

			2	12			Technical Manual for Model SLS-4M (20 X 10) Strip Line Switch	Delta	D93-116C (M47/R05/315)				
			2	11			FMK Installation Instructions	Delta	1D42-98-1				
			4	10		102-0316	Washer, Splitlock, 5/16"		Stainless Steel				
			4	9		138-0316-008	Bolt, Hex Hd, 5/16"-18 x 1/2" Lg		Stainless Steel				
			1	8		071-0936	Cover, 1-5/8" Hole Cluster	Delta	D71-936				
			1	7		744-0023	Allen Wrench, 1/16"	Snap-On	AW2				
			1	6		890-0008	Grease, White, 1-3/4 oz Tube	Lubriplate	11387				
			1	5		890-0007	Lubricant, Silver, Conductive, 1 Gram Tube	Emerson & Cumming	SO Silver				
			120	4		142-0012	Screw, Pan Hd, Cross Recessed, #6-32 x 5/16" w/Split Lockwasher		Stainless Steel				
			10	3		081-0108-014	Strip Line Cont Assy, Crosspoint, Ground, Angle Plate	Delta	D81-108-14				
			20	2		081-0108-011	Strip Line Cont Assy, Crosspoint, Front, Ground	Delta	D81-108-11				
			2	1		043-0001	Contact Spreader Tool	Delta	D43-1				
<b>QTY</b>	<b>QTY</b>	<b>QTY</b>	<b>QTY</b>	<b>ITEM</b>	<b>CODE ID</b>	<b>DELTA NO.</b>	<b>DESCRIPTION</b>	<b>MFR</b>	<b>MFR PART NO.</b>	<b>CKT SYM</b>			
			-1	<b>LIST OF MATERIAL</b>									
				<b>SIGNATURE</b>		<b>DATE</b>	ANTENNA GROUND FIELD MODIFICATION KIT MODEL SLS-4M (20 X 10) STRIP LINE SWITCH SERIAL NUMBER 315			<b>DELTA ELECTRONICS, INC.</b> <b>ALEXANDRIA, VIRGINIA</b> <b>CODE IDENT 19482</b>			
				<b>DR</b>	D. Petree	12/5/97				<b>8D42-98</b>		<b>REV</b> A	
				<b>CHK</b>	W. Fox								
				<b>ENGR</b>	W. Fox	2/16/98							
				<b>APP</b>									
<b>FILE NAME:</b> 8D42-98.RVA						<b>USED ON:</b> SLS-4M S/N 315/R05			<b>SHEET</b> 1 <b>OF</b> 1				