

## TP3401, TP3402

### DASL Digital Adapter for Subscriber Loops

#### General Description

The TP3401 and TP3402 are complete monolithic transceivers for data transmission on twisted pair subscriber loops. They are built on National's double poly microCMOS process, and require only a single +5 Volt supply. Alternate Mark Inversion (AMI) line coding, in which binary '1's are alternately transmitted as a positive pulse then a negative pulse, is used to ensure low error rates in the presence of noise with lower emi radiation than other codes such as Bi-phase (Manchester).

Full-duplex transmission at 144 kb/s is achieved on a single twisted wire pair using a burst-mode technique (Time Compression Multiplexed). Thus the device operates as an ISDN 'U' Interface for short loop applications, typically in a PBX environment, providing transmission for 2 B channels and 1 D channel. On #24 cable, the range is at least 1.8 km (6k ft).

System timing is based on a Master/Slave configuration, with the line card end being the Master which controls loop timing and synchronisation. All timing sequences necessary for loop activation and de-activation are generated on-chip. Selection of Master and Slave mode operation is programmed via the Microwire Control Interface.

A 2.048 MHz clock, which may be synchronized to the system clock, controls all transmission-related timing functions.

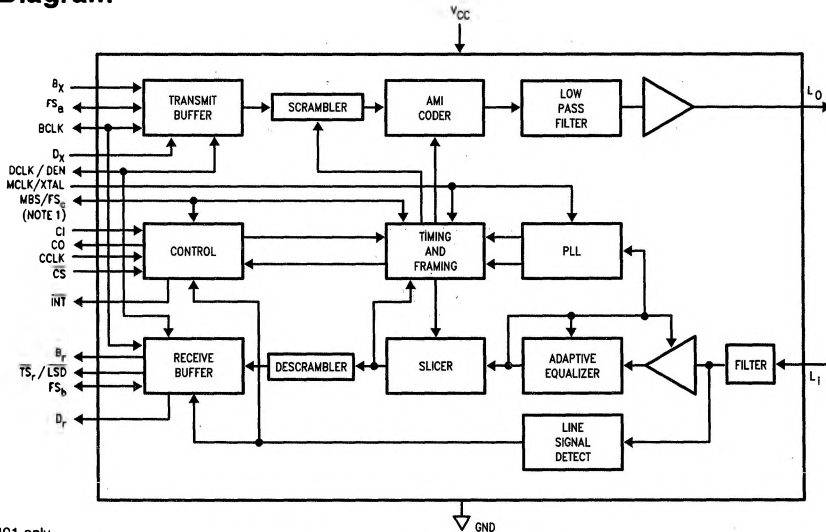
For the TP3401, this clock must be provided from an external source; the TP3402 includes an oscillator circuit requiring an external crystal.

#### Features

Complete ISDN PBX 2-Wire Data Transceiver including:

- 2 B plus D channel interface for PBX U' Interface
- 144 kb/s full-duplex on 1 twisted pair using Burst Mode
- Loop range up to 6 kft (#24AWG)
- Alternate Mark Inversion coding with transmit filter and scrambler for low emi radiation
- Adaptive line equalizer
- On-chip timing recovery, no external components
- Standard TDM interface for B channels
- Separate interface for D channel
- 2.048 MHz master clock
- Driver for line transformer
- 4 loop-back test modes
- Single +5V supply
- MICROWIRE™ compatible serial control interface
- 20-pin package
- Applications in:
  - PBX Line Cards
  - Terminals
  - Regenerators

#### Block Diagram



Note 1: TP3401 only.

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