



# VAB™

Graphical Component-oriented DSP Design Software  
as it relates to eXpressDSP™

DSPS Fest - Houston, TX  
4 August 2000



# Overview

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# Hyperception Company Background

- ◆ 1984 - Founded
- ◆ 1984 - Gambled on making DSP Development Software for PC using DOS through 1989
- ◆ 1989 - Early gamble on Windows (version 2.11)
- ◆ 1989 - charter was to develop new paradigm for DSP algorithm development using graphical component-oriented concepts (RIDE™ product development)
- ◆ 1999 - VAB™ Leveraged from 10 year RIDE Development work



## VAB - What is it?

- ◆ A Component-based Graphical Design Technology for DSP Design
- ◆ All based on an Open Software Architecture
- ◆ Allows 'RAPID PRODUCTION' via direct graphical to DSP Object Code Generation
- ◆ Program Real-time DSP Applications using a graphical paradigm which is DSP-centric -

**Block Diagram direct to real-time DSP**



## VAB History

- ◆ Hyperception worked closely with TI to develop VAB
- ◆ VAB concept leveraged Hyperception's RIDE product
- ◆ Chosen by TI University Program over various other ideas to **make real-time DSP easier** to teach/learn
- ◆ VAB University version delivered initially in 1999
  - ◆ direct support for 'C31 DSK, 'C5402 DSK, 'C6211 DSK, and 'C6711 DSK
- ◆ VAB for 'C6000
- ◆ VAB for 'C5000
- ◆ VAB for 'C2000

## VAB History

- ◆ 2000 - VAB is the very first eXpressDSP Compliant Plug-in!



- ◆ Initial Block Diagram direct to CCS program link
- ◆ More integration already completed and additional work planned for VAB plug-in



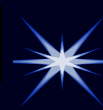
## How does VAB leverage eXpressDSP?

- ◆ Intended to embrace **eXpressDSP technology** directly using a graphical means
  - ◆ Allows for direct use, creation, and testing of **DSP Algorithm Standard** components graphically
  - ◆ Allows for alternate, easier method of utilizing **BIOS** within a DSP application
  - ◆ Utilizes **CCS plug-in** strategy to accomplish the above to TI-based target hardware in a device-independent manner (C6000, C5000, C2000, etc.)

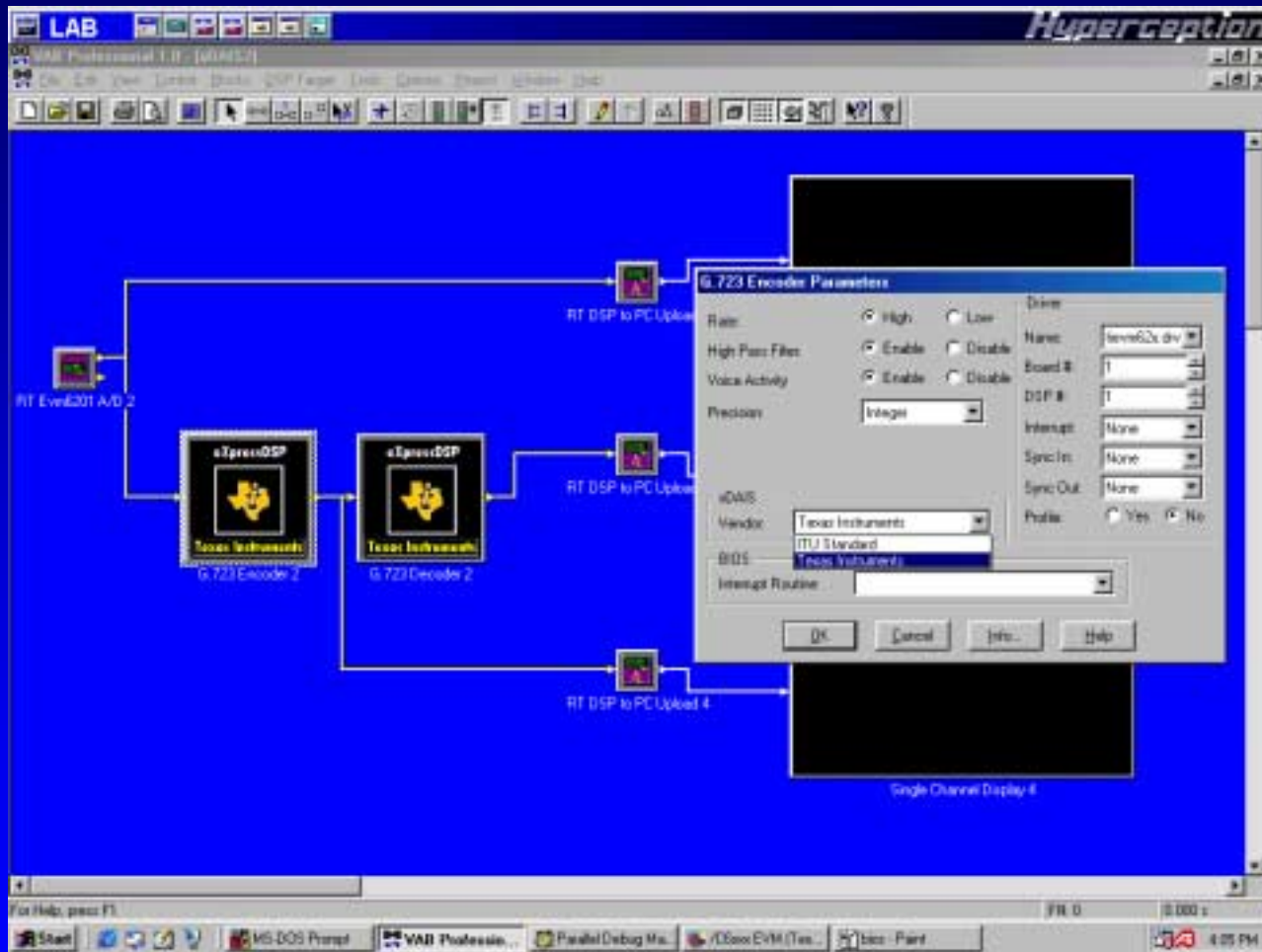
## VAB - Component Delivery Vehicle

- ◆ A Component-based Graphical Design tool for directly creating DSP Object Code using DSP Algorithm Standard components
- ◆ eXpressDSP Component Wizard to automate making DSP Algorithm Standard components
  - ◆ Based on mature Block Wizard technology
  - ◆ Allows for much faster, more robust component development, with much lower learning curve
- ◆ A method for automating Algorithm Verification to allow testing DSP Algorithm Standard components





# VAB - Alg Std



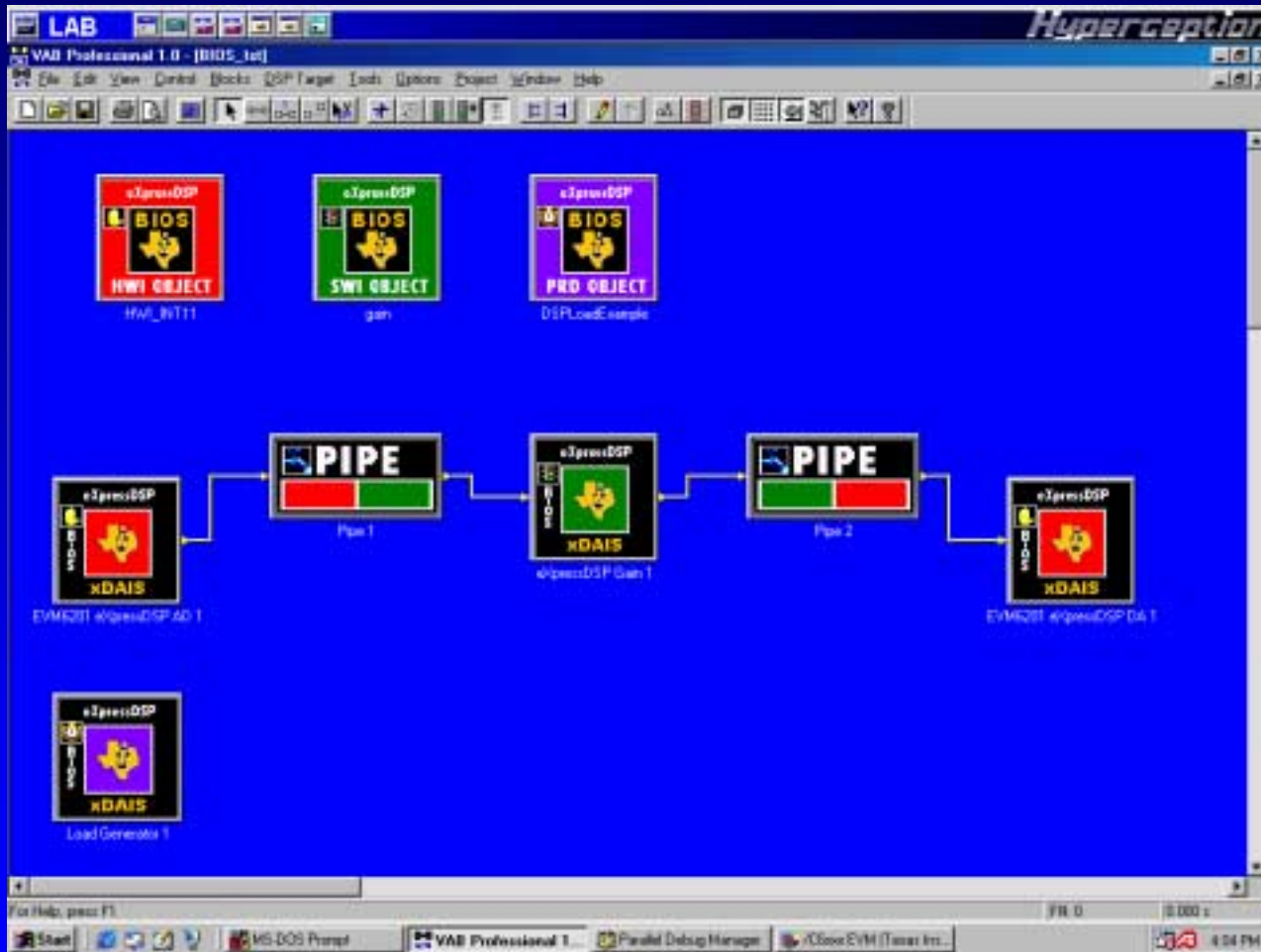


## VAB - BIOS Facilitator

- ◆ **Make BIOS easier** for many people
- ◆ Allow for much lower learning curve on BIOS implementation
- ◆ Supports scalable BIOS usage in applications
- ◆ Allow for possible **new audience of engineers** with less design experience to start exploiting BIOS
- ◆ Significant new approach to **using BIOS!**



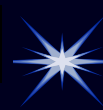
# VAB - BIOS





## VAB - CCS Plug In

- ◆ VAB **can utilize plug-in strategy** of CCS
- ◆ Allows for direct support of all CCS targets
- ◆ Inter-operates with CCS to allow better overall DSP code development
- ◆ Positions TI for possible new areas of technology related to advanced DSP algorithm debug and development



# VAB - CCS

The screenshot displays the Hyperception VAB software interface. The main window is titled "LAB" and "Hyperception". The central pane shows assembly code for a "Dis-Assembly" window:

```

00003334 00000000    NOP
00003336 00000000    NOP
0000333C 00000000    NOP
00003340          BIOS_rtwst:
00003340 00000212    B.S2      0x3350      ; 5 delay slots
00003344 000005E2    SUB.S2    B0,B0,B0
00003348 020003A2    MVC.S2    B0,IER
0000334C 00004000    NOP      3
00003350 07F0002A    MVK.S2    0xFFFF000,SP
00003354 07C0006A    MVKTH.S2 0x8000,SP
    
```

Below the assembly code is a "Component Graph" showing a state transition diagram with nodes labeled "gierGwi", "LoadExample", "PRD\_iss", "Offset Thread", "PRD Tick", "Time", and "Acquisition". The graph shows various states like "waiting", "ready", "unknown", "wait", and "running".

At the bottom, there is a "Performance" section with a graph showing a peak of 18965 and a last value of 0.115. To the right of the graph are controls for "RTDx-Enable" and "Channel" selection, with "RTA\_Inst4out0" and "RTA\_Inst4out1" selected.

The bottom status bar shows "DSP RUNNING", "For Help, press F1", "Parallel Debug Manager", and "AC9000 EVM (Texas I...)" with a system clock of 4:08 PM.

## VAB - the Component Wizard

- ◆ Allows new components to be created easily
- ◆ supports the DSP Application Standard for maximum interoperability
- ◆ Takes the guesswork out of developing a new component
- ◆ Standalone, may be used with or without VAB
- ◆ Supports development with CCS directly using plug-in strategy



**eXpressDSP Component Wizard 1.0**

Instance Creation Parameters:  
XDAS\_Int8\_byteParam

**Function Prototype Wizard**

Parameter Name: nFrameLen  
Parameter Type: XDAS\_UInt16  
Parameter Number: 2 of 3

`XDAS_Int32 FUBAR_HYP_myApply(IFUBAR_Handle handle,  
XDAS_Bool bEnable, XDAS_UInt16 nFrameLen, XDAS_UInt8 uSym);`

< Back   Next >   Cancel   Help

< Back   Next >   Cancel   Help

## VAB - What problems are solved?

- ◆ A **visual product-oriented solution** matched exceptionally well to the concept of eXpressDSP
- ◆ TECHNICAL
  - ◆ A solid mature product which leverages eXpressDSP to create DSP applications quickly
  - ◆ Allows **easier use** & **better harmony** of eXpressDSP
- ◆ MANAGEMENT
  - ◆ Faster project development
  - ◆ Reduced Learning Curve
  - ◆ Maintainability



# Why is VAB important for current/future DSP Markets?

- ◆ Allows for target-independent DSP design using a variety of solutions from different vendors (HW/SW)
- ◆ VAB can reduce technical expertise barriers to entry, allowing larger pool of available DSP Engineering Labor to be utilized, thus widening market
- ◆ Allows for a much reduced learning curve for developing DSP Applications via eXpressDSP

## How can this help in the DSP Market?

- ◆ This tool can be used to graphically demonstrate the ease at which DSP can be done today
- ◆ This tool can be used as a basis for creation, testing, delivery and usage of component software solutions
- ◆ This tool, when bundled/used with evaluation kits/boards, will increase the likelihood that a potential customer will make a decision to use DSP, as opposed to deciding DSP is too fraught with design difficulties and overwhelming in-house expertise requirements

## How can this help TI in the DSP Market?

- ◆ This tool will demonstrate to potential new DSP customers that they, with proper tools, have the capability to use DSP in their application, thus increasing the total available market
- ◆ Preserves TI's Leadership in DSP and gives them another 'First'
- ◆ Hyperception has all of this in a mature product offering now



## Schedule

- ◆ VAB for 'C6000
  - ◆ support for 62x, 67x now; support for 64x planned (awaiting hw)
  - ◆ Comp. Wizard, Alg. Standard now; BIOS support 4Q00
- ◆ VAB for 'C5000
  - ◆ support for 54xx now; support for 55xx planned (awaiting hw)
  - ◆ Comp. Wizard, Alg. Standard now; BIOS support 4Q00
- ◆ VAB for 'C2000
  - ◆ support for F240, 243 now; support for 2407 planned



# Schedule

- ◆ VAB for 'others'
  - ◆ C3x is supported now
  - ◆ C4x could be supported easily (supported already in RIDE); not currently planned



# COST

- ◆ VAB for 'C6000
  - ◆ \$1495 US, P/N HSWN1060
- ◆ VAB for 'C5000
  - ◆ \$1495 US, P/N HSWN1050
- ◆ VAB for 'C2000
  - ◆ \$1495 US, P/N HSWN1020



# VAB Summary

- ◆ Demonstrations (time permitting)
  
- ◆ Additional Information:
  - ◆ Hyperception, Inc.
    - ◆ Phone: 214-343-8525
    - ◆ Fax: 214-343-2457
    - ◆ E-mail: [info@hyperception.com](mailto:info@hyperception.com)