

AC7 Integrated Voice and Data (IVD) Reference Design

September 2004



TI Broadband Solutions Landscape

CABLE

- ◆ Data Cable Modem
- ◆ Voice-Enabled Cable Modem
- ◆ Wireless LAN Gateway Cable Modem

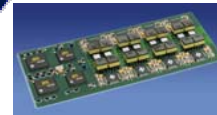


VoIP

- ◆ High-Density Gateway
- ◆ Enterprise Gateway
- ◆ Residential/SOHO Gateway
- ◆ WLAN IP phone
- ◆ Enterprise IP Phone

WLAN

- ◆ 802.11b, b/g, and a/b/g Processor and System Development Kits - Station
- ◆ 802.11b, b/g, and a/b/g Processor and System Development Kits - Access Point



DSL

- ◆ DSL Infrastructure (DSLAM, DLC, MDU)
- ◆ DSL CPE Modem
- ◆ Wireless DSL CPE Router
- ◆ Wireless DSL Router with VoIP

Leading-Edge Solutions Fuel Momentum

#1 in Cable
modem
performance

100%
DOCSIS cert.
pass rate

2 of top 3
Cable modem
OEMs choose TI

4 of top 5
WLAN
manufacturers
choose TI

#2 in wireless
LAN in 2003
Source: Forward
Concepts

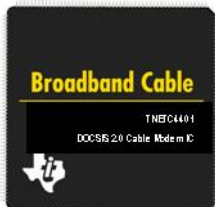
6 of top 10
DSL OEMs
choose TI

TI has shipped
over **50 Million**
DSL ports to
more than **190**
OEMs
worldwide

#1 in VoIP silicon
and software
solutions in 2004

TI has shipped
over **50 Million**
VoIP Ports to
more than **250**
OEMs
worldwide

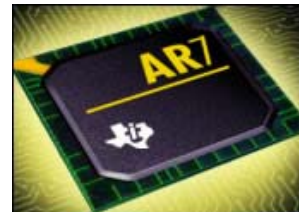
Customers Choose TI Broadband



DOCSIS 2.0™
certified Cable
modem chipset



Single-Chip
802.11 a/b/g
MAC/baseband



1st Fully
integrated single-
chip DSL router
with extensions



SOC voice
processing with
unprecedented
throughput

TI Continues Technology Leadership

REAL WORLD SIGNAL PROCESSING™

 **TEXAS INSTRUMENTS**

DSL Market Requirements



Reduced Costs

More subscribers per chipset /chassis

New Features

Support for new standards

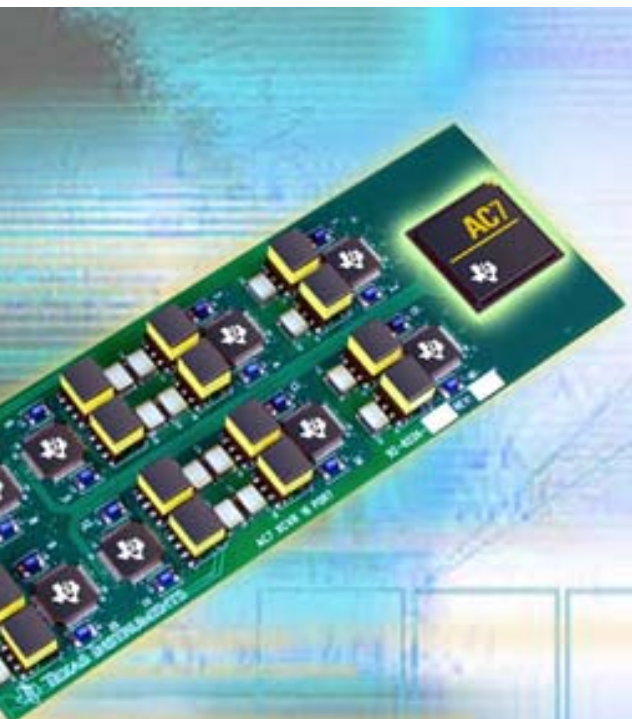
Backward Compatibility

Support for legacy standards

Interoperability

High-performance with all CPEs

AC7 IVD Answers Needs of OEMs and Operators



Reduced costs

Simplified AC7 design reduces total cost of ownership (TCO) for operators' ADSL systems & networks

New Voice Features

Integrates POTS + DSL on one line card with option to add VoP and packet aggregation processor

Backward Compatibility

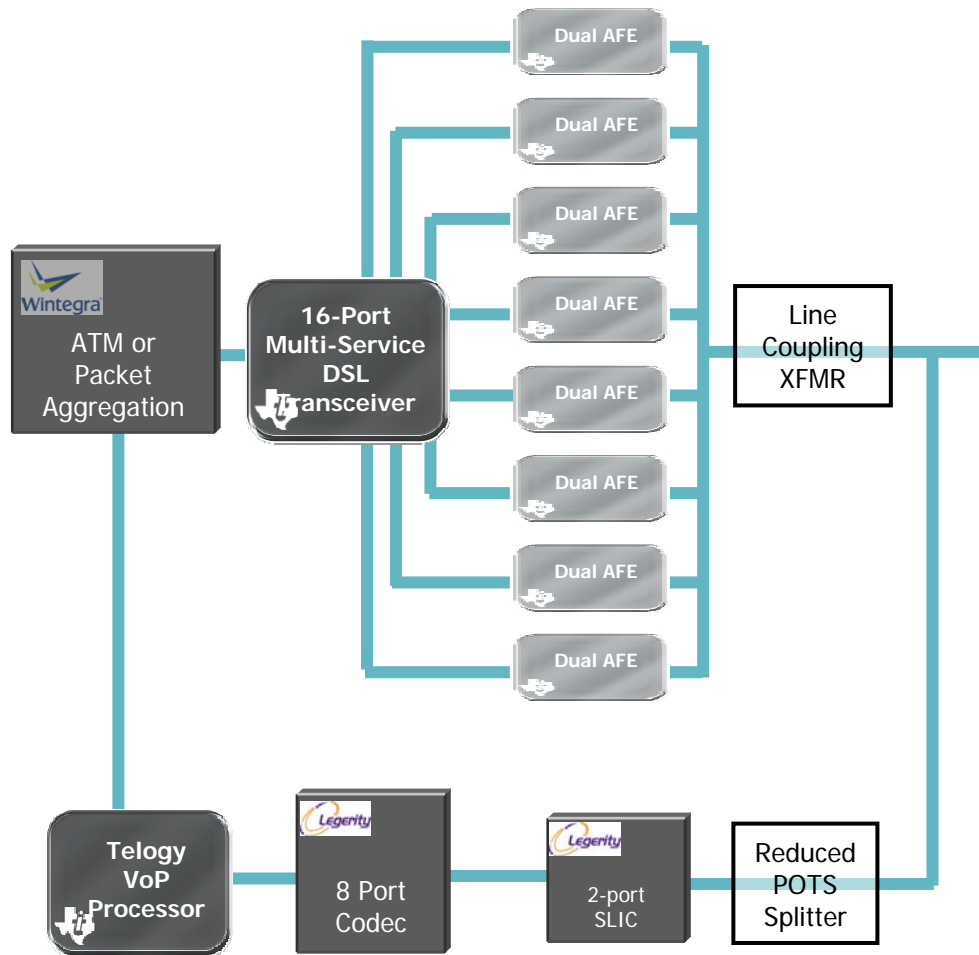
Supports ADSL1, 2, 2+ and G.711, G.729ABE for packet processing and wide range of other LBRCs

Interoperability

AC7IVD offers the industry's strongest interoperability performance

AC7-IVD

"Integrated Voice and Data Reference Design"



Standards:

- ✓ ADSL1, 2, 2+, READSL
- ✓ T1.413i2, ETSI, G.DMT
- ✓ Annex A, B, I, J, L,M

Performance:

- ✓ TR-048: GSPN, CNXT, STM
- ✓ TR-067: AR7
- ✓ POTS TR-57
- ✓ xpanDSL™
- ✓ G.711, G.729, etc.

Field Proven Silicon

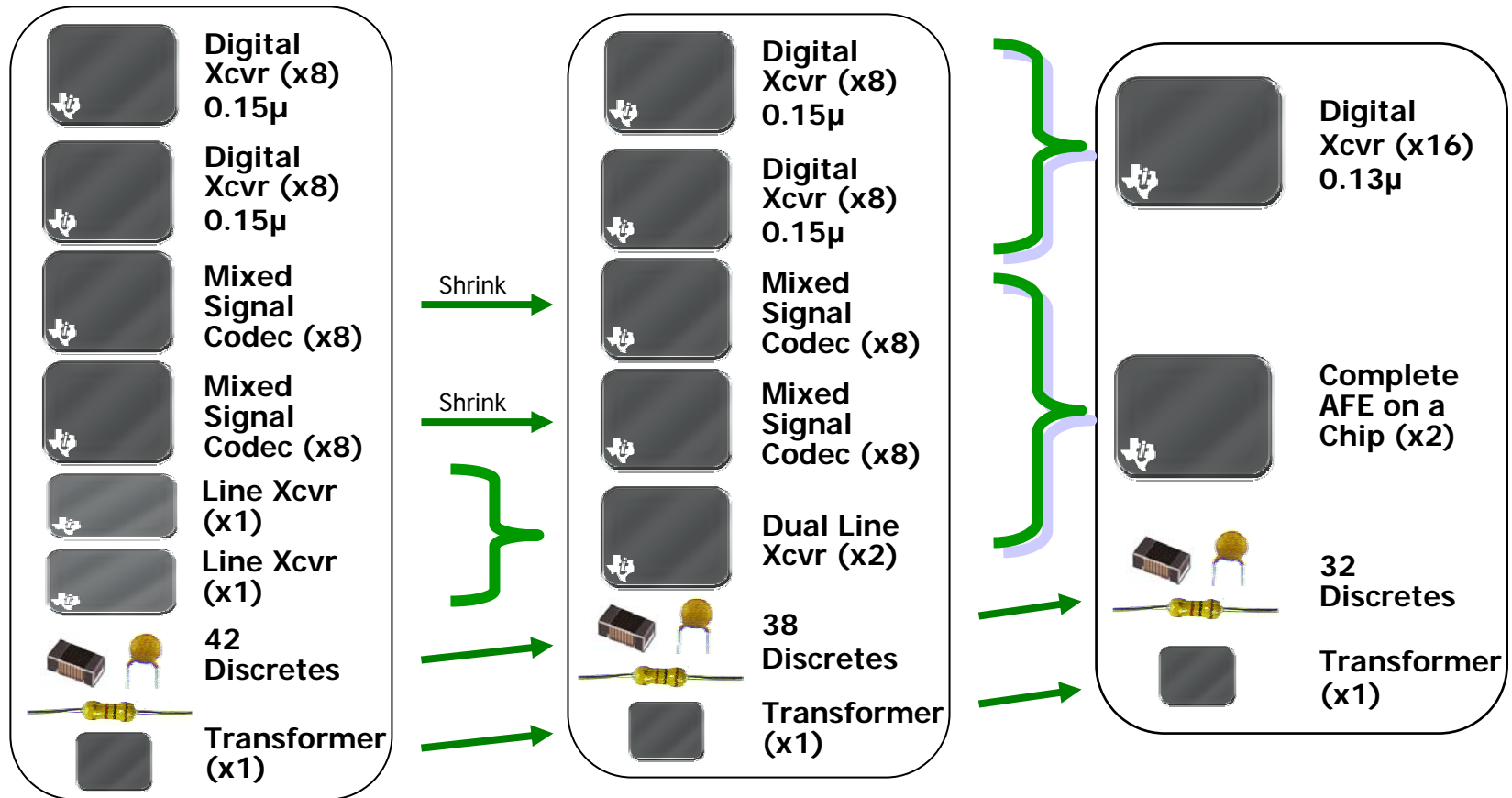
- ✓ TI Worldwide DSL Footprint
- ✓ > 20 yrs of Legerity POTS

System Level Reference Design

- ✓ Voice Packetization
- ✓ SW programmable POTS
- ✓ Scalable Aggregation

IVD building on AC7 Integration

16 Port Example



**ADSL CO
Bill of
Material**

AC5
2 chipsets
20 chips
752 discretes

AC6
2 chipsets
12 chips
624 discretes

AC7
1 chipset
9 chips
368 discretes

POTS and VoP capabilities in one design

AC7 Chipset

- TNET7160 TXCR
- TNET7122/3 AFE
- Most Integrated DSL
- WW Deployment
- ADSL1, 2, 2+

POTS + Splitter

- Legerity SLIC & SLAC
- Programmable for WW compliance
- Size and cost- optimized splitter
- Self test features
- Internal & External ringing capable
- Multiple POTS standards support

Wintegra Aggregation Module

- Wintegra Winpath
- ATM & IP support
- DSL Datapath SW
- Field proven

Telogy VoP Module

- C55x™ DSP w/Telogy Software™ for VoP
- LBRC – G.711, G.729, etc
- 32ms ECU
- RTP
- SIP, H.323, MGCP

Total Cost of Ownership Advantage

Addressing the DSL Investment Chain

OEM Expenses

AC7 IVD Advantage

H/W Development

- Multiple designs
- Board re-spins
- CAD resources

- Multi-service chipsets
- One board for world market
- Trace count reductions

S/W Development

- Managing Multiple API's

- Common API w/previous & future chipsets

Testing

- Board debug

- Advanced analog built in self test

Operational

- Purchasing
- Inspection
- Inventory
- Assembly

- 33% reduction in chip count
- 31 passives/port

Service Provider Expenses

AC7 IVD Advantage

Capital

- System costs
- Linecard costs
- Separate service cards

- Most integrated chipset
- Lowest system cost enabled
- Multi-service linecards

Provisioning

- Truck rolls
- Interop problems

- Broad interoperability testing
- Multi-standard support

Operational

- Network level electricity draw

- Low power consumption

Maintenance

- Fault isolation
- Modem stability
- Failure rates

- ADSL2: DELT
- Interoperability stability
- Fewer linecard potential failure points

Offering Superior End-to-End Interoperability



**ADSL Testing
Facilities in
Dallas, Texas and
San Jose, California**



**Over 300 CPEs and
30+ DSLAMs can be
tested against**

Interoperability is the fundamental requirement for all operators worldwide

TI's world-class interoperability lab delivers:

- Automated testing with latest deployed equipment
- Database for test data storage and comparisons
- Operator reports, TI SW release interoperability reports

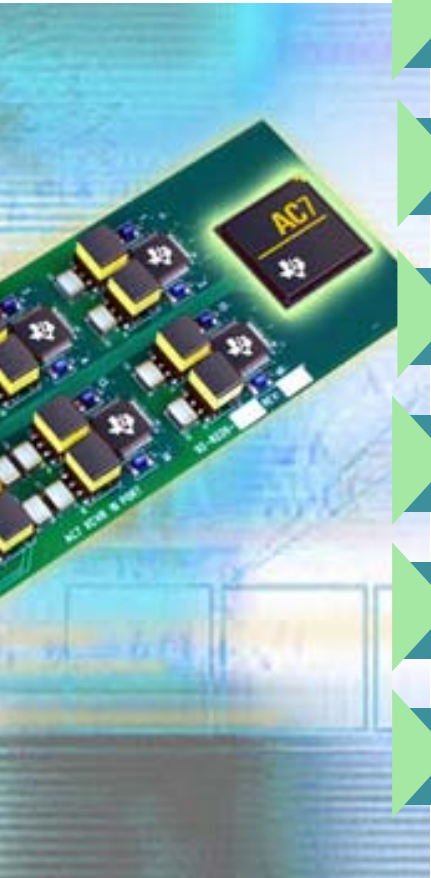
TI's interOps facilities shorten manufacturer and operator qualification cycle

a4

Need correct interOps logo -- it should say interOps Test Labs not testing

a0193251, 8/29/2003

AC7 IVD: Summary



Integrated Data +POTS Reduces Total Cost and Space

Flexible design w/ VoP & Aggregation Proc. add-ons

Based on leading AC7 platform

Industry Leading Interoperability

24 Port Multi-Standard Design (ADSL1, 2, 2+, READSL)

Best-in-Class design from Legerity, Wintegra & Telogy