- PA1688 key-note speech on 5111soft VOIP business conference on May 16, 2004，Shanghai
- Written and presentation by PA1688 product manager Lin Rongrong （woody, 林蓉榕）

Company Review

- Founded in 1999, Original name Palmmicro
- Global offices in 4 locations:
- Santa Clara, California, US (20 employees)
- Shanghai, China (75 employees)
- Beijing, China (11 employees)
- Taipei (6 employees)

Products Review

- SOC and total solution provider
- Palm1: PA1688 (in production)
- Palm2: Atlas-1 AT2xx (in production), target handheld applications, reason to change company name
- Palm3: Q3, 2004 (Under development)
- Palm1+: Q1, 2005 (Under development)

PA1688 History

- Design start: Feb, 1999
- Silicon ready: April, 2000
- Design name: Palm1
- Original shipping name: PA1680
- Change to PA1688 for VOIP applications
- Volume shipment starting from 2001, 700% revenue growth every year

PA1688 Business Advantage

- Total solution including all chip vendor, third party software and design house functions
- Quick technical support and customization for different systems and different customer requirement
- Small die size and small software size for minimum cost

PA1688 Chip Overview

- TSMC .25 process
- Controller: 50Mhz 8bit 8032 CPU
- DSP: 50Mhz ADSP21xx compatible
- USB 1.1
- Tiny on-chip memory
- Various interfaces include SDRAM, Program flash, AC97, I2S, I2C, Camera

Palm1+ Enhancement

- .18 process
- DSP speed increase to 80Mhz
- Add USB host and 16 bits card-bus for wireless lan VOIP applications
- Add 10/100base-T ethernet MAC
- Remove I2S, I2C, camera interface to save pin

Core Hardware Design

- Max 2M*8bit program flash needed (Recommend MT28F016S5, bundle with PA1688 to avoid shortage)
- Max 1M*16bit SDRAM needed
- Realtek RTL8019AS 10base-T ethernet
- Realtek RTL8305SB switch (Optional)
- Realtek ALC202A or Wolfson WM9707 AC97 codec

Hardware Design Continue

- AG1170 module for 1-port FXS gateway (Ready)
- AM79R70 design for 1-port FXS gateway (Debugging noise)
- Standard 16C550 design to connect dialup modem (Ready)
- Low cost discrete components design for 1-port FXO gateway (Debugging)

Design Names - Old

- Single one PA1688 chip, different hardware designs with different PA168X reference design names
- Most are program flash difference
- PA168B/C/E (Boex, Tsinghua Huahuan)
- PA168D (Unisen, Yuxin)
- PA168F/FB/FS

Design Names - Current

- All use MX29LV008TTC program flash, including all H323/SIP/MGCP/N2P protocol and all G.723.1/G.729/GSM/G.711 voice codec
- PA168S/M, Lan Phone and Modem phone
- PA168Q, 1-port FXS based on AG1170
- PA168P, 1-port FXS based on AM79R70

Design Names – Future1

- Use MT28F016S5, twice large as MX29LV008TTC, same price, including everything plus Chinese support
- PA168T, Lan phone and Modem phone
- PA168H, Lan phone and Modem phone with Chinese display and pinyin input support for SMS functions

Design Names – Future 2

- PA168R, add a 16bit co-processor for built-in router support, plus H functions, add 6 US dollars to today's single RJ45 LAN phone BOM
- PA168W, wireless lan desktop phone plus R functions, add about 10 US dollars to R's BOM

Design Names – Future 3

- PA168U, 1-port FXS and USB gateway with Chinese SMS support, for cordless phone and travel usage
- PA168O, 1-port FXO gateway, for company PBX and PSTN routing

Software Overview

- Current steady version: 1.33, steady version move 0.01 every 3 or 4 weeks, will update website with upgrade files and documents
- Current test version: 1.34.xxx, built everyday, available by sending email to support@aredfox.com
- Tech support only available for most recent steady or test version

Software - Codec

- Fully G.723.1, G.729, GSM, G.711 support
- DTMF generation and detection
- Jitter buffer control and comfortable noise generation (CNG)
- Automatically gain control (AGC, in debug)
- G.165/G.168 32ms echo cancellation
- G.167 32ms acoustical echo cancellation (coming soon)

Software – H323

- Oldest History, rich feature support including fast-start and tunneling, h.235 encryption, citron NAT solution and various special system support, excellent co-work with openh323 and gnugk
- China Unicom AIVGR（宝视通）service
- Poor support for H.450 supplemental service and conference features

Software - SIP

- Implemented since 2002, fully functional, better supplemental service support than H.323 like call hold, call wait, call transfer
- Work with every popular SIP system and terminal, better interoperation support than H.323
- Support STUN and Outbound Proxy for NAT

Software - MGCP

- Implemented since 2003, most parts functional, lack of open-source system and terminal test like H323/SIP
- Basic call functions work well with famous ZTE, Huawei, Habour, UT, Uptech systems, details need more adjustment
- 2004 software key point to enhance MGCP support

Software – Private Protocols

- Support Net2phone private protocols since 2002
- Mediaring support in half-way
- PA1688 API user can implement their own private protocols without knowing the details of our TCPIP library

Software – Digital Map

- MGCP concept used in H323, SIP and other protocols to save “#” or time-out after dialing a number
- Save in phone as a part of settings, can be get from server like MGCP if system support, can be automatically update from ftp server too.

Software – Update and Config

- Dedicated FTP or TFTP server, fixed DNS name
- Automatically check and update new phone settings
- Automatically check and update digital map
- Automatically check upgrade binary files on server and prompt user to update

Software - UI

- HTTP and telnet server for configuration
- SNTP to get time and date from internet or internal server
- FTP and TFTP upgrade
- PalmTool for debug, config and upgrade
- “Standard” phone UI, config and upgrade using phone keypad and LCD

Software – FAX

- T.38 FAX support: 3 months plan, later than software version 1.36
- Can use G.711 to send fax for the moment (not steady after test, need further study)

Special Topics - Router

- Do NOT have built-in router plan for PA1688 and Palm1+, because 8051 is not fast enough and router software is more complicated than VOIP software, recommend to use separate router
- Wireless router will win, the future need to focus on wireless lan handset

Special Topics - SNMP

- Urgent need from MGCP system provider
- In protocol study stage
- Is this really needed? What volume we are expecting if this is done?

Special Topics – Palm1+

- Why not integrate switch and PHY? RTL8305SB is cheap enough and MII interface needed
- Why not integrate AC97? Next step if cost is sensitive enough
- Why not integrate wireless lan base-band and MAC? Next ARM based chip

Special Topics – WI-FI mobile phone

- Atlas-1 based high-end design
- Dual-mode must or not?
- How big is the market?
- Who can build it?

Related Web Links

- http://www.centralitycomm.com/solutions/voip.html
- http://www.palmmicro.com.cn
- http://www.aredfox.com
- http://groups.yahoo.com/group/pa1688/
- Thanks to 5111soft and all PA1688 customers, hardware and software designers and end users