

Am7953/Am7957

Subscriber Line Interface Circuit

ADVANCE INFORMATION

DISTINCTIVE CHARACTERISTICS

- Programmable constant current (Am7953), or constant Voltage Linear Feed (Am7957)
- Programmable loop detect threshold
- Ground key detect
- Line feed characteristics independent of battery variations
- On-chip switching regulator for low power dissipation
- Low standby power
- Two-wire impedance set by single external impedance

GENERAL DESCRIPTION

The Am7953/57 Subscriber Line Interface Circuit (SLIC) performs the telephone line interface functions required in both Central Office and PABX environments. The full range of signal transmission, battery feed, and loop supervision functions are performed. Signal-transmission performance is compatible with North American and CCITT recommendations. Overvoltage protection and ringing are provided by means of external networks.

The signal transmission functions include both 2-to-4-wire and 4-to-2-wire conversion. The 2-wire termination impedance is programmable with a single external impedance, which may be complex. The companion AMD SLAC (Subscriber Line Audio Processing Circuit) has a digital balancing filter that provides the trans-hybrid loss function. If the SLAC is not used, most codec/filter sets provide an uncommitted op amp which may be used for this purpose.

The Am7953's battery-feed architecture makes the DC-feed current programmable with external resistors. The feed current is independent of battery variations.

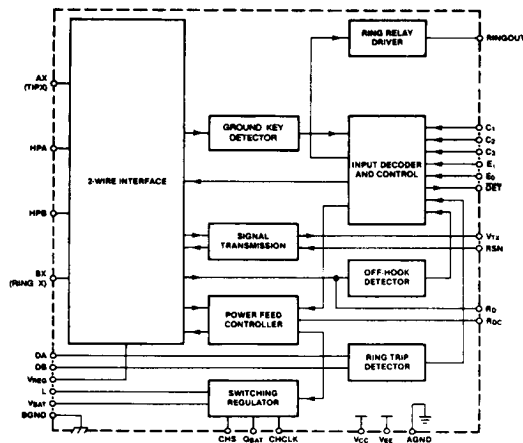
In the Am7957, the battery-feed architecture makes the DC feed resistance programmable with external resistors. Furthermore, the open circuit feed voltage and feed resistance are independent of battery variations. Loop currents up to 70 mA are recommended, although higher loop currents are possible.

A Polarity Reversal function is provided which transposes the normal voltage sense of the A(TIP) and B(RING) leads with a controlled transition time. All transmission functions continue normally following the transition. A disable mode limits loop current and cuts power dissipation while allowing the full complement of supervisory functions to be utilized. The output amplifiers are powered by an internal switching regulator in order to also reduce power consumption.

The supervisory functions allow for off-hook detection, ground key detection, and ring trip detection. The outputs of these detectors are read through a single, TTL-compatible output. To eliminate noise-induced errors, the off-hook detector signal may be filtered, and has a threshold adjusted by means of external components. Additional supervisory functions put the A(TIP) lead into an open-circuit or high-impedance state suitable for application in ground-start systems. Similarly, both the A(TIP) and B(RING) leads may be open circuited to clear relays, recover from line faults, or shut off out-of-service lines. A relay driver is provided for the Ring-relay function.

The Am7953/57 SLIC's user-programmable states are controlled by a 3-bit TTL-compatible digital code. The detector output is controlled by a selector bit and an enable bit. These lines are TTL-compatible.

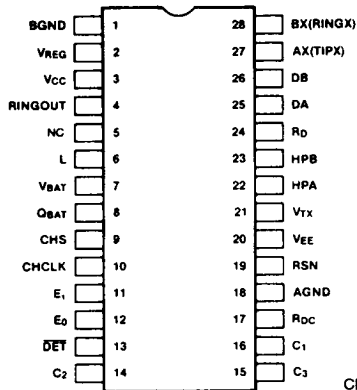
BLOCK DIAGRAM



BD005490

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CONNECTION DIAGRAM



CD007070

PIN DESCRIPTION

VCC
+5-volt power supply

VEE
-5-volt power supply

AGND Ground
Analog (quiet) and digital ground

BGND Ground
Battery (power) ground

VBAT
Battery supply

AX(TIPX) (Output)
Output of A(TIP) power amplifier

BX(RINGX) (Output)
Output of B(RING) power amplifier

HPA
A(TIP) side of high-pass filter capacitor

HPB
B(RING) side of high-pass filter capacitor

RSN Receive Summing Node
The metallic current (both AC and DC) between A(TIP) and B(RING) is equal to 1000 times the current into this pin. The networks which program receive gain. 2-wire impedance and feed resistance all connect to this node.

VTX Transmit Audio (Output)
This output is a unit-gain version of the AX(TIPX) and BX(RINGX) metallic voltage. The other end of the 2-wire input-impedance-programming network connects here.

E0 Read Enable
A logic HIGH enables $\overline{\text{DET}}$. A logic disables $\overline{\text{DET}}$.

E1 Ground Key Enable (Input)
When E_0 is HIGH, $E_1 = \text{HIGH}$ connects the ground key detector to $\overline{\text{DET}}$, and $E_1 = \text{LOW}$ connects the off-hook or ring trip detector to $\overline{\text{DET}}$.

$\overline{\text{DET}}$ Detector (Output)
When enabled, a logic LOW indicates that the selected detector is tripped. The detector is selected by the logic inputs

($C_1 - C_3, E_1$). The output is open-collector with a pullup resistor.

RD
Threshold modification and filter point for the off-hook detector. Also sets current in disable mode to 1.5 times the hook threshold.

RDC
Connection point for DC feed resistance programming network. The other end of the network connects to receiver summing node (RSN). The sign of V_{RDC} is for normal polarity and plus for reverse polarity. The magnitude is typically 2.5 volts except during voltage-output.

CHS Chopper Stabilization (Input)

CHCLK Chopper Clock (Input)
Input to switching regulator (TTL compatible). Frequency 256 kHz (nominal).

L Switching Regulator Power Transistor (Output)
Connection point for 1.0-mH inductor and anode of diode. This pin will have up to 60 volts pulse waveform. Extreme care must be taken to keep the diode connected short because of the high currents and high di/dt.

VREG Regulated Voltage (Input)
Provides negative power supply for power amplifiers. Connection point for inductor, filter capacitor and chopper stabilization.

QBAT Filtered Battery Supply
For the signal processing circuits

$C_1 - C_3$ Decoder (Inputs)
TTL compatible. C_3 is MSB and C_1 is LSB

RINGOUT Ring Relay Driver (Output)
Sourcing from VCC

DA Negative (Input)
Negative input to ring trip comparator

DB Positive (Input)
Positive input to ring trip comparator