Winbond W681388

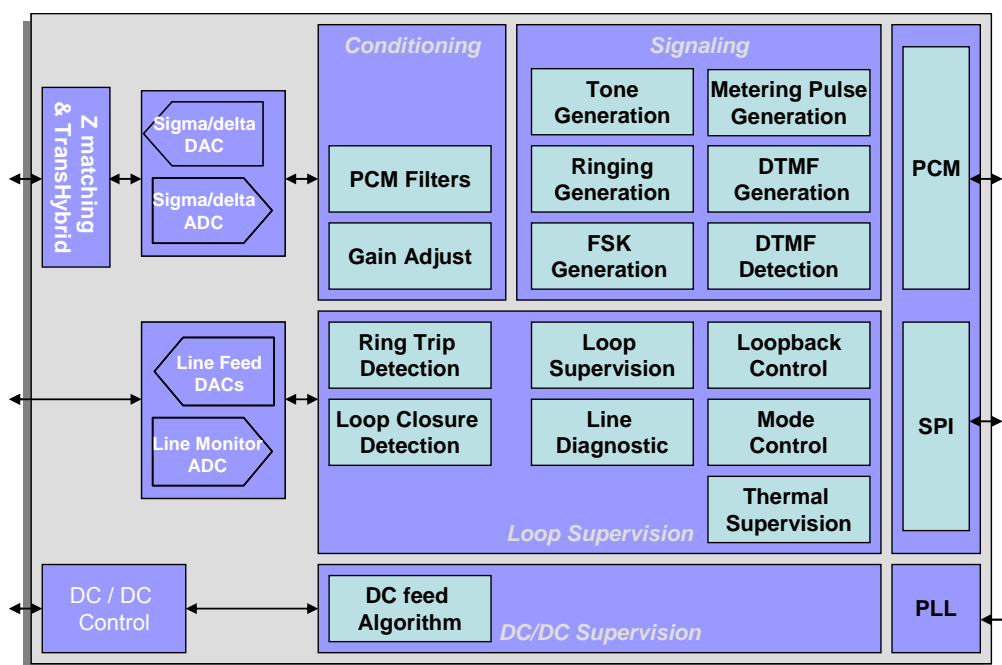## Single Programmable Extended CODEC/SLIC

The W681388 implements a single channel FXS telephone line interface optimized for short loop applications. It integrates SLIC (Subscriber Line Interface Circuit) functionality with a programmable CODEC and a DC-to-DC controller. The SLIC supports internal ringing up to 90 V_{PK} (5 REN at 4 kft), ideal for customer premise equipment (CPE). The CODEC can be configured for μ-law/A-law or 16-bit linear PCM encoding and supports a comprehensive set of signaling capabilities required to supervise and control both telephone lines. These include tone generation (including ring tones), DTMF generation and detection as well as FSK and metering pulse generation. An on-chip pulse width modulation (PWM) driver allows the control of DC-to-DC conversion for the line. Programmable impedance and transhybrid balancing allow for worldwide deployment.
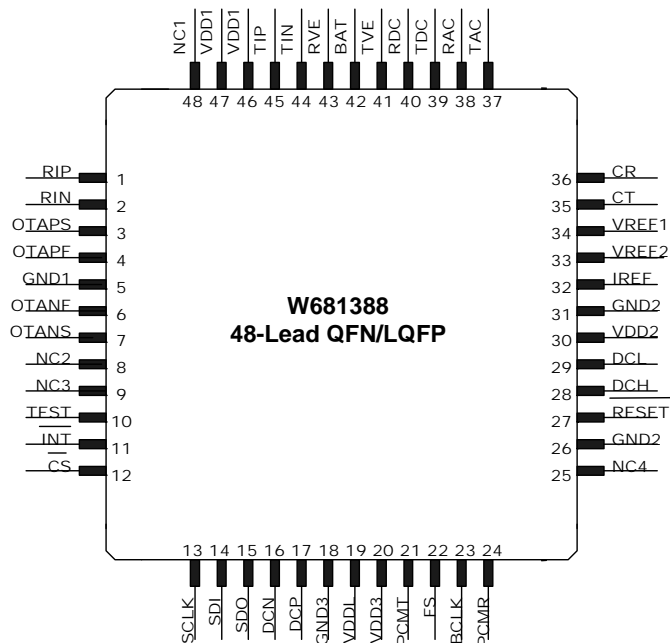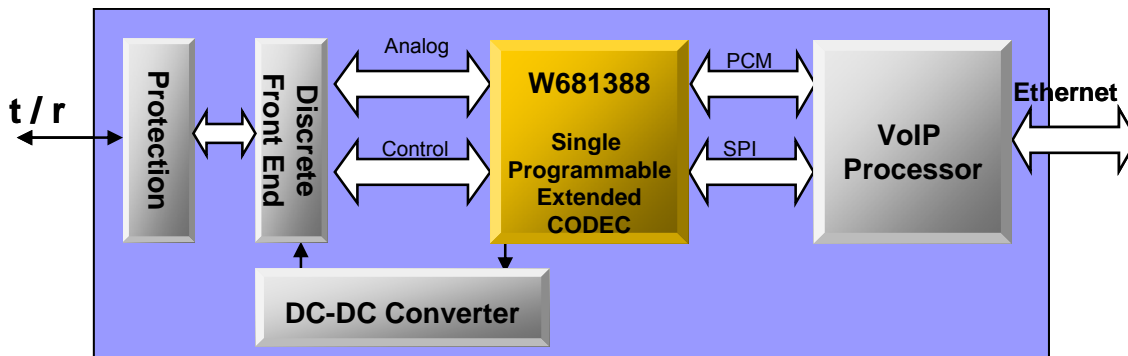
APPLICATIONS
- Analog Telephone Adapter
- Voice enabled DSL Modems
- Voice enabled Cable Modems
- Residential VoIP Gateways / Routers
- Integrated Access Devices
- Fiber to the Premise/Home (FTTP/H)
- Optical Network Terminals (ONT)
- Set Top Boxes
- Wireless Local Loop
- PBX

FEATURES
- Performs complete BORSCHT functions for a single channel with a single device
- Internal balanced ringing up to 90VPK (5REN up to 4kft)
- Integrated Power Management
  - Integrated DC-DC controller regulates battery voltage to minimize power dissipation in all operating modes
- Programmable linefeed characteristics
  - Ringing frequency, amplitude, cadence
  - Trapezoidal and Sinusoidal waveforms
  - Two-wire AC impedance, transhybrid balance
  - Constant Current feed (20 to 41mA)
  - Ring trip and loop closure thresholds
- Programmable signal generation
  - DTMF generation and detection
  - Metering pulse generation (12/16kHz)
  - Enhanced Caller ID (FSK) generation (Type I and Type II)
  - Tone generation (up to four simultaneous)
  - G.711 μ-Law/A-Law / 16-bit linear PCM audio
- Loop test and diagnostics support
  - Integrated loopback modes
  - Realtime linefeed monitoring
  - On-chip temperature sensor
- PCM and SPI bus digital interfaces
  - PCM Master and Slave modes supported
- On-chip PLL for flexible clocking options including 1MHz / 2MHz
- 3.3V operation
- Small Footprint Packages: LQFP-48, QFN-48

Application Example: Analog Telephone Adapter (ATA) supporting 1 voice port

t / r — Protection — Discrete Front End — Analog / Control — **W681388** Single Programmable Extended CODEC — PCM / SPI — VoIP Processor — Ethernet — DC-DC Converter

W681388
48-Lead QFN/LQFP

Pin labels (top, pins 48–37): NC1, VDD1, VDD1, TIP, TIN, RVE, BAT, TVE, RDC, TDC, RAC, TAC

Left side (pins 1–12): RIP, RIN, OTAPS, OTAPF, GND1, OTANF, OTANS, NC2, NC3, TEST, INT, CS

Right side (pins 36–25): CR, CT, VREF1, VREF2, IREF, GND2, VDD2, DCL, DCH, RESET, GND2, NC4

Bottom (pins 13–24): SCLK, SDI, SDO, DCN, DCP, GND3, VDDL, VDD3, PCMT, FS, BCLK, PCMR

BENEFITS

- High integration reduces overall system BOM and footprint
- Low power consumption for battery-backup and other power sensitive applications
- High programmability reduces real-time software overhead
- Extensive line sensing enables diagnostics support

W681388 ORDERING INFORMATION

Part Number	Package	Notes
W681388DG	LQFP-48	Pb-Free
W681388YG	QFN-48	Pb-Free

Note: For more details on the W681388, please refer to Winbond America's web site at: **http://www.winbond-usa.com**

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