MOST150 Repeater

User's Manual

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Mar. 2010

MOST®

Media **O**riented **S**ystems **T**ransport

Multimedia and Control Networking Technology

Legend

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MOST150 Repeater

User's Manual Versions

Doc. Number	Date	Description
UM_MOST150_Repeater_V01_00_XX-1.pdf	Mar. 2010	First version

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1 Preface

1.1 Intended Use

This SMSC product is intended to be used for developing, testing, or analyzing MOST based multimedia products and systems by persons with experience in developing multimedia devices.

Do not interfere in the product's original state, otherwise user safety, faultless operation and electromagnetic compatibility is not guaranteed.

1.2 Scope of Delivery

This product is delivered with:

- MOST150 Repeater box
- Optical fibers
- Power cable set
- Plug connector fitting for the relay contact

Check your shipment for completeness. If you have any complaints direct them to sales-ais-europe@smsc.com (Europe and Asia) or to sales-ais-usa@smsc.com (America). Providing the delivery note number eases the handling.

2 Introduction

When examining MOST150 network environments, connecting to the network without changing the network's structure is an important requirement. The MOST150 Repeater is a versatile device that can act as a network extender or provide monitor out functionality[1] without interfering in the network's structure. It can help managing many of the tasks arising during the development phase of a MOST150 system.

This starts with single signal recovery or device replacement for an defective device and continues with including of additional MOST150 devices in a MOST network when used as an extender. The transmit signal of the MOST150 Repeater's extension side can be connected to a analyzing device, such as an OptoLyzer® G2 3150o, to spy MOST150 network traffic without changing the number of active network nodes.

After the MOST150 Repeater has detected light, it is switched on immediately. It also supports slave wake-up on the extension side. Additionally, the MOST150 Repeater has a switch off mechanism, which is activated when detecting no light for a dedicated time.

The MOST150 Repeater provides a relay contact whose position depends on whether light is detected or not. Thus the MOST150 Repeater is able to loop an external provided power signal through the closed relay contact.

For easy lock indication, the MOST150 Repeater provides respectively one status LED on the main and the extension side.

Power will be applied via a screwable 3-pole power plug and a cable pigtail. The power supply follows the automotive requirements (filtering, load dump protection, etc.). If there is no activity on the bus, the MOST150 Repeater falls into a stand-by mode, where the overall current consumption is less then 30 µA. Therefore no other cables are required than UBATT (battery power) and GND (ground).

Important: The number of nodes is not affected by using the MOST150 Repeater since there is no active node inside. It lasts 300 ms till an extension ring is included in the MOST network after it is connected to the MOST150 Repeater.

1. This means the TX of the extension ring is only connected with the RX of an analyzing device (spy, e.g., the OptoLyzer OL3150o) to avoid data / message loss that may occur otherwise until the extension ring will be included (typically 300 ms).

2.1 Feature List

The MOST150 Repeater features the following:

- Two MOST150 oPHY (optical Physical) layer compliant interfaces at main and extension side
- Internal automotive compliant power supply
- Low power consumption in sleep mode (< 30 µA)
- Slave wake-up possible at extension side
- Monitor-out functionality without extra FOT on extension side
- Indication of the lock status through a LED on each side
- Relay-switched lock contact max, 20 V / 1 A, short-circuit protected
- Signal recovery

2.2 Block Diagram

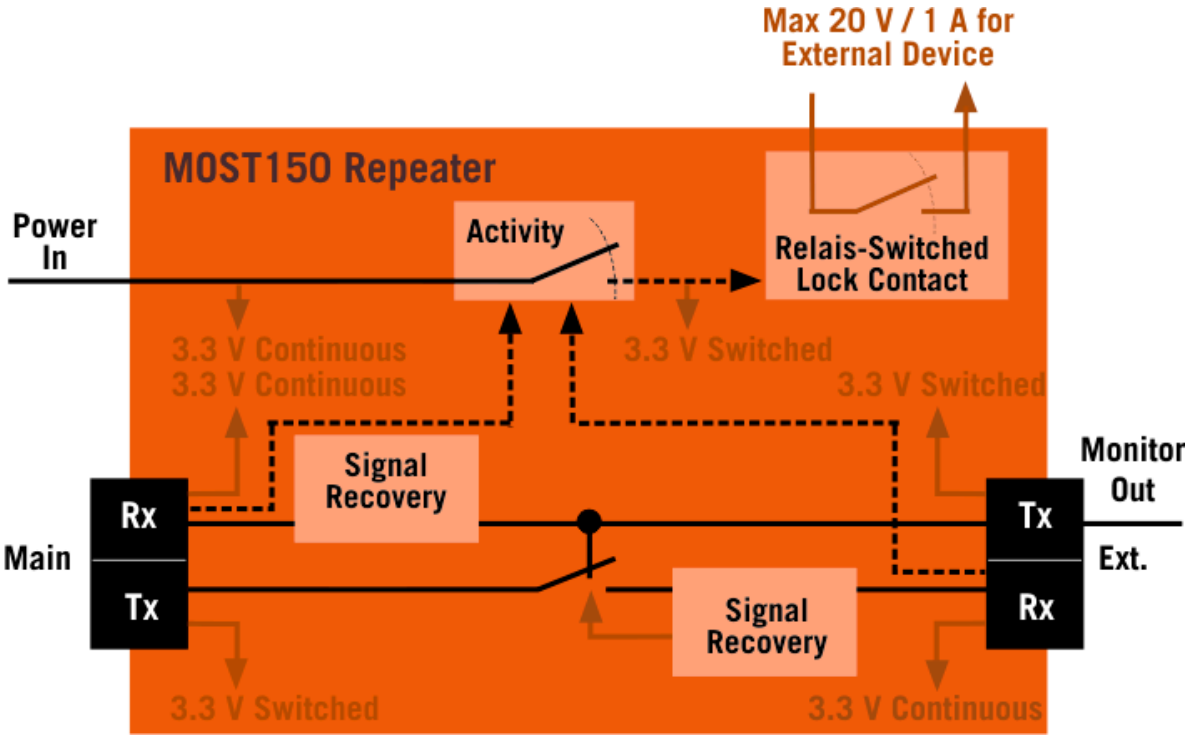


Figure 2-1: Block Diagram

2.3 Functional Description

The MOST150 Repeater has two interfaces that act slightly different: The main ring to be connected to the timing master and the extension ring.

After powering, the MOST150 Repeater switches into stand-by mode having a low power consumption less than 30 µA. Both Lock LEDs remain dark. As soon as the MOST150 Repeater detects light on an interface the corresponding LED lights red but switches immediately to green if the interface detects also lock. The LED of the other interface remains dark.

If the interface on the main ring detects light the MOST network is closed by default. If the interface of the extension ring detects stable lock it takes up to 300 ms until the extension ring is included in the MOST network. If the extension is deconnected it takes about 10 ms to close the main ring.

The MOST150 Repeater also supports slave wake-up. This means, the extension ring is able to wake-up the main ring being in sleep mode (power consumption less than 30 µA) after stable lock has been detected on the extension's side.

In case the MOST150 Repeater detects no light it switches back to sleep mode after 2000 ms.

The MOST150 Repeater provides a relay contact allowing to loop an external provided power signal through the closed relay contact. The relay contact, which is short circuit protected, closes if light is detected either on the main ring or on the extension ring side. The power signal can be used for powering an external device e.g., for data logging or storage. Thus it is possible to log all data of the MOST network. If the power signal exceeds the maximum values for current (1 A) the relay drops out. Before the relay contact can be reused the MOST Repeater has to be switched off and on again.

2.4 Description of Start-up and Shut-down in Detail

2.4.1 Light on in the Main Ring

When the MOST150 Repeater obtains no light on RX it remains in sleep mode (indicated as grey dashed lines in Figure 2-2) assuming the device itself is powered .

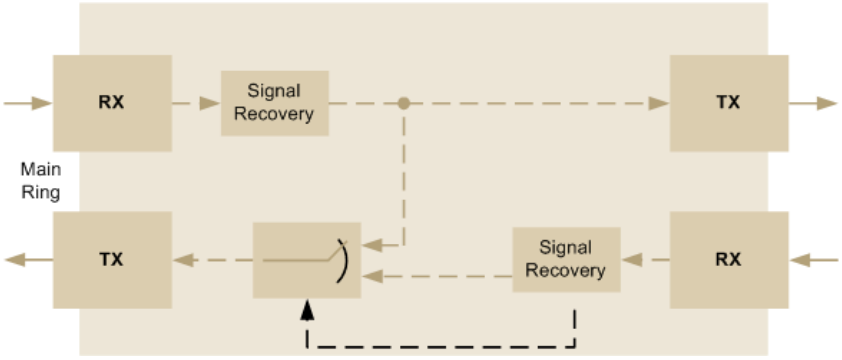


Figure 2-2: Light in Main Ring Step 1

If light is detected on RX in the main ring the MOST150 Repeater switches on. The light is transmitted back to TX on the main ring, i.e., via an internal loop, and to the TX of the extension ring (indicated by the orange lines in Figure 2-3). In additon, the MOST signal will be recovered via an internal PLL.

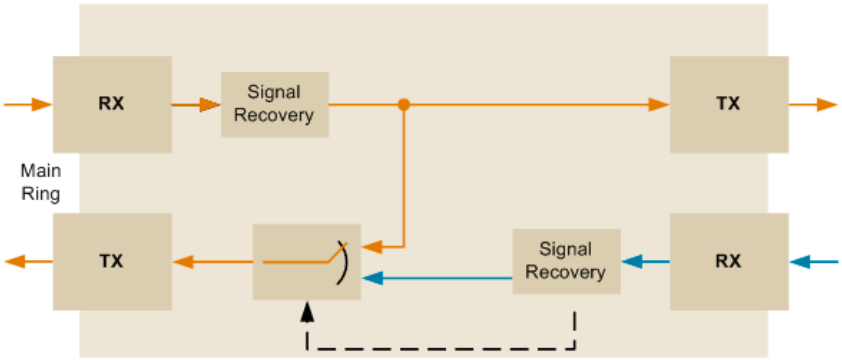


Figure 2-3: Light in Main Ring Step 2

In case a proper MOST device is connected in the extension ring its RX obtains also light (indicated by blue lines in Figure 2-3).

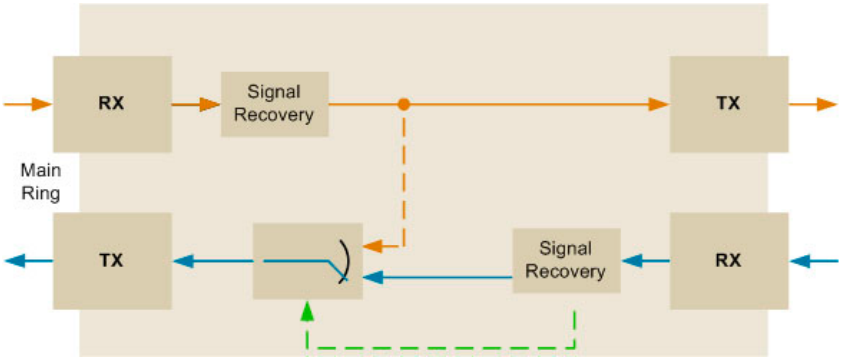


Figure 2-4: Light in Main Ring Step 3

If the RX of the extension ring receives light the MOST150 Repeater checks the signal quality (lock) and includes the extension ring within at least 300 ms in the MOST network (indicated by the green dashed line of influence in Figure 2-4). Internally a switch opens the loop behind the main ring and includes the external ring (indicated by the blue lines in Figure 2-4).

2.4.2 Light off in the Extension Ring

The base is a closed ring where the extension ring is included in the MOST network.

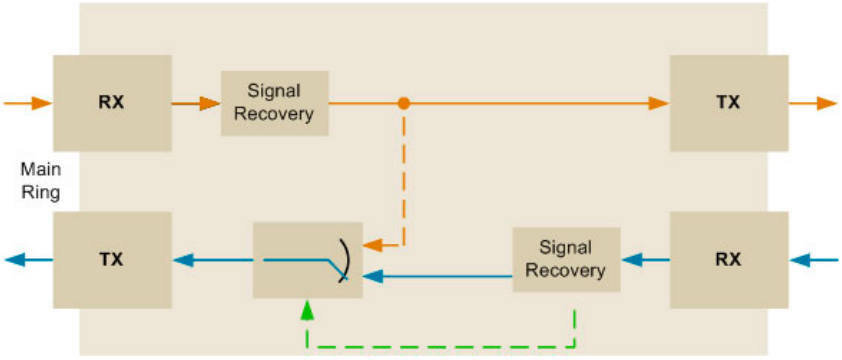


Figure 2-5: Light off in Extension Ring Step 1

If a break is detected on the extension ring's side i.e., no light is detected on the RX of the extension ring, the MOST150 Repeater keeps the ring closed for 10 ms (see position of the switch in Figure 2-6).

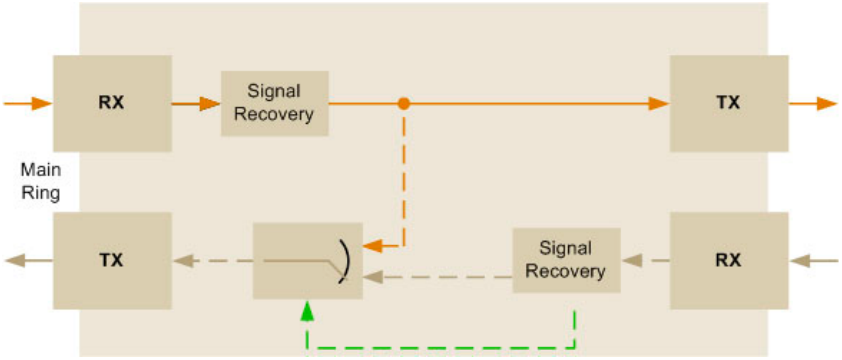


Figure 2-6: Light off in Extension Ring Step 2

If the break lasts more than 10 ms (indicated by the green dashed line of influence in Figure 2-6) the MOST150 Repeater excludes the external ring and closes the internal loop of the main ring (indicated by orange lines in Figure 2-7).

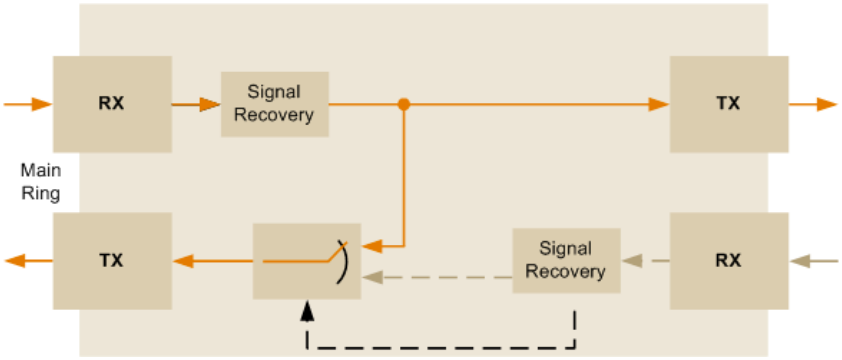


Figure 2-7: Light off in Extension Ring Step 3

2.4.3 Light off in the Main Ring

The base is a closed ring where the extension ring is included in the MOST network.

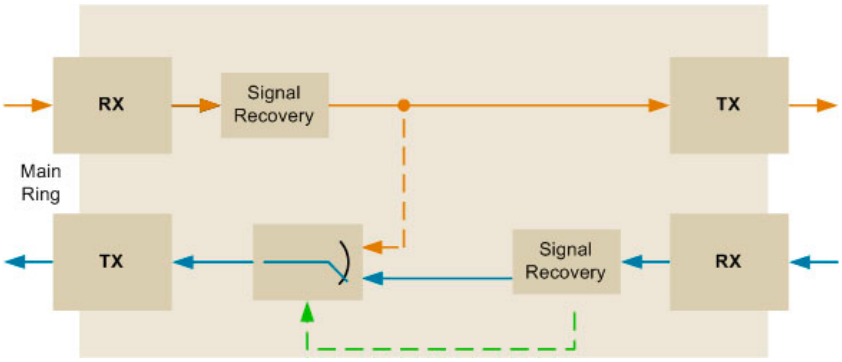


Figure 2-8: Light off in Main Ring Step 1

If light switches off at RX of the main ring the MOST150 Repeater excludes the extension ring after about 10 ms (see position of the switch in Figure 2-8).

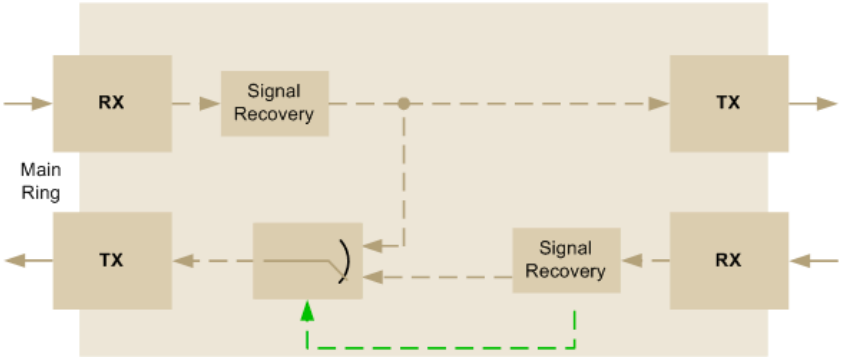


Figure 2-9: Light off in Main Ring Step 2

If RX of the main ring obtains no light for about 2000 ms the MOST Repeater switches into stand-by mode.

2.4.4 Slave Wake-up in the Extension Ring

The MOST150 Repeater is in stand-by mode i.e., the device itself is powerd but RX of the main ring obtains no light (indicated by grey dashed lines in Figure 2-10).

> Important: After a slave wake-up it lasts 300 ms till the extension ring is included and visible in the MOST network.

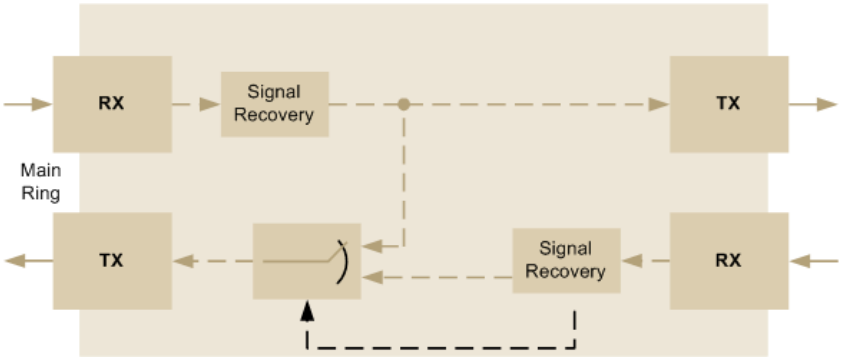


Figure 2-10: Slave Wake-up Step 1

RX on the extension ring detects light transmitted by the slave (indicated by blue lines in Figure 2-11).

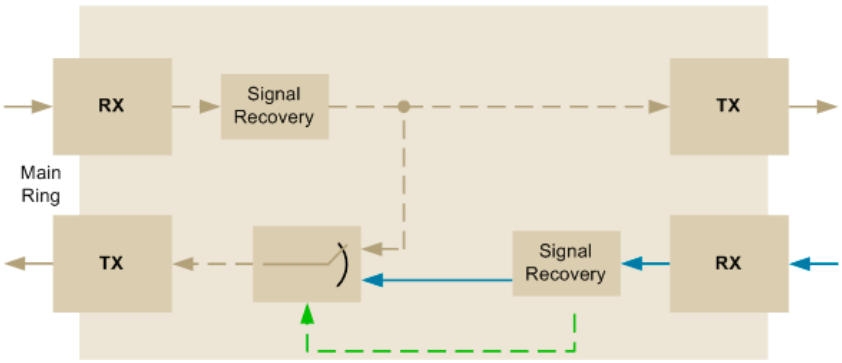


Figure 2-11: Slave Wake-up Step 2

If light is detected on RX of the extension ring for about 300 ms the positon of the internal switch changes and includes the extension ring to the MOST network (see Figure 2-12).

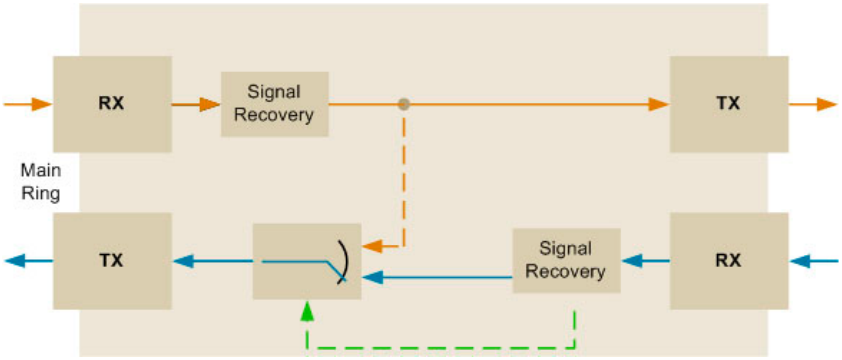


Figure 2-12: Slave Wake-up Step 3

2.5 Typical Applications

2.5.1 Network Extension

The MOST150 Repeater is mainly designed to extend the MOST network with additional devices. Therefore connect the extension ring on the extension's side. An application might look as Figure 2-13.

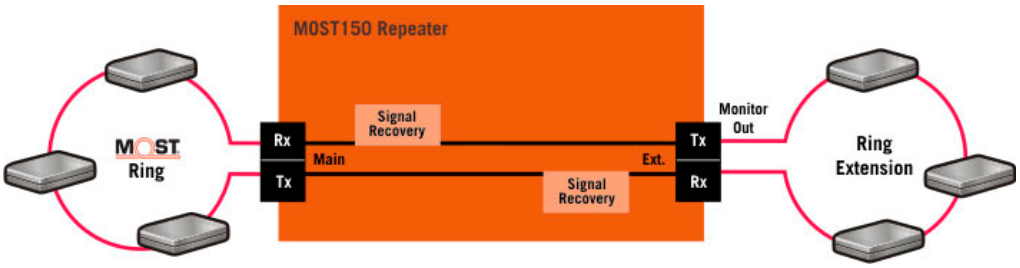


Figure 2-13: MOST150 Repeater with Extension Ring

2.5.2 Single Signal Recovery

The MOST150 Repeater can be used for signal recovery purposes if you have extended transmission distances. Signal recovery is possible on both the main ring and the extension ring side. An application might look as Figure 2-13.

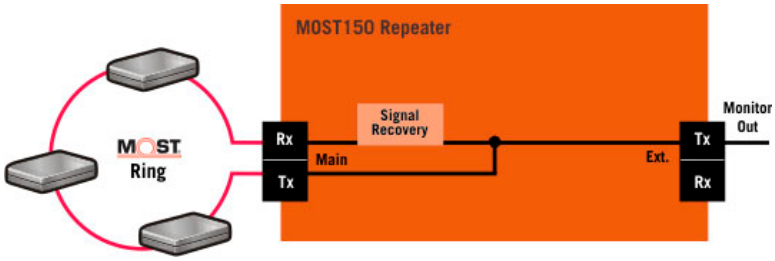


Figure 2-14: Signal Recovery in the MOST150 Repeater

2.5.3 Device Replacement

The MOST150 Repeater can be used when a defective device needs to be replaced. Just remove the defective device and replace it by the MOST150 Repeater. The internal loop closes the ring. In addition a signal recovery is done.

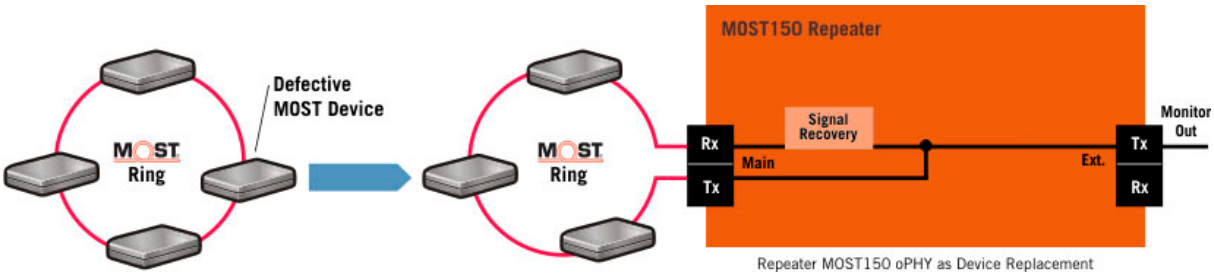
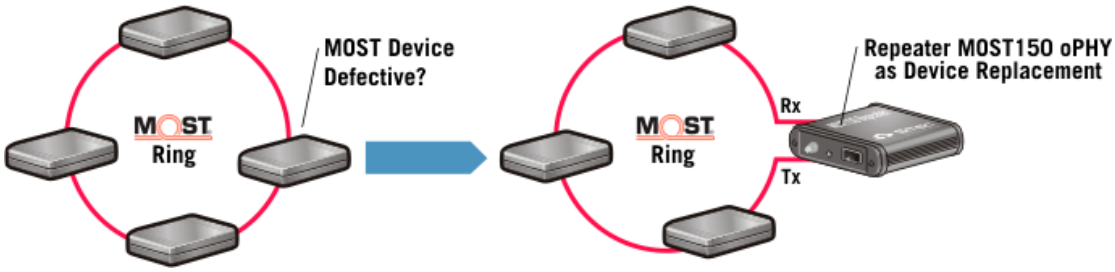


Figure 2-15: Device Replacement by MOST150 Repeater

2.5.3.1 Usage in a Garage

In a garage a common use case is to identify a defective MOST device. Therefor disconnect the device that is assumed to be defective and connect the MOST150 Repeater instead. If the MOST ring works properly the removed MOST device is probably faulty and should be replaced by a new one. If the MOST ring does not work properly[1] the MOST150 Repeater can be used to replace one device after the other in the ring except the controlling devices (e.g., headunit, timing master). For details how to evaluate the defective device refer e.g., to the OEM's work instruction.

Replacing by the MOST150 Repeater means the replaced device is substituted by an electrical short-circuit (i.e., the internal loop of the MOST150 Repeater).



Note: The extension functionality of the MOST150 Repeater is not considered in the use case 'device replacement in a garage' that is described above.

1. The functionality of the replaced device is missing in the MOST ring.

2.5.4 Connecting OptoLyzer G2 3150o

The MOST150 Repeater can be connected to a monitoring device, such as an OptoLyzer G2 3150o, to spy MOST150 network traffic. To avoid data / message loss until the extension ring will be included (which takes up to typically 300 ms) we recommend to only connect the TX of the extension port with the RX of the OptoLyzer OL3150o.

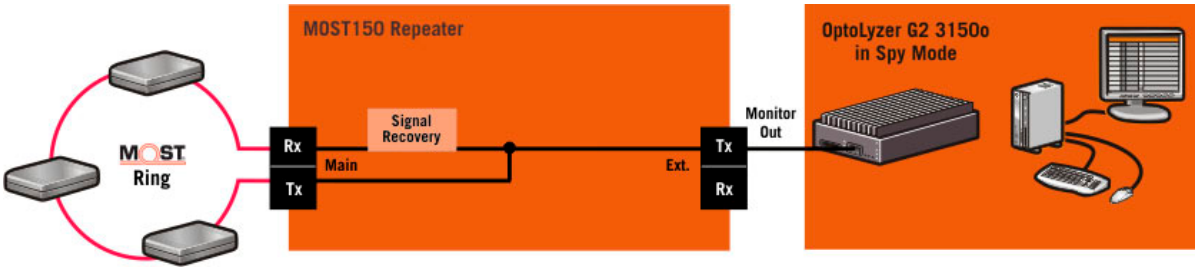


Figure 2-16: MOST150 Repeater with Connected OptoLyzer G2 3150o

3 Switches and Connectors

3.1 Power Connector

Power connector: Binder 09-3403-00-03

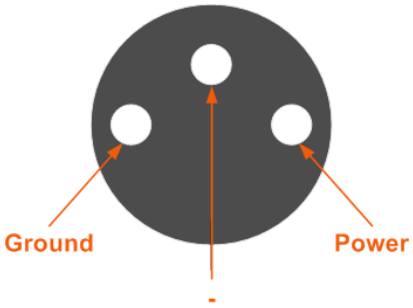


Figure 3-1: Power Connector - Rear Panel View

3.1.1 Power Supply

Operating Voltage:	8 V - 30 V (DC)
Power Consumption: Operation (typical):	6 W
Current Drain (max):	0.5 A

3.2 Relay Contact

Relay-switched lock contact: Phoenix MC 1.5/ 2-G-3.81, max. 20 V / 1 A, short-circuit protected against 6 A.

3.2.1 Relay Plug Connector

The delivered connector can be plugged in the relay contact of the MOST150 Repeater. An external device can be connected via the screw connection.

MINI COMBICON Connector MC1,5/2-ST-3,81, to be used with max. 20 V / 1 A.

3.3 MOST Interface

The MOST150 Repeater can be connected to the MOST network on both interfaces via a MOST150 2+0 connector.

- Tx: Optical output for MOST network
- Rx: Optical input for MOST network

3.4 LED

There is one status LED on each interface. The color of the LED and its meaning is described in the table below.

LED Color	Interface	Duration	Description
Off	Main Ring		Describes two states: The MOST150 Repeater is not powered. The MOST Repeater is powered but in sleep mode as there is no light detected on RX.
	Extension Ring		Describes two states: The MOST150 Repeater is not powered. The main ring is closed but receives no light at RXof the extension ring.
Red	Main Ring / Extension Ring	Visible continuously	The interface detects light but no stable lock.
Green	Main Ring / Extension Ring		The interface detects a stable lock.

Table 3-1: LEDs

4 Technical Specification

4.1 Mechanical and Environmental Characteristics

Mechanical dimensions of the MOST150 Repeater in millimeters, without plugs:

Height	Width	Depth
36	85	121

Table 4-1: Mechanical Dimensions of the MOST150 Repeater

Weight of the MOST150 Repeater, without plugs: 210 g.

4.2 Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Input Power	UBatt	8	12	30	V
Current Consumption (Active Mode)	I_{Active}		300	500	mA
Current Consumption (Sleep Mode)	I_{Sleep}		30	50	µA
Relay Contact					
Load Voltage	U_{Ld}			20	V
Load Current	I_{Ld}			1	A
Switching Times					
Time to Sleep Mode after Light Off	T_{Sleep}		2000		ms
Time from Sleep Mode to Active Mode	T_{Active}		8		ms
Time till Stable Lock if Extension Is Included to Main Ring	T_{LkIn}		300		ms
Time to Close the Main Ring after Excluding the Extension	T_{ClEx}		10		ms

Table 4-2: Electrical Characteristics

Notes:

Notes:

Further Information

For more information on SMSC's automotive products, including integrated circuits, software, and MOST development tools and modules, visit our web site: http://www.smsc-ais.com. Direct contact information is available at: http://www.smsc-ais.com/offices.

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