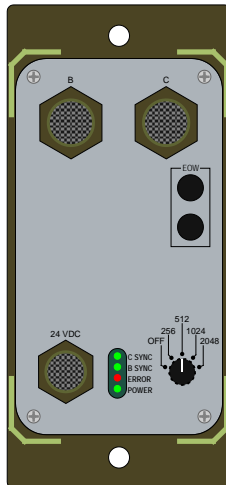


Line Terminating Unit

P/N: 108600

Eurocom D/1 Interface A/B
To
Eurocom D/1 Interface C

Tactical Communications System



Operations Manual

MOOG
PROTOKRAFT

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Eurocom D/1 Interface A/B
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Tactical Communications System
Operations Manual

Moog Protokraft

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REVISION HISTORY

Revision	Description	Date	Approval
A	Original Release	04/17/02	R. Stenzel
B	Revised to incorporate improvements submitted by users of this manual.	05/11/02	R. Stenzel
C	Revised Figures 1 & 8 to show new positions of rear DATA IN / DATA OUT binding posts.	08/26/02	R. Stenzel
D	Revised logo and name from Northrop Grumman Component Technologies, Poly-Scientific, to Moog Components Group.	01/20/06	R. Stenzel

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1.0 Introduction

1.1 General

The purpose of this manual is to give the user the necessary knowledge for connection and operation of the Line Terminating Unit, part number 108600.

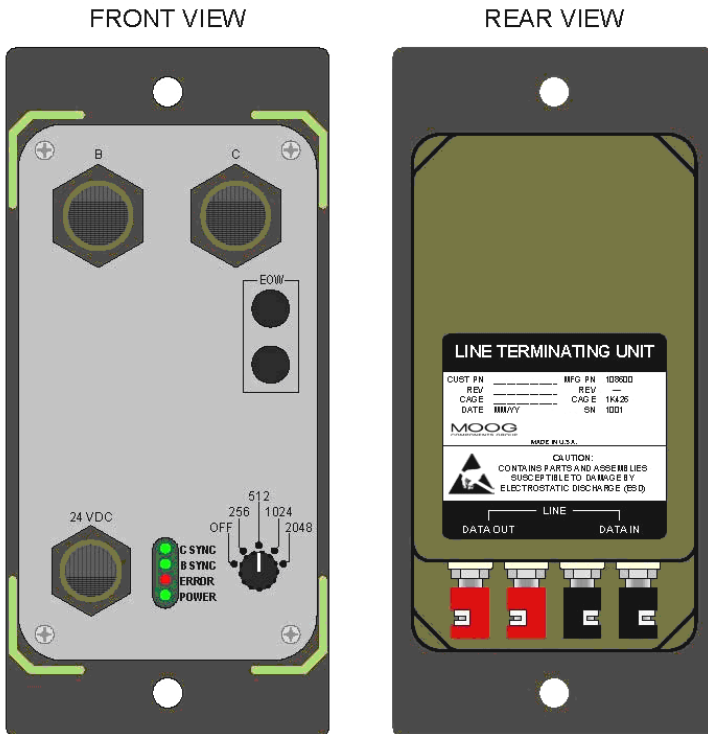


Figure 1: 108600 Line Terminating Unit

1.2 Abbreviations & Definitions

AMI	Alternate Mark Inversion, a special line code used in TDM interface, EUROCOM A or EUROCOM B.
BFOM	Fiber Optic Modem (FOM) which provides electrical to optical conversion of EUROCOM B electronic communication and data signals for transmission using tactical fiber optic cable. For more information, visit our website at: www.moogprotokraft.com
EUROCOM	European standard for signaling between military communications equipment.
EUROCOM A	Interface for TDM-signaling. Range of approximately 50 meters on a multi-pair cable.
EUROCOM B	Encrypted EUROCOM A signal.
EUROCOM C	Interface for signaling with a range of approximately 1000 meters.
HDB-3	High Density Bipolar 3, a special line code used in the TDM interface, EUROCOM, with field cable WD-1/TT.
LTU	Line Terminating Unit
TDM	Time Division Multiplexing

2.0 Technical Data

2.1 Definition

The Line Terminating Unit includes the following:

<u>Part Number</u>	<u>Description</u>
108600	Line Terminating Unit
107715	TDM Signal Cable
108607-01	Power Cable (24 VDC)
10860038	Operations Manual

The 108600 is a unit which converts digital signals from the EUROCOM A/B interface to the EUROCOM C interface for full duplex transmission via a maximum of 1000 meters of new, dry WD-1/TT field cable.

The TDM bit-rate can be selected between 256, 512, 1024, or 2048 kilobits per second.

2.2 Physical Data

4 units fit side-by-side in a standard 19" rack.

	<u>Metric</u>	<u>English</u>
Width:	110 mm	4.32 Inches
Height:	235 mm	9.25 Inches
Depth:	89 mm	3.50 Inches
Weight:	1.14 kg	2.5 Pounds

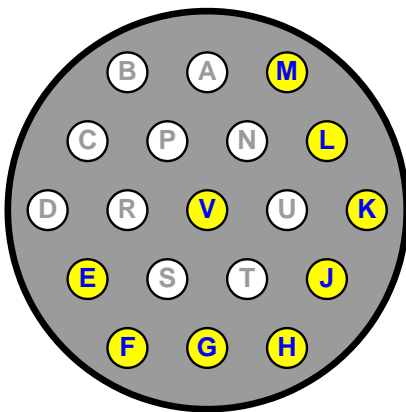
2.3 Electrical Data

- Time Delay: <12 bits per second between the A/B and C interfaces.
- Synchronization: Corrects up to ± 60 ppm deviation related to bit-rate.
- B-interface: Balance inputs, AMI-code 256, 512, 1024, or 2048 kilobits per second. Input line length is 50 meters maximum.
- C-interface Maximum cable length is 1000 meters with new, dry cable.
Maximum bit-rate error is 1×10^{-6} .
Connection to socket on front panel or binding posts on the rear of the unit.
- Power supply: 24 VDC nominal, 12 to 36 VDC Max (independent of polarity)
- Power consumption: 5 Watts Maximum
- Operation temp: -40°C to $+55^{\circ}\text{C}$
- Storage temp: -55°C to $+70^{\circ}\text{C}$
- EOW: Connection for field telephone (LB).

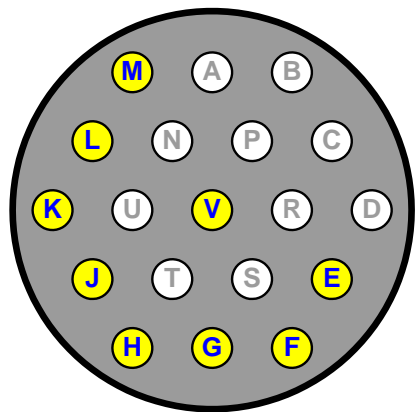
2.4 Electrical Interface

Table 1: EUROCOM B Interface

Pin	Function
E	Data Tx (a)
F	Data Tx (b)
G	Data Rx (a)
H	Data Rx (b)
J	Clock Tx (a)
K	Clock Tx (b)
L	Clock Rx (a)
M	Clock Rx (b)
V	Shield
A, B, C, D, N, P, R, S, T, & U	No Connection



**LTU CONNECTOR:
AMPHENOL 71-533724-19S**



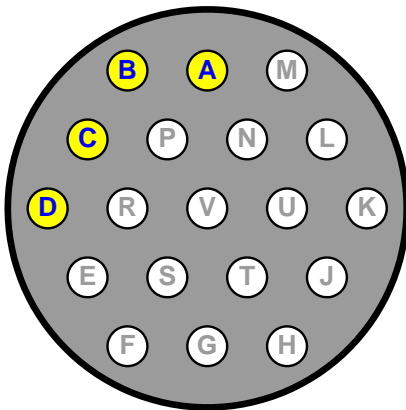
**MATING CONNECTOR:
MS3126F14-19P**

Figure 2: B Interface Contact Arrangement

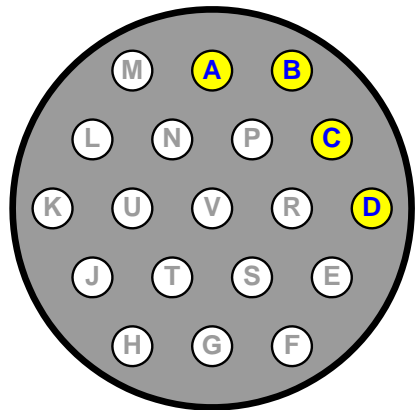
2.4 Electrical Interface (continued)

Table 2: EUROCOM C Interface

Pin	Function
A	Data Tx
B	Data Tx
C	Data Rx
D	Data Rx
E, F, G, H, J, K, L, M, N, P, R, S, T, U, & V	No Connection



**LTU CONNECTOR:
AMPHENOL 71-533724-19S**



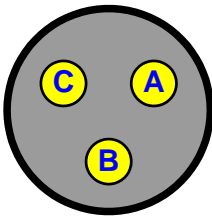
**MATING CONNECTOR:
MS3126F14-19P**

Figure 3: C Interface Contact Arrangement

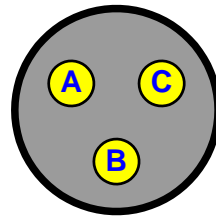
2.4 Electrical Interface (continued)

Table 3: Power Supply Interface (24VDC)

Pin	Function
A	DC Input (polarity independent)
B	Case Ground
C	DC Input (polarity independent)



**LTU CONNECTOR:
AMPHENOL 71-533723-03P**



**MATING CONNECTOR:
MS3126F14-19S**

Figure 4: Power Supply Contact Arrangement

3.0 Design & Functions

3.1 General

The 108600 is a rugged, light weight transmission unit for Eurocom networks, which converts digital signals from EUROCOM A/B to EUROCOM C and visa versa. It is used when the distance between relevant equipment units is too long for EUROCOM A/B transmissions, or when standard cable lengths are too short. It is also used when equipment units with different interface types are to be connected.

Note! *If EUROCOM A is connected directly to the 108600, this will operate as EUROCOM B, but without encryption.*

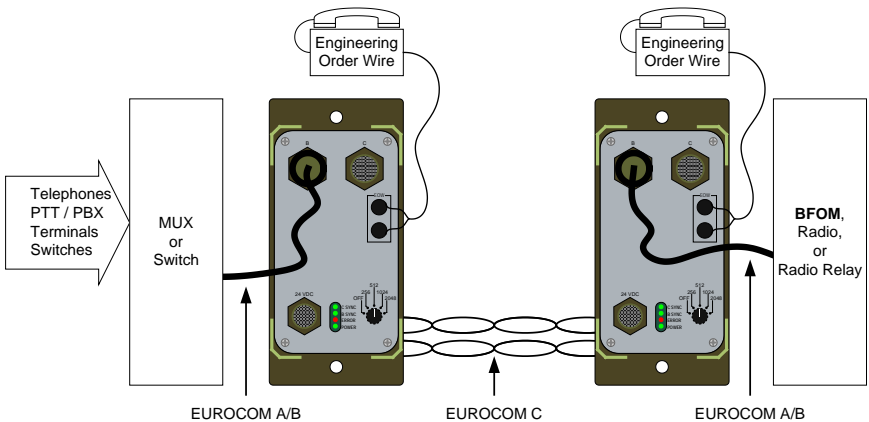


Figure 5: System Interconnect

When transmitting at the highest bit rate (2048 kbits/s) and with the use of a dry field cable, the cable length can be up to 1000 meters. At lower bit rates, the cable length may be increased.

3.2 Mounting

The 108600 is primarily used in mobile installations and has therefore a mechanical construction which is prepared for field vehicle mounting and / or transport. Four units can be mounted side by side in a 19" rack.

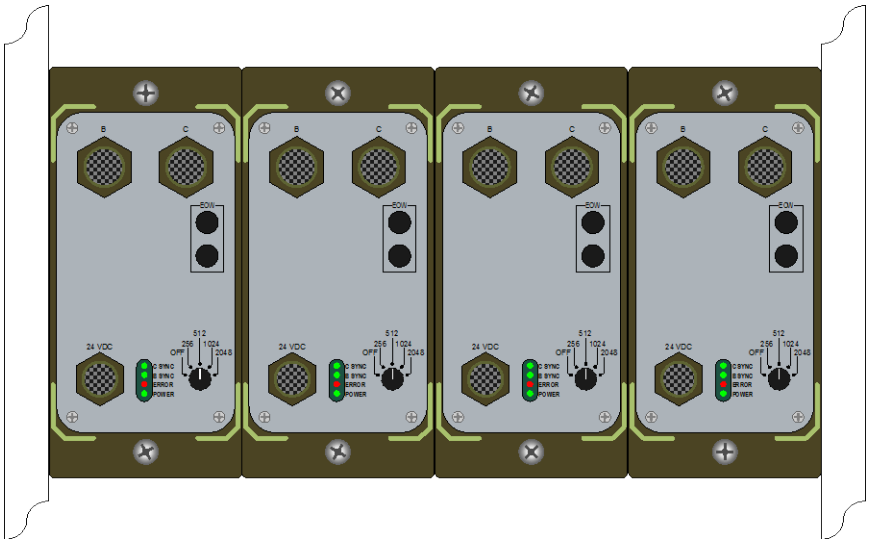


Figure 6: Rack Mounted (19" Rack)

3.3 Connections

The 108600 is easily connected to the rest of the communications network. Adjustments are not necessary to make the unit operative.

All operations are done at the front panel. Connection of field cable (EUROCOM C) is done through the binding posts for data in / out at the rear of the unit. All other connections are on the front panel.

4.0 Operation & Handling

4.1 General

All connections / controls are clearly marked. All connections shall be made before the 108600 is switched ON. Protection caps shall be on, and ON/OFF knob switched to the OFF position when the unit is not in use.

4.2 Connection & Operation

Take the protection caps off and connect the 108600 as shown in Figures 7 and 8.

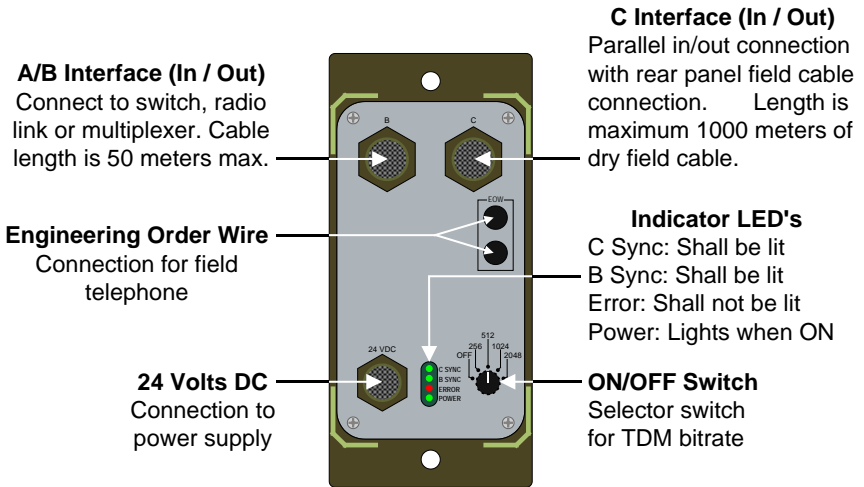


Figure 7: Front Panel

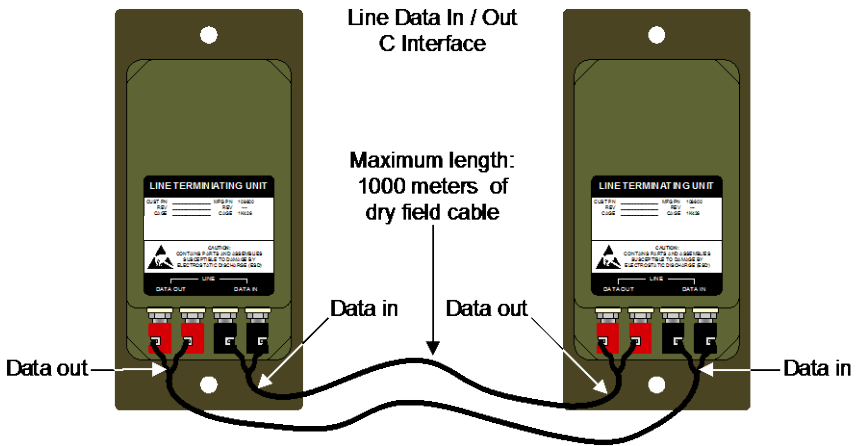


Figure 8: Connection of Field Cable at Rear

4.3 Regeneration

If a field cable of more than 1000 meters is needed, a regenerator consisting of two 108600's must be connected to the field cable after the first 1000 meters. A power supply of 24 Volts DC must be available for each unit. See Figure 9 for connection details.

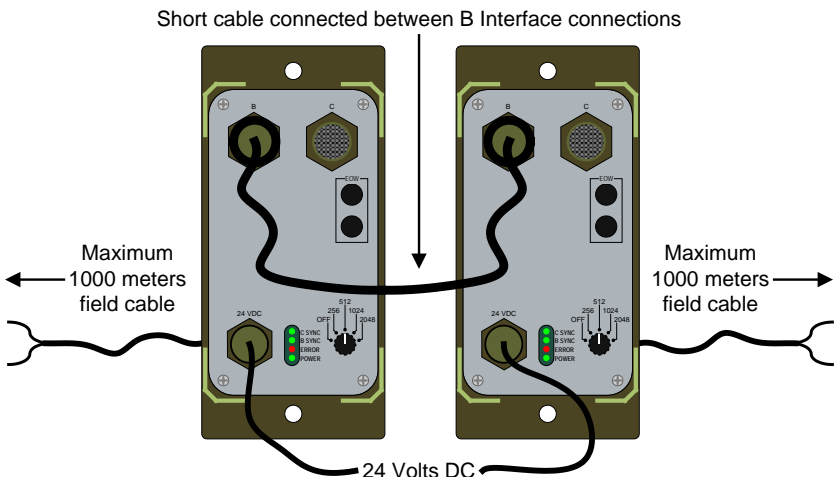


Figure 9: Connection of Regenerators

4.4 Error Indicator

When the 108600 detects bit errors from the EUROCOM C line, the error indicator (Red LED) in the window on the front panel will light up for one second after detection of the last bit error. Therefore the LED may be constantly lit, even at a relatively low bit error rate.

Even if the error indicator is constantly lit, it does not necessarily have any significance for the ongoing data transmission.

The error indicator will be constantly lit in the absence of EUROCOM C signals, or if there is physical damage to the EUROCOM C line (field cable).

4.5 C-Sync Indicator

The C-Sync indicator (Green LED) in the window on the front panel will light up when synchronization is obtained on the EUROCOM C line.

4.6 B-Sync Indicator

The B-Sync indicator (Green LED) in the window on the front panel will light up when synchronization is obtained on the EUROCOM A/B line.

4.7 Power Indicator

The Power indicator (Green LED) in the window on the front panel will light up when 24 Volts DC is applied and the unit is switched on.

5.0 Maintenance

5.1 General

Maintenance of the 108600 is limited to 1st echelon maintenance. If the unit fails, it is not to be opened in the field, but shall be returned for 3rd or 4th echelon maintenance and troubleshooting.

5.2 Cleaning

The surface of the 108600 and connection cables are to be cleaned with a soft cloth dampened with water. Detergents and solvents are not to be used.

Cleaning of the electrical contacts may be made with a dry brush or cloth. Contact cleanser may be used when necessary.

5.3 Inspection

Check that the ON / OFF switch is working properly. Connectors on the front panel that are not in use shall have protective caps put on. The window on the front panel shall be free from cracks or other defects, and shall be transparent.

The cables shall be in good condition and not have any cracks in the insulation, sharp bends, or be otherwise damaged. The connectors shall be clean and secure to their cables. Connector pins shall not be bent or damaged, sockets shall be void of debris and contaminants.

5.4 Troubleshooting

Refer to Figure 10 through Figure 14 and follow the procedures specified in the Troubleshooting flowcharts to isolate the failure in the communications link.

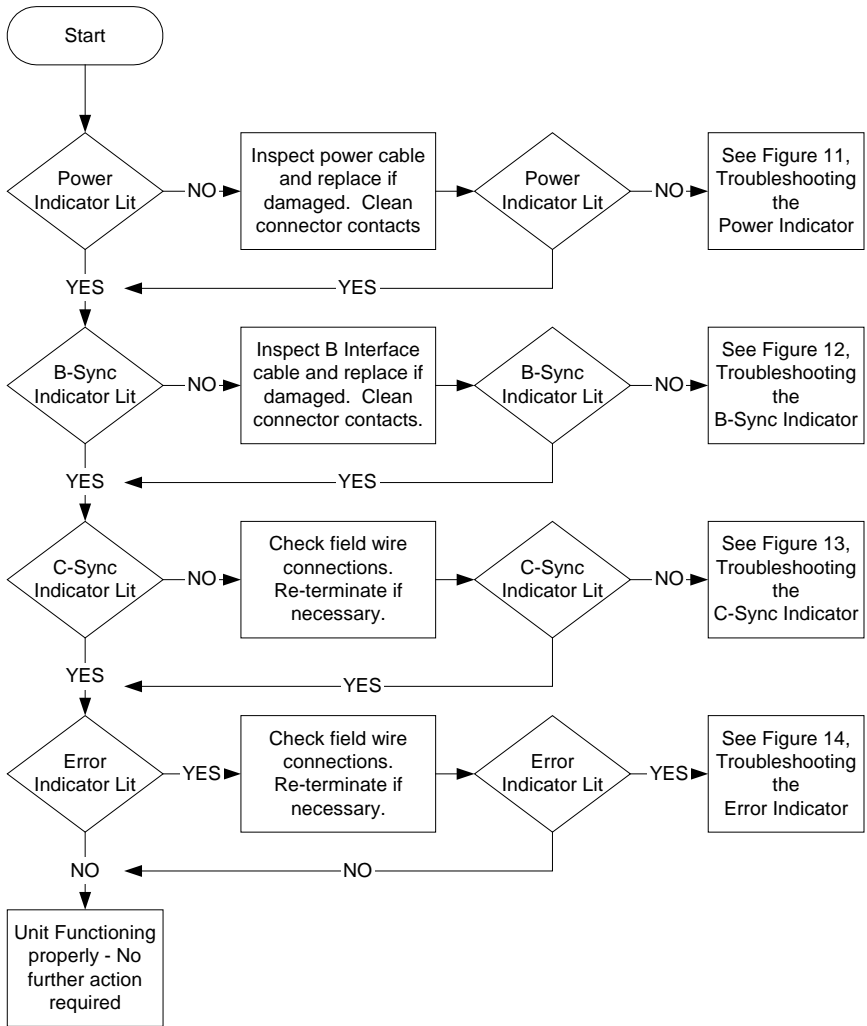


Figure 10: Main Troubleshooting Flowchart

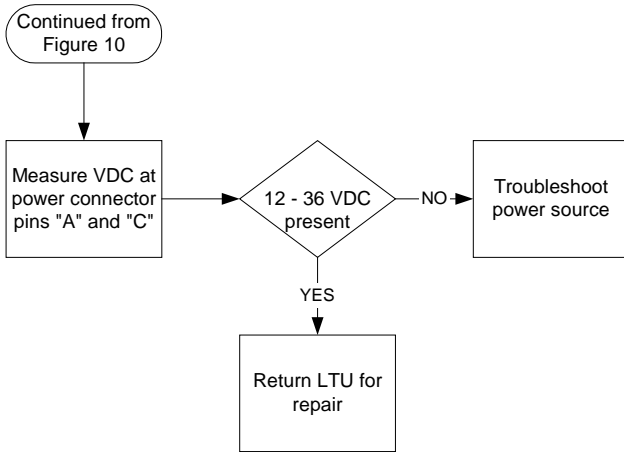


Figure 11: Troubleshooting the Power Indicator

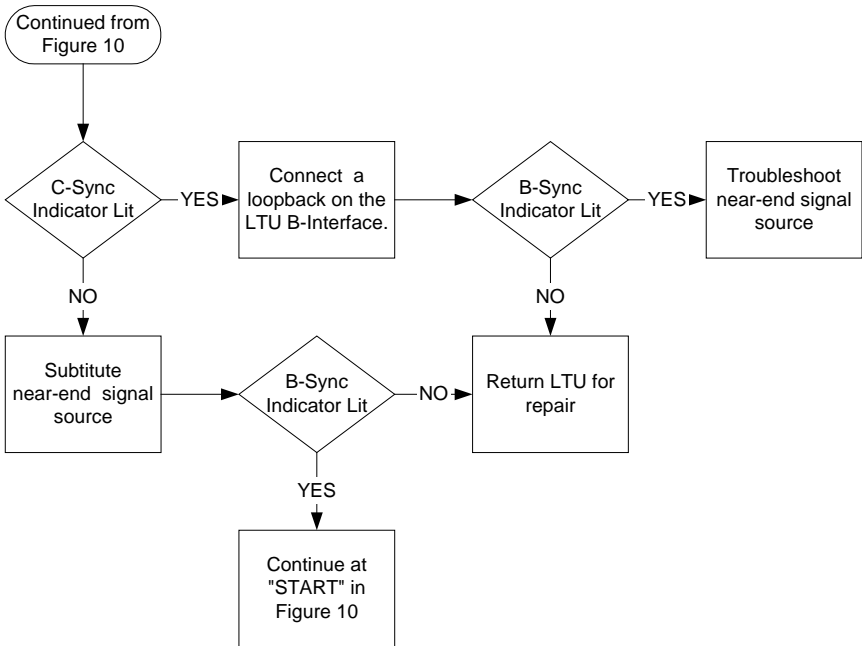


Figure 12: Troubleshooting the B-Sync Indicator

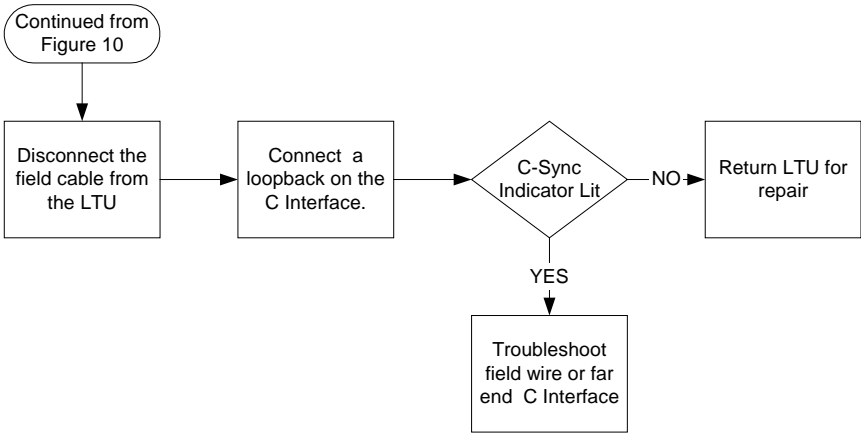


Figure 13: Troubleshooting the C-Sync Indicator

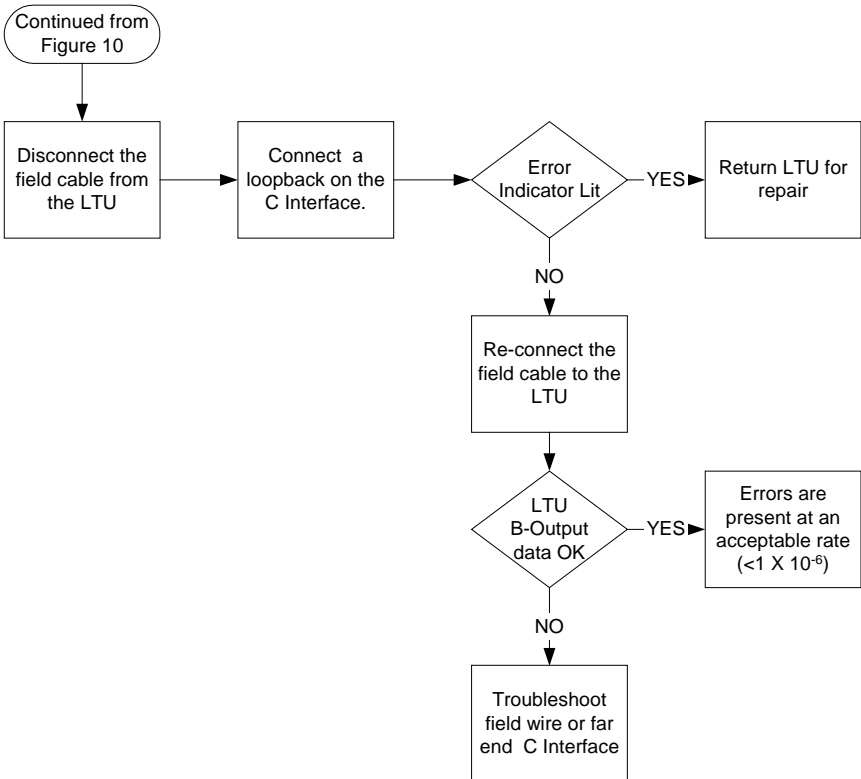


Figure 14: Troubleshooting the Error Indicator

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