

## Agere Systems DSP1648C Host-Based Controller V.92 Modem Chip Set

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### Features

- Two chip 3.3 V PCI modem solution with 5 V tolerant buffers
- Data mode capabilities:
  - ITU-T V.92\*: 56000 bits/s—28000 bits/s
  - ITU-T V.90\*: 56000 bits/s—28000 bits/s
  - ITU-T V.34: 33600 bits/s—2400 bits/s
  - V.32bis, and fallbacks
  - V.42 and MNP™ error correction (LAPM)
  - V.44, V.42bis and MNP Class 5 data compression
- FAX mode capabilities:
  - ITU-T V.17, V.29, V.27ter, and V.21 Ch 2
  - ITU-T T.31 Class 1 FAX
- Compatible with transformer-based and silicon DAA circuits:
  - High-precision sigma-delta codec (CSP1034C)
  - Line-powered silicon DAA (CSP1035A)
- Enhanced voice features:
  - Full-duplex speakerphone (requires CSP1027 audio codec)
  - Telephone answering machine (TAM)
  - Caller identification (caller-ID)
- V.80 video-ready interface
- Bit I/Os to support domestic and international DAAs
- Low power consumption
- Flexible power management modes
- Operating system support:
  - Windows® 95, 98, 2000, Windows NT® 4.0, Windows ME, and Windows XP
  - Linux®
  - PC 2001 compliant

### Introduction

The DSP1648C, host-accelerated modem chip is an exciting new upgrade to Agere Systems Inc. line of host-based controller modems. The DSP1648C upgrades the technologies found in the DSP1648 V.90 modem solution to the new ITU-T recommendations V.92 and V.44 communication industry standards. V.92 and V.44 have four innovative features, designed to improve modem performance in the internet environment. The new features are as follows:

- Modem fast connect: faster start-up times.
- Modem on hold†: switch between modem and an incoming phone call without losing the data connection.
- PCM upstream: send data to central site at rates approaching 48 kbits/s.
- Data compression enhancement focused on today's internet traffic.

The DSP1648C has an integrated PCI interface, which eliminates the 16550 UART bottleneck found in traditional hardware modems. The PCI interface supports both slave and master operations while providing greater access to host PC system resources.

Host-based controller modems have the benefit of using powerful CPUs and accessing their plentiful RAM and disk space. Modem firmware can therefore be updated in the field since the code simply resides on the disk.

With this feature set, designers can create full-featured modem solutions which are characterized by low-cost, low power consumption, and high-performance.

\* Due to FCC limitations, speeds of 53 kbits/s are the maximum permissible transmit power levels during download transmission. Actual data speeds will vary depending on the line conditions.

† Modem on hold functionality requires call waiting services.

## Functional Description

### DSP1648C

The Agere Systems DSP1648C chip set is a two-chip solution consisting of Agere Systems DSP1648C digital signal processor, a CSP1035A silicon data access arrangement (DAA) or a CSP1034 line codec. An optional CSP1027 audio codec is required to support full-duplex speakerphone. It supports V.92, V.90, V.34 data, and FAX rates up to 14.4 kbits/s. The host-based controller solution is compatible with *Windows 95* and *Windows 98* telephony application program interface (TAPI), including the unimodem and unimodem-V service providers, and can be used with off-the-shelf TAPI compliant voice and telephony applications.

The DSP1648C chip set supports ITU-T V.253 based TAM features, using DLE shielded commands and AT+V commands supporting 7.2 kHz, 8.0 kHz, and 11.025 kHz for both 8-bit and 16-bit samples.

### Video-Ready Interface

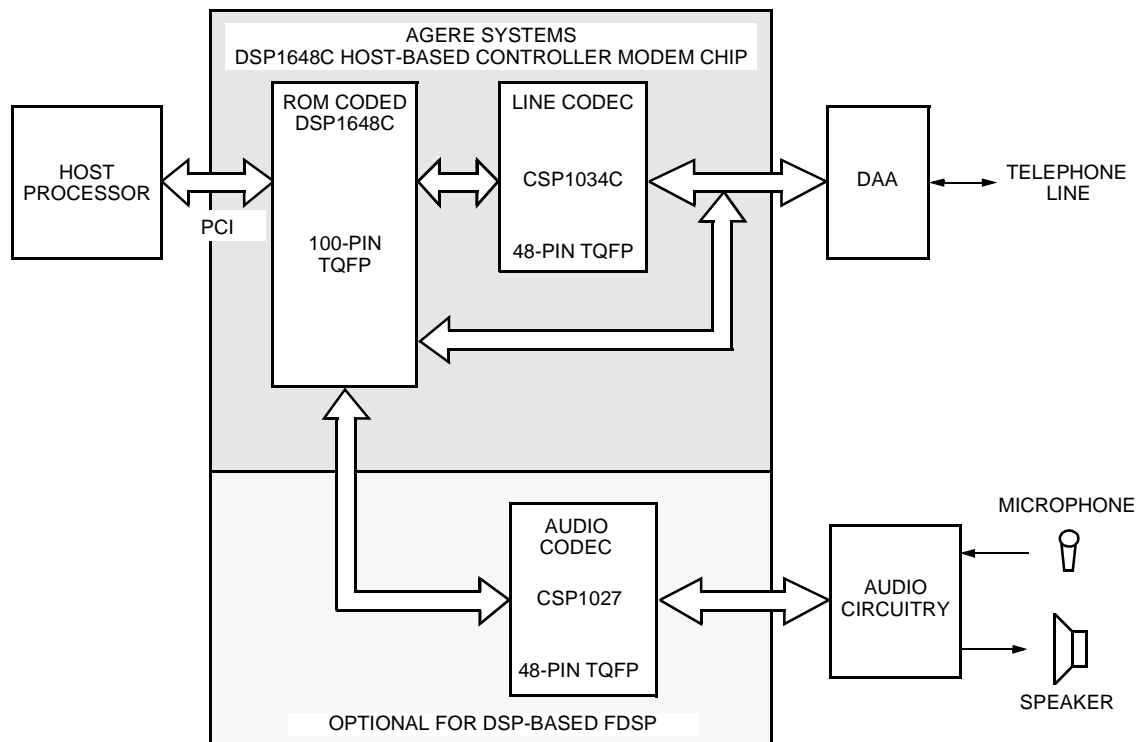
The video-ready interface supplied by the DSP1648C chip set provides video conferencing capability using traditional POTS lines. The implementation of the ITU-T V.80 standard provides a seamless interface for either software or hardware-accelerated ITU-T H.324 implementation. The host-based architecture of this chip set facilitates future upgrades.

### Telephone Answering Machine

The TAM mode uses a modified version of the command set defined by ITU-T recommendation V.253. All AT commands are sent through the COM port. The actual voice samples are sent by a WAVE driver directly to the data pump hardware.

In order to be backward compatible to some voice applications, the DSP1648C also supports a standard V.253 command set. In V.253 voice commands, voice samples are sent to the COM port along with <DLE> shielded commands.

Concurrent data, FAX, voice discrimination, and DTMF tone detection are supported during TAM mode. Distinctive ring and synthesized rings are available in TAM mode.



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Figure 1. Agere Systems DSP1648C and Transformer-Based DAA Block Diagram with Audio Codec

**Functional Description** (continued)

**Changes from DSP1648 (Mars 3)**

DSP1648C is a digital IC that provides the engine for various modem standards. DSP1648C uses existing DSP1648 specifications and functionality with some enhancements. The following is a list of the new features:

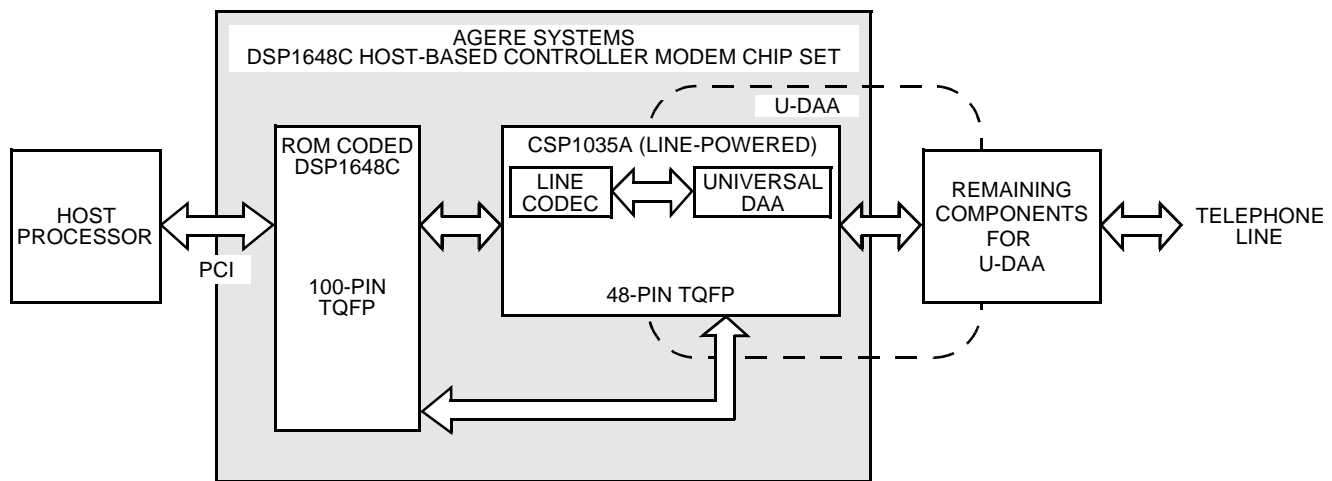
- Support for V.92 and V.44:
  - Fast connect
  - Modem on hold
  - PCM upstream
  - Improved data compression
- Additional on-chip RAM for V.92 support.
- Additional PCI power management for future WHQL requirements.
- Lower power dissipation.

**Integrated PCI Interface**

The DSP1648C features a ROM-coded DSP1600 core combined with the control and communications logic required to implement a modem data pump. The DSP1648C incorporates a PCI interface which supports two full-duplex bus master streams for greater access to host system resources. One PCI stream can be switched between the audio codec interface or the DSP core. The second full-duplex stream supports 4-word block transfers between system and DSP core. 3.3 V and 5 V signaling systems are supported for PCI bus buffers. The device supply must come from a 3.3 V PCI supply, vaux, or a regulated 3.3 V supply.

**I/O Voltage Considerations**

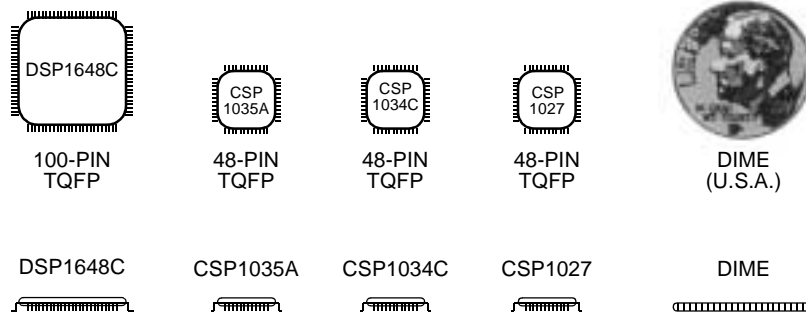
The system supply voltage requirement is 3.3 V ± 0.3 Vdc. This device also employs a 5 V tolerant buffer topology. To support this 5 V tolerant I/O, the VIO pin (pin 93) is provided as an indicator to the device of the signaling voltage being used on the bus.



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**Figure 2. Agere Systems DSP1648C Host-Based Controller Modem Chip Set Block Diagram without Audio Codec**

## Package Information



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Figure 3. DSP1648C Chip Set Package Options

## Ordering Information

Device	Description	Voltage	Package	Part Number	Comcode
DSP1648C	Modem Chip	3.3/5 V	100 TQFP	1648C-TV5SEGV-DB	109061374
CSP1034C	Modem Codec	3.3 V	48 TQFP	CSP1034C-T11	108159542
CSP1035A	Silicon DAA	3.3 V	48 TQFP	CSP1035A-T11	108393935
CSP1027	Audio Codec	3.3/5 V	48 TQFP	CSP1027-S11	106888555

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*Linux* is a registered trademark of William Della Croce, Jr.

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