

SB-100

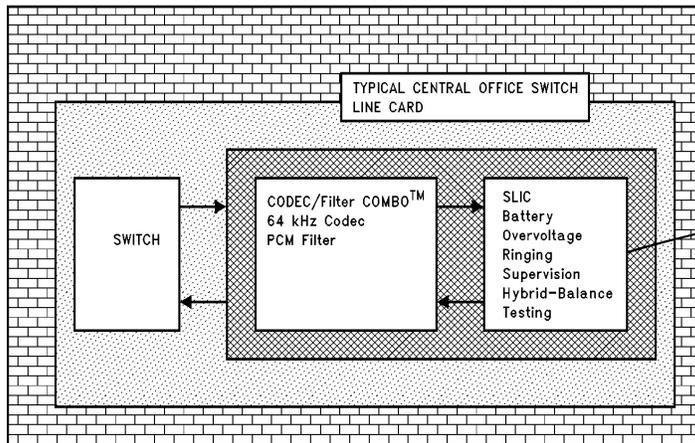
*SB-100 Subscriber Line Card for Central Office Telephone Switching
Equipment*



Literature Number: SNOA161

Subscriber Line Card for Central Office Telephone Switching Equipment

National Semiconductor
System Brief 100
May 1990



TL/F/10850-1

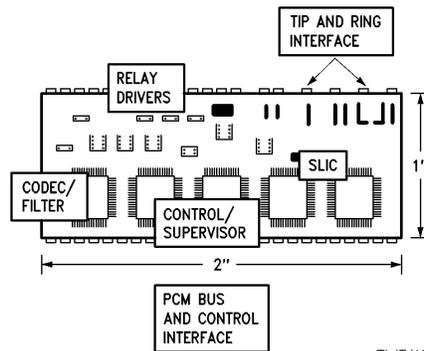
SYSTEM DESCRIPTION

Subscriber linecards are designed to interface the analog subscriber line to a PCM highway in a Digital Central Office or a Digital Loop Carrier (DLC) channel bank or remote concentrator systems. Subscriber Line Interface Module (SLIM™) devices are complete Electronic Subscriber Line Interface Circuit (SLIC) and PCM COMBO® CODEC/Filter systems, designed to meet the requirements for POTS (Plain Old Telephone Service) lines for Central Office or DLC subscriber line cards. When used in conjunction with a simple, non-critical, external protection network, two feed resistors, and a ring relay, the SLIM forms a complete line circuit handling all of the BORSCHT functions.

The SLIM consists of a line driver, a line receiver, a line impedance control circuit, a hybrid balance circuit, a loop supervision circuit, a ring supervision circuit, three positive relay drivers, a TP3054 COMBO CODEC/Filter, and a serial control interface.

The SLIM is assembled in a 1" by 2" Dual-In-Line Package, which allows very high density line cards with many lines per card and typically can reduce the card to card spacing within a switch rack or frame.

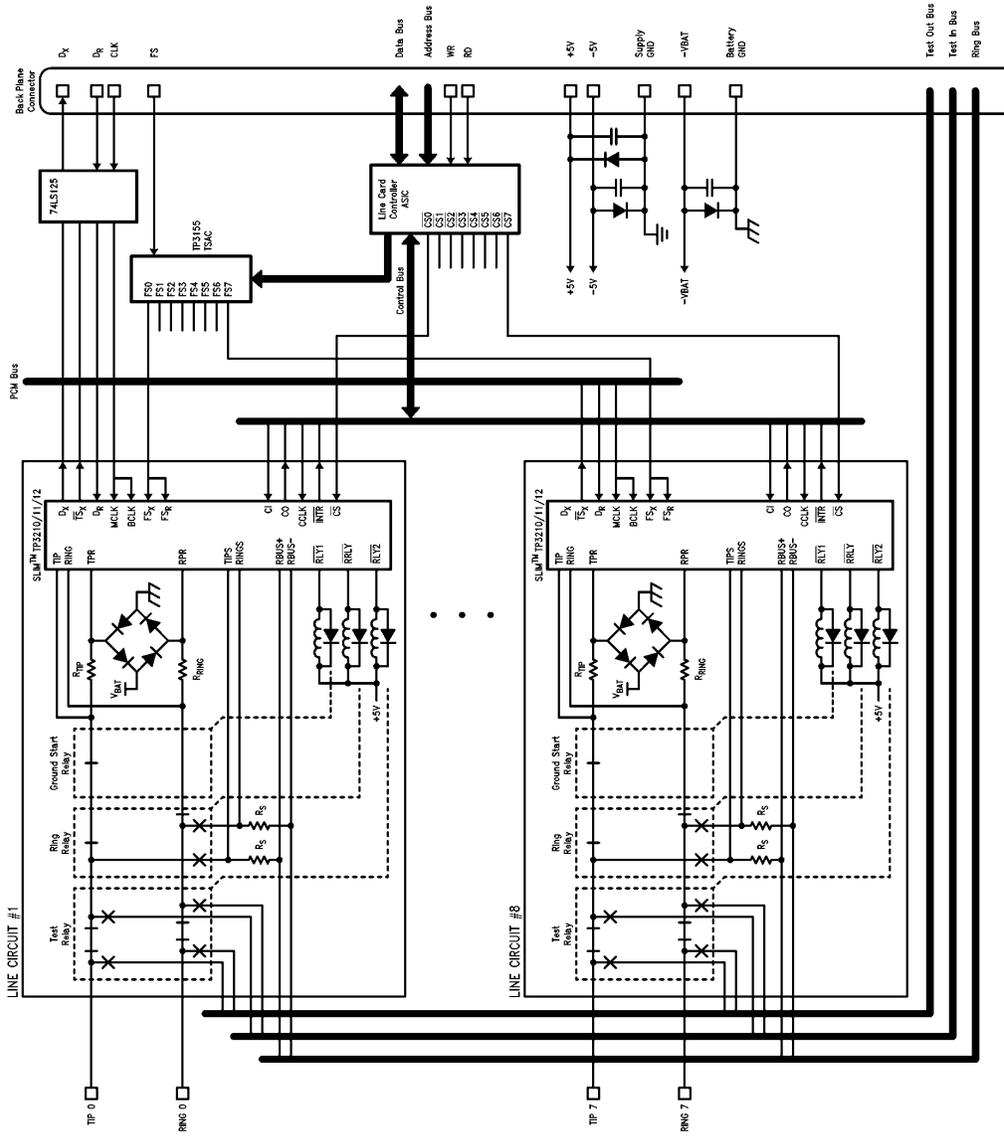
SLIM-Subscriber Line Interface Module



TL/F/10850-2

COMBO® is a registered trademark of National Semiconductor Corporation.
SLIM™ is a trademark of National Semiconductor Corporation.

Typical 8-Line Line Card Using the National Semiconductor SLIM



TL/F/10850-3

KEY DESIGN CHALLENGES

Meeting All Bellcore/REA/CCITT Specifications

Designing a Subscriber Line circuit which meets all of the Bellcore/REA/CCITT specifications not only requires tremendous awareness of the specifications, but when understood, can be extremely difficult to meet from a hardware point of view. Discrete solutions typically used require the precise evaluation of each component and careful system planning and design to insure compliance to all of the Bellcore/REA/CCITT specifications. The SLIM, being a complete line circuit system in a single package which is designed by National Semiconductor to meet the specifications, minimizes the demands on the designer and the technical risk associated with discrete multi-component approaches.

Meeting System Cost Requirements

The Switching System Equipment market is highly competitive and therefore the demands on the designer to use the least cost approach is ever dominant. The SLIM is competitive with all other modern alternatives, and due to its highly integrated system level approach, it minimizes the component incoming test, linecard assembly and yield loss factors, thereby reducing total cost of ownership for the linecard solution.

Time to Market

Typical turn around time from design start through field trials and production release can be very lengthy and therefore is dangerous in terms of keeping a competitive edge or stay-

ing competitive. The SLIM, being a complete line circuit "system" in a single package, reduces the engineering design time to system and line card evaluation time, thus significantly decreasing the time to market.

KEY FEATURES OF THE TP3210, TP3211, TP3212 SLIM SUBSCRIBER LINE INTERFACE MODULE

- Complete CODEC/Filter and SLIC functions plus protection
- Requires only simple protection network and 4 resistors externally
- Very small 1" by 2" package supports high density line card and system
- Superb power surge and lightning protection
- Withstands 500V Return to Ground surge
- Power Denial mode
- Thermal overload protection
- Automatic Ring Trip
- Four Selectable Balance Networks
- Three positive relay drivers
- TP3210 SLIM meets all Bellcore and REA specifications for USA Central Office
- TP3211 SLIM meets all CCITT requirements for 600Ω Central Office applications
- TP3212 meets TR-TSY-00057 specification for DLC POTS lines

Typical Bill of Material for an 8-Channel SLIM Based Line Card

Function	Description	NSC Part	Other Mfg	Qty
SLIC+ CODEC/Filter Line Circuit Protection	SLIM	TP3210/11/12		8
	Diode Bridge			8
	Fusistors	2 x 100Ω, ±3%		8
Ring Feed Relays	Resistors	2 x 360Ω, ±3%		8
	Ring Relay		DS-2E-5VDC	8
	Test Relay		DS-4E-5VDC	8
	Ground Start Relay (Note 1)		DS-2E-5VDC	8
Relay Catch Diodes			1N4001	24
Time Slot Assigner	TSAC	TP3155		1
Line Card Controller		ASIC (Note 2)		1
Buffer		74LS125		1
Supplies Filter and Protection	Schottky Diodes		1N5820	2
			1N6290A	1
	Tantalum Capacitors		47 μF, 25V	2
	Electrolytic Capacitor		47 μF, 63V	1

Note 1: Ground Start Relay is Optional depending on application.

Note 2: Line Card Controller ASIC is dependent on backplane structure.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems 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.
2. A critical component is any component of 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 Corporation
 1111 West Bardin Road
 Arlington, TX 76017
 Tel: 1(800) 272-9959
 Fax: 1(800) 737-7018

National Semiconductor Europe
 Fax: (+49) 0-180-530 85 86
 Email: onjwge@tevm2.nsc.com
 Deutsch Tel: (+49) 0-180-530 85 85
 English Tel: (+49) 0-180-532 78 32
 Français Tel: (+49) 0-180-532 93 58
 Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
 19th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: (852) 2737-1600
 Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
 Tel: 81-043-299-2309
 Fax: 81-043-299-2408

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Transportation and Automotive	www.ti.com/automotive
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2011, Texas Instruments Incorporated