Application Report
SNLA281–September 2017

3G-SDI Cable Driver Compatibility Guide – TI / MACOM

ABSTRACT

To facilitate design with TI's 3G-SDI portfolio, this guide provides a detailed description about cable driver devices that are drop-in compatible and functional equivalent replacements for similar MACOM cable drivers. In addition, this guide provides details about 3G-SDI cable driver part selection for new designs to enable improved performance and an easy future upgrade path from 3G to 12G.

Contents

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1 Introduction

TI offers a diverse 3G-SDI portfolio that includes cable equalizers, reclockers, and cable drivers. Many of these 3G-SDI devices are pin-compatible or functional equivalent replacement options with devices offered by other SDI IC vendors. This guide serves as a pin-by-pin reference with a detailed comparison of TI's 3G cable drivers and similar cable driver devices offered by MACOM.

2 Cable Driver Compatibility Overview

The TI devices below are pin-compatible with the following MACOM cable driver:

TI CABLE DRIVER	PIN-COMPATIBLE WITH...	DEVICE DETAILS
LMH0303 LMH0302	M21328	Single Cable Driver 16-Pin QFN 4 mm × 4 mm

The TI device below is functionally equivalent, but not pin-compatible, with the following MACOM cable driver:

TI CABLE DRIVER	FUNCTIONALLY COMPATIBLE WITH...	DEVICE DETAILS
LMH0307	M21428	Dual Cable Driver 16-Pin QFN 4 mm x 4 mm (TI) 3 mm x 3 mm (MACOM)

3 LMH0303, LMH0302 Pin Compatibility With M21328

3.1 Key Schematic Differences

Figure 1 highlights key schematic differences between TI and MACOM drop-in compatible solutions in **blue**. For a detailed comparison of device pin functionality, refer to Section 3.2.

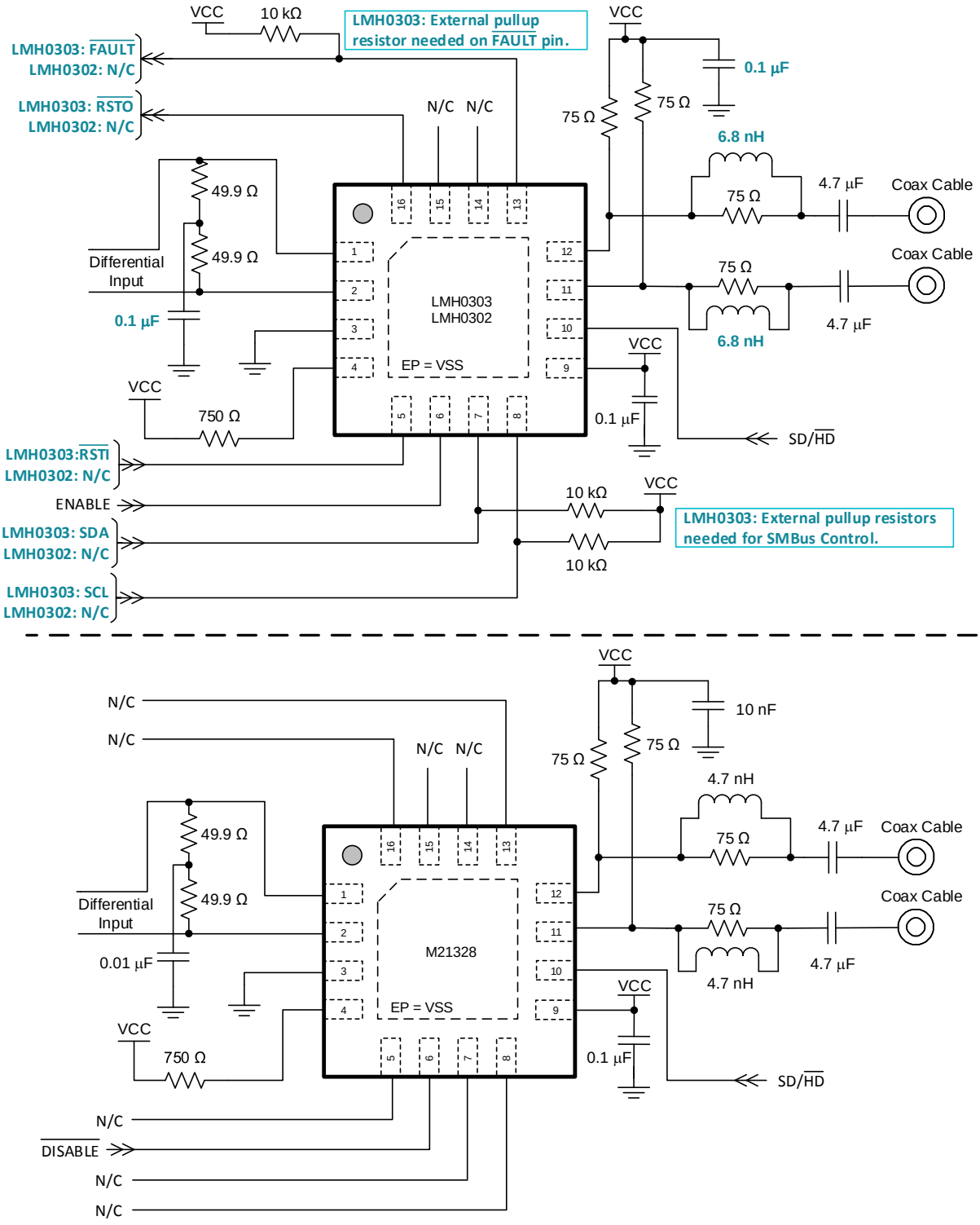

Figure 1. LMH0303, LMH0302 Pin Compatibility With M21328

3.2 Pin-by-Pin Comparison

PIN NO.	LMH0303[1] LMH0302	M21328	FUNCTIONAL DIFFERENCES AND NOTES
1, 2	SDI, $\overline{\text{SDI}}$	SDI, $\overline{\text{SDI}}$	None
3, DAP	V_{EE}	AV_{SS}	None
4	R_{REF}	RSET	Use 750-Ω pullup for 800 mVpp launch amplitude.
5	LMH0303: $\overline{\text{RSTI}}$ LMH0302: N/C	N/C	LMH0303: Reset input with internal pullup. Can be left as no connect for normal operation
6	ENABLE	$\overline{\text{DISABLE}}$	None
7	LMH0303: SDA LMH0302: N/C	N/C	LMH0303: SMBus bidirectional data. When using SMBus interface, this pin requires 10-kΩ pullup. Otherwise, this pin may be left floating.
8	LMH0303: SCL LMH0302: N/C	N/C	LMH0303: SMBus clock input. When using SMBus interface, this pin requires 10-kΩ pullup. Otherwise, this pin may be left floating.
9	V_{CC}	AV_{DD}	None. 3.3-V Supply
10	SD/$\overline{\text{HD}}$	SD/$\overline{\text{HD}}$	None
11, 12	$\overline{\text{SDO}}$, SDO	$\overline{\text{SDO}}$, SDO	None
13	LMH0303: $\overline{\text{FAULT}}$ LMH0302: N/C	N/C	LMH0303: Fault open-drain output flag. Requires external pullup resistor for normal operation.
14	N/C	N/C	None
15	N/C	N/C	None
16	LMH0303: $\overline{\text{RSTO}}$ LMH0302: N/C	N/C	LMH0303: Reset output. For pin compatibility, this pin can be left as no connect for normal operation.

(1) The LMH0303 can be configured either by pin settings or optional SMBus interface. The MACOM M21328 only supports configuration by pin settings.

3.3 External Component Differences

To replace the M21328, the following external component changes should be observed regarding the LMH0303/LMH0302:

COMPONENT(S)	CHANGE FROM...	CHANGE TO...
External Pullup Resistor on Pin 13	N/C	LMH0303: 10-kΩ pullup LMH0302: N/C
External Pullup Resistor on Pins 7 and 8	N/C	LMH0303: 10-kΩ pullup if SMBus interface is used. Otherwise, leave as N/C. LMH0302: N/C
Return Loss Inductor	4.7 nH	6.8 nH

4 LMH0307 Functional Equivalent With M21428

While TI does not have a pin-compatible equivalent to MACOM's M21428 3G-SDI dual cable driver, the LMH0307 can be used as a functional equivalent. The LMH0307 supports lower additive jitter and increased operating temperature range, while offering extended programmability through SMBus control.

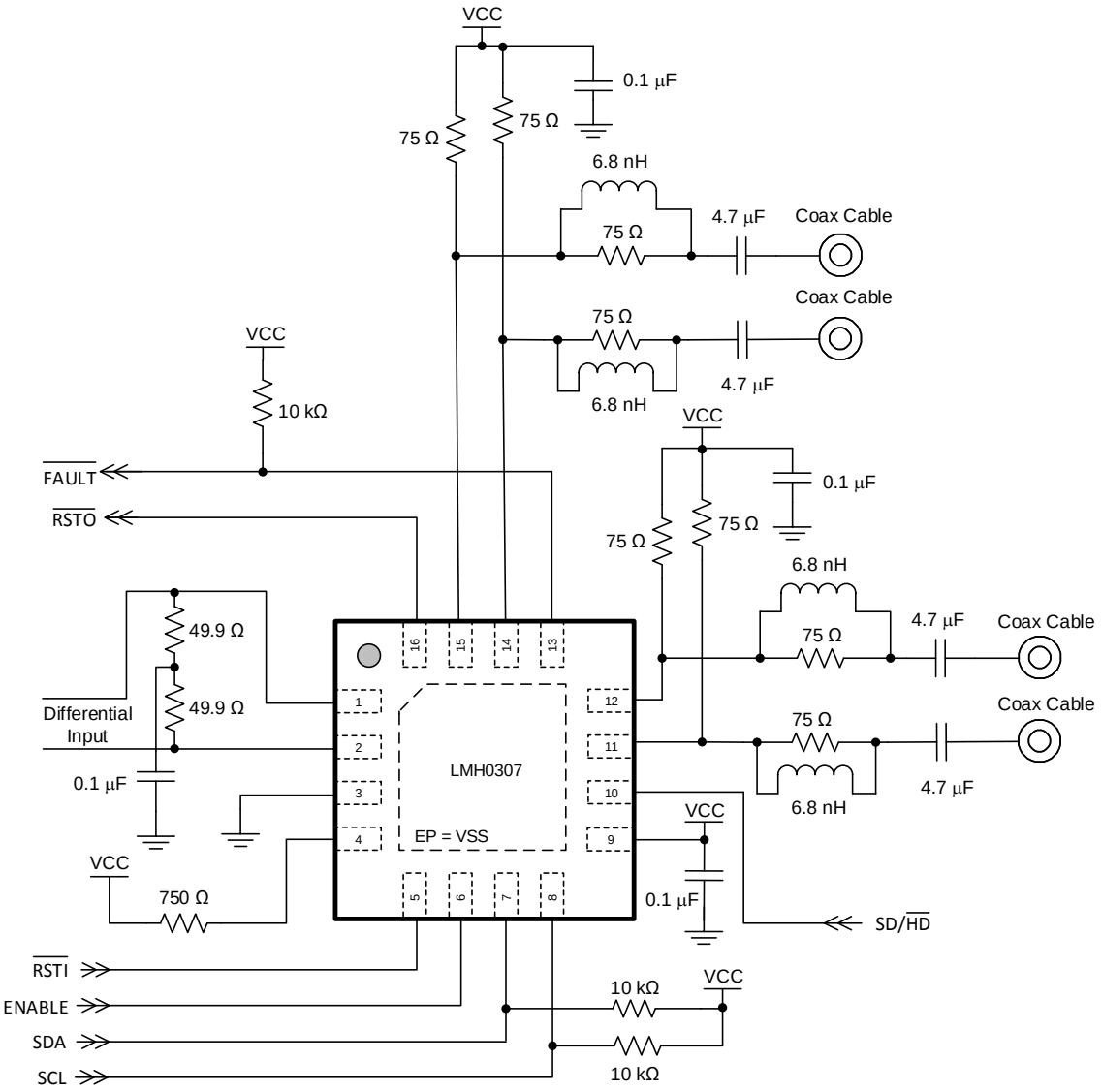

Figure 2. LMH0307 Dual Cable Driver Schematic

5 LMH0318 3G-SDI Cable Driver for New Designs

For new 3G-SDI designs in the component-selection phase, TI recommends designing with the LMH0318. Using the LMH0318 enables an easy upgrade path to the LMH1218, a pin-compatible 12G-SDI cable driver with integrated reclocker. In addition, the LMH0318 offers the following advantages compared to previous generation 3G-SDI cable drivers:

- User-Programmable PCB Trace Equalizer
- Integrated Reclocker
- Internal Eye-Opening Monitor for Debug Purposes
- Integrated Input and Output Terminations
- Integrated Return Loss Network
- Input 2:1 Mux
- 75-Ω and 100-Ω Transmitter Outputs
- SMBus or SPI Control Programmability

NOTE: The LMH0318 is *not* pin-compatible with the previously mentioned 3G-SDI devices (LMH0302, LMH0303, LMH0307).

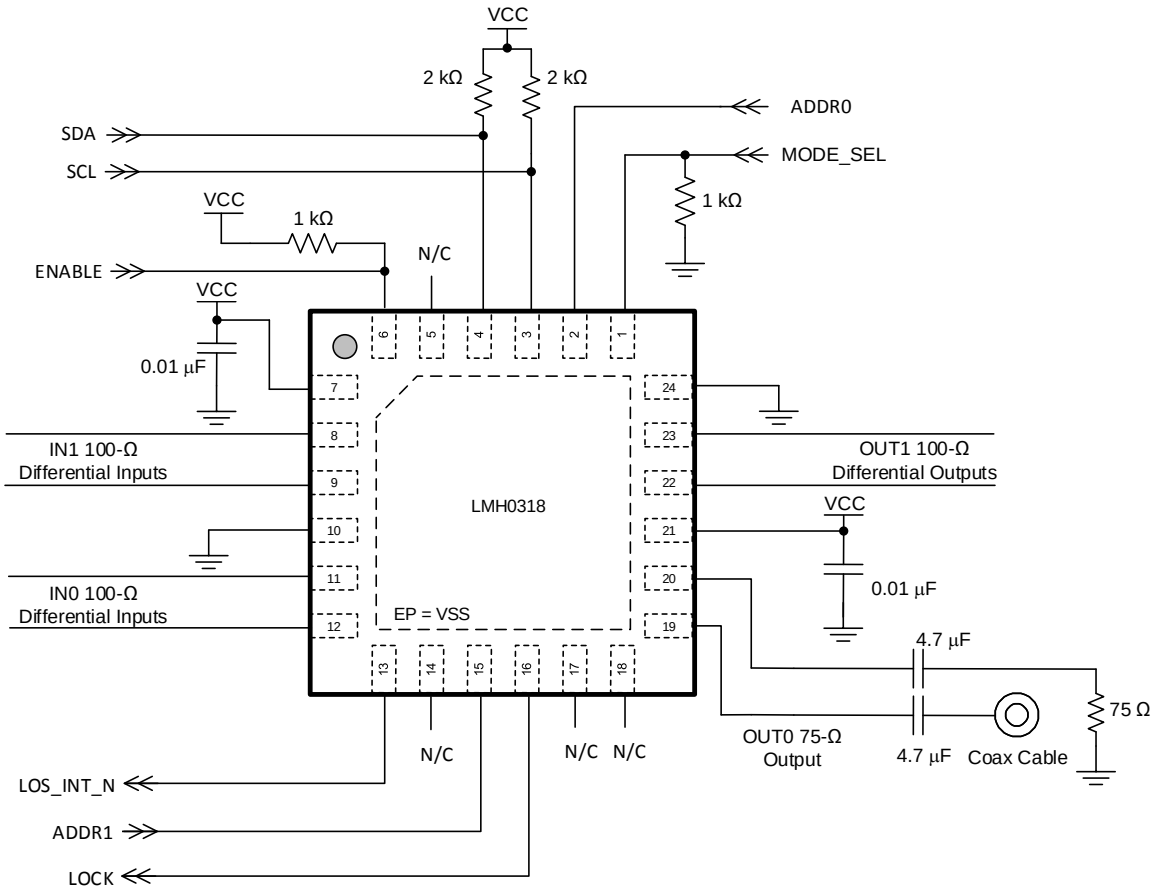

Figure 3. LMH0318 Application Schematic in SMBus Mode

For more information, visit the LMH0318 product folder to access the full data sheet and other design documents.

6 Summary

TI offers a wide SDI portfolio pin-compatible and functional equivalent alternatives to MACOM 3G-SDI cable drivers. With a few simple component changes to an existing SDI design and board layout, a MACOM 3G-SDI single cable driver can be replaced and improved with TI's pin-compatible 3G-SDI cable drivers. For MACOM's 3G-SDI dual cable driver, the LMH0307 can be used as a functionally compatible replacement. For new 3G designs that are in the component selection phase, TI recommends the LMH0318 for improved performance and easy upgrade path to 12G.

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