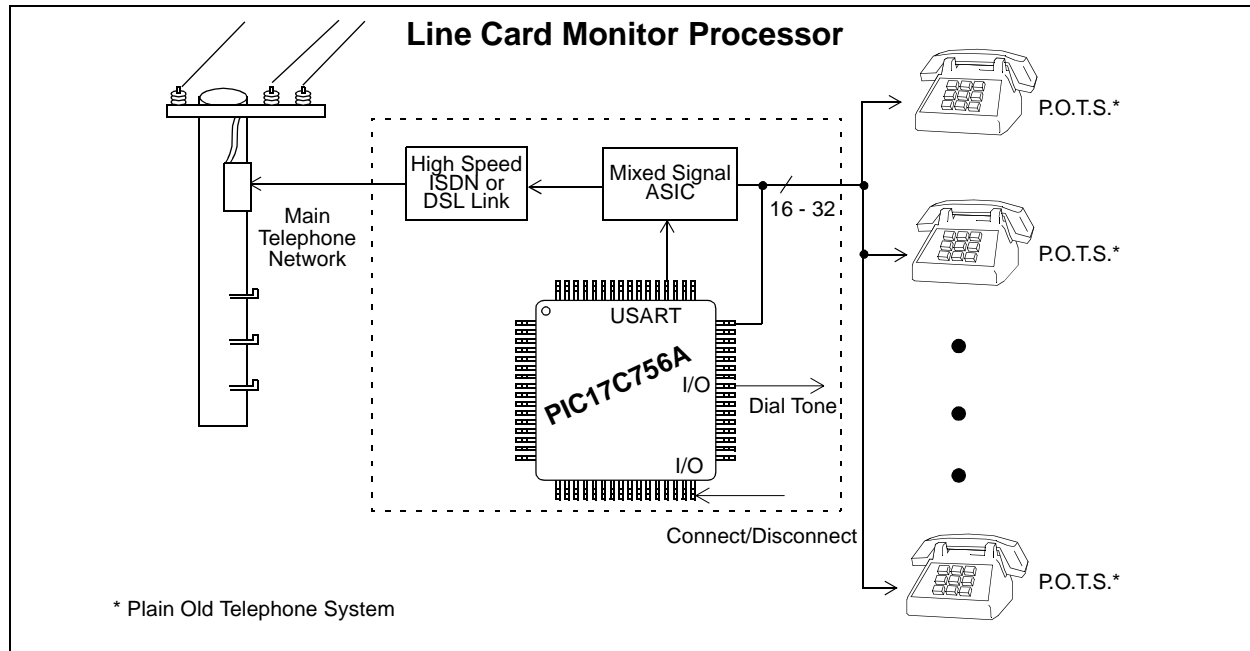


Telephone Line Cards Application Brief



APPLICATION DESCRIPTION

In most commercial or residential telephone services, the final connection to the telephone exchange is made via a line card. Normally 16 to 32 Plain Old Telephone Systems (POTS) are connected to one line card, and in a given interchange, there may be a dozen or more line cards. Each line card essentially contains a mixed-signal, high-speed ASIC, which interfaces the POTS to high-speed ISDN or DSL lines connected to the central exchange. In most cases, the ASIC does a pretty good job in handling the interchange. However, as each ASIC is asked to handle more and more signals, the throughput drops dramatically. The main reason for the drop is the number of lines being used at one time and the different distances of lines from the line cards.

The PIC17C756A was added to the line card to reduce some of the overhead of the ASIC. The PIC17C756A independently monitors the signal

condition and the connect/disconnect condition of the POTS. This information is communicated to the ASIC via the USART, and the ASIC in turn takes direct action to compensate for a drop in the line or other conditions which may occur. Thus the line card essentially has doubled its capacity with the addition of a peripheral microcontroller, namely the PIC17C756A.

The large number of I/O lines on the PIC17C756A can be used to monitor the POTS.

The 12 channel A/D converter with 10 bit accuracy can monitor the POTS signal level and determine if additional gain needs to be applied to a particular POTS.

The fast throughput of the PIC17C756A speeds calculations and monitoring of the I/O line and A/D converters.

The USART is used for communications to the ASIC.

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System Requirements

System Requirements	PICmicro™ MCU Applicability
Interface POTS* to ISDN or DSL high speed telephone links and handle signal level, dial tone and basic connect/disconnect of POTS.	<ul style="list-style-type: none"> Fast throughput. The PIC17C756A acts as a co-processor on the line card to reduce load on Mixed Signal ASIC
Must handle multiple lines (16 to 32 POTS)	<ul style="list-style-type: none"> 50 I/O lines to handle larger number of lines
Must monitor signal strength and connect/disconnect condition	<ul style="list-style-type: none"> A/D converter to monitor signal conditions, i.e., signal strength, connect and disconnect condition of POTS
Must have high throughput capability	<ul style="list-style-type: none"> USART to communicate directly to ASIC, resulting in faster throughput to handle line traffic

Related Applications

- Other Telecom

PIC17C756A Features

Performance	Peripherals	Power	Package
<ul style="list-style-type: none"> ✓ DC - 33 MHz ✓ Program Memory: 16K internal, 64K external ✓ Data Memory: 902 bytes ✓ Single Cycle Instructions ✓ 8 x 8 Single Cycle Multiply in 121 ns 	<ul style="list-style-type: none"> 4 Captures (16 bit) ✓ 3 PWM (10 bit) 4 Timers ✓ 2 USARTs ✓ 10-bit A/D (12 channel), <math>< \pm 1\text{LSb}</math> error SPI™ I²C™ Master Watchdog Timer 	<ul style="list-style-type: none"> BOR <math>< 1 \mu\text{A}</math> Standby Current ✓ Low Voltage Capability - see the PIC17C75X Data Sheet for details (DS30264A) 	<ul style="list-style-type: none"> DIE ✓ 64/68 pin
<ul style="list-style-type: none"> ✓ Key features utilized in this application. 			



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