

LMH0340, LMH0040, LMH0070, LMH0050 3G, HD, SD, DVB-ASI SDI Serializer and Driver with LVDS Interface

General Description

The LMH0040 family of products provide a very simple 5:1 serializer and transmitter function, intended to be paired with an FPGA host which will format the data appropriately such that the output of the LMH0040 will be compliant with the output requirements of DVB-ASI, SMPTE 259M, and SMPTE 292M. The LMH0340 adds support for SMPTE 424M, the LMH0070 supports 270 Mbps operation only, and the LMH0050 requires an external cable driver. Throughout this document, if not explicitly stated, when the LMH0040 is referred to this includes all members of the family. The interface between the LMH0040 and the FPGA consists of a 5 bit wide LVDS bus, an LVDS clock and an SMBus interface. The product is packaged in a physically small 48 pin LLP package.

Key Specifications

- Output compliant with SMPTE 424M, SMPTE 292M, SMPTE 259M-C and DVB-ASI
- Typical power dissipation: 420 mW
- Typical output jitter <53 ps (HD, 3G)

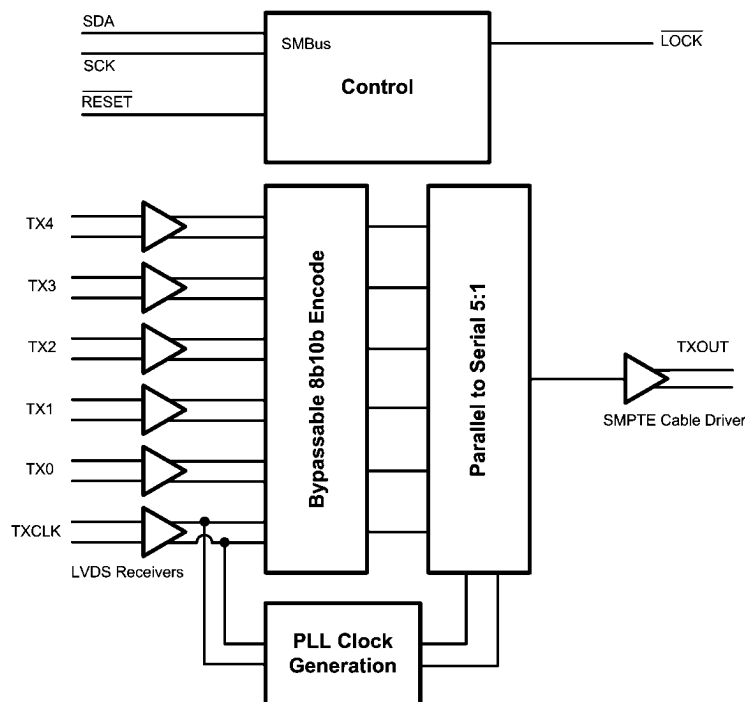
Features

- LVDS Interface
- No external VCO or clock required
- Integrated Variable output Cable Driver
- 3.3V SMBus configuration interface
- 48pin LLP package

Applications

- SDI interfaces for:
 - Video Cameras
 - DVRs
 - Video Switchers
 - Video Editing Systems

Block Diagram



30017001

TABLE 1. Feature Table

Device	SMPTE 424M Support	SMPTE 292M Support	SMPTE 259M Support	DVB-ASI Support	SMPTE Compliant cable driver
LMH0340	X	X	X	X	X
LMH0040		X	X	X	X
LMH0070			X	X	X
LMH0050		X	X	X	

Device Operation

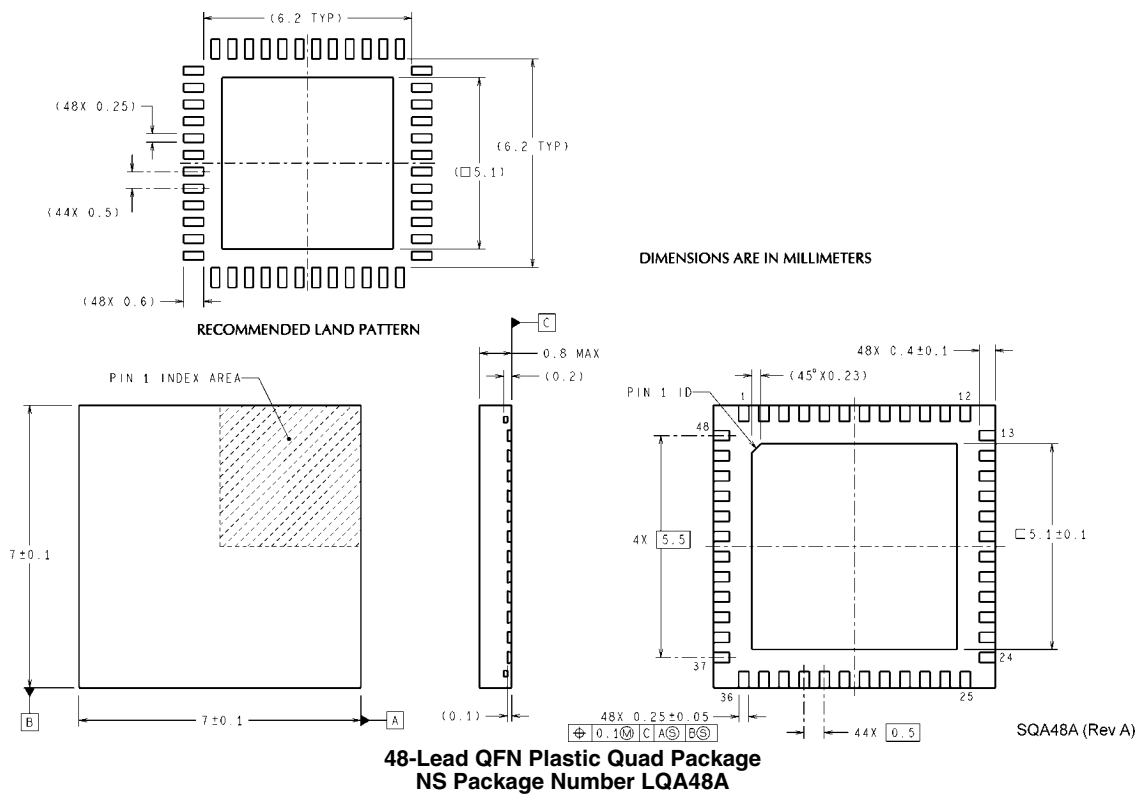
The LMH0040 serializer is used in digital video signal origination equipment. It is intended to be operated in conjunction with an FPGA host which preprocesses data for it, and then provides this data over the five bit wide datapath. Provided the host has properly formatted the data for the LMH0040, the output of the device will be compliant with DVB-ASI, SMPTE 259M-C, SMPTE 292M or SMPTE 424M depending upon the output mode selected.

high, then the four bit nibbles from TX0–TX3 are taken to form an 8 bit word, which is then converted to a 10 bit code via an internal 8b10b encoder and this 10 bit word is serialized and driven on the output. The nibble taken in on the rising edge of the clock is the most significant nibble and the nibble taken in on the falling edge is the least significant nibble. If TX4+/TX4- is low, then the input on TX0–TX3 are ignored and the 10b idle character is inserted in the output stream.

DVB_ASI Mode

The LMH0040 has a special mode for DVB-ASI. In this mode, the input signal on TX4+/TX4- is treated as a data valid bit, if

Physical Dimensions inches (millimeters) unless otherwise noted



Notes

THE CONTENTS OF THIS DOCUMENT ARE PROVIDED IN CONNECTION WITH NATIONAL SEMICONDUCTOR CORPORATION ("NATIONAL") PRODUCTS. NATIONAL MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS PUBLICATION AND RESERVES THE RIGHT TO MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE. NO LICENSE, WHETHER EXPRESS, IMPLIED, ARISING BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT.

TESTING AND OTHER QUALITY CONTROLS ARE USED TO THE EXTENT NATIONAL DEEMS NECESSARY TO SUPPORT NATIONAL'S PRODUCT WARRANTY. EXCEPT WHERE MANDATED BY GOVERNMENT REQUIREMENTS, TESTING OF ALL PARAMETERS OF EACH PRODUCT IS NOT NECESSARILY PERFORMED. NATIONAL ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR BUYER PRODUCT DESIGN. BUYERS ARE RESPONSIBLE FOR THEIR PRODUCTS AND APPLICATIONS USING NATIONAL COMPONENTS. PRIOR TO USING OR DISTRIBUTING ANY PRODUCTS THAT INCLUDE NATIONAL COMPONENTS, BUYERS SHOULD PROVIDE ADEQUATE DESIGN, TESTING AND OPERATING SAFEGUARDS.

EXCEPT AS PROVIDED IN NATIONAL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, NATIONAL ASSUMES NO LIABILITY WHATSOEVER, AND NATIONAL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE SALE AND/OR USE OF NATIONAL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

National Semiconductor and the National Semiconductor logo are registered trademarks of National Semiconductor Corporation. All other brand or product names may be trademarks or registered trademarks of their respective holders.

Copyright© 2007 National Semiconductor Corporation

For the most current product information visit us at www.national.com



**National Semiconductor
Americas Customer
Support Center**
Email:
new.feedback@nsc.com
Tel: 1-800-272-9959

**National Semiconductor Europe
Customer Support Center**
Fax: +49 (0) 180-530-85-86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +49 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 8790

**National Semiconductor Asia
Pacific Customer Support Center**
Email: ap.support@nsc.com

**National Semiconductor Japan
Customer Support Center**
Fax: 81-3-5639-7507
Email: jpn.feedback@nsc.com
Tel: 81-3-5639-7560