



Agilent Technologies

.Net for Test and Measurement

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Agenda

- What is .NET and Visual Studio .Net?
- What is the T&M Programmers Toolkit?
- Toolkit features
- How to get more information

Why .NET? Why Toolkit?



Visual Studio .NET

Visual Studio .NET is the **comprehensive tool** for rapidly building applications and integrating XML Web services

Desktop and Web Applications



Integrated Development Environment

- **Shared environment**
 - Single Solution Explorer, Toolbox, and Debugger
 - Intellisense statement completion and squiggles
 - Create multi-language solutions
- **Fully extensible**
 - 3rd Party Languages
 - 3rd Party Tools
 - Rational Rose and Agilent Toolkit
- **Fully customizable**
 - Record and play productivity macros

Ultimate Developer Cockpit



Multiple Language Support

- **Visual Basic .NET**
 - Fully object oriented
 - Supports free threading
 - Structured exception handling
- **Visual C# .NET**
 - Increased productivity for C++ developer
 - Component-oriented, type-safe
- **Visual C++ .NET**
 - Attribute based programming
 - Managed Extensions for C++
- **Visual J# .NET**
 - Java Syntax and Language on the rich .NET environment
- **And 28 Other Languages via third parties**

Language Enhancements



Enterprise Architect Tools

- Advanced modeling tools
 - Software modeling using UML
 - Conceptual, logical, physical database modeling
 - Business process modeling
- Enterprise frameworks and templates
 - Share best practices, provide architectural guidelines
- Performance, load, functional testing tools
- Integrated source code and version control

Tools Integrated into the Environment

Span Any Platform or Device

- RAD for the Web – Web Forms
- RAD for the Desktop – Windows Forms, TabletPC
- RAD for Devices – SDE (Software Device Extensions)
- RAD for Mobile – Mobile Web Forms

Rapid Application Development -- RAD



Enhanced Productivity

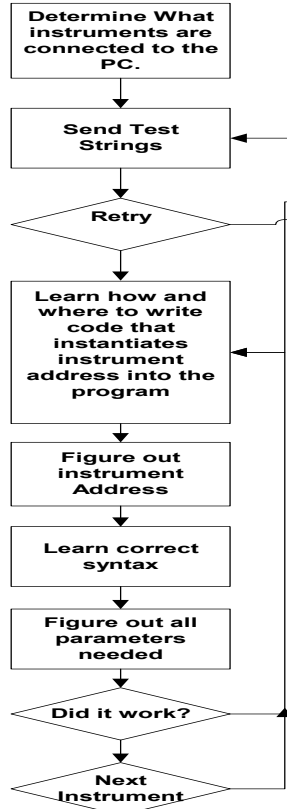
- .NET Class Libraries
 - Logical namespace hierarchy
- Debugging
 - Remote
 - Multiple languages
- Instrumenting an Application
 - Analyze events

Build Powerful Applications Fast

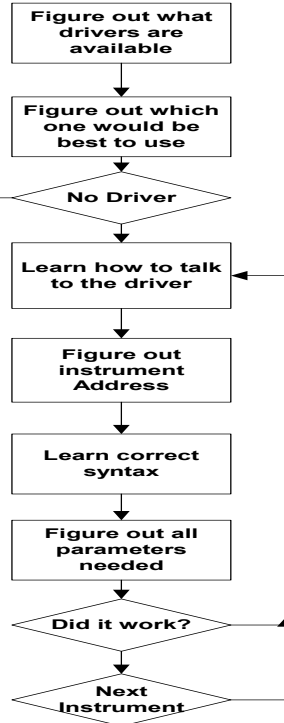


Without the T&M Toolkit

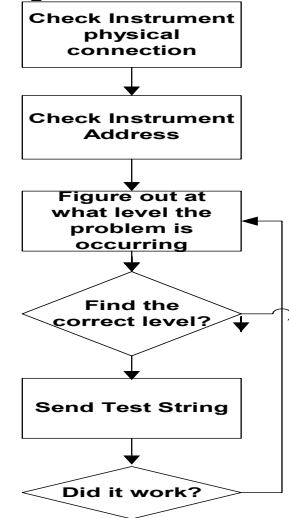
Connecting to an Instrument



Using Instrument Drivers

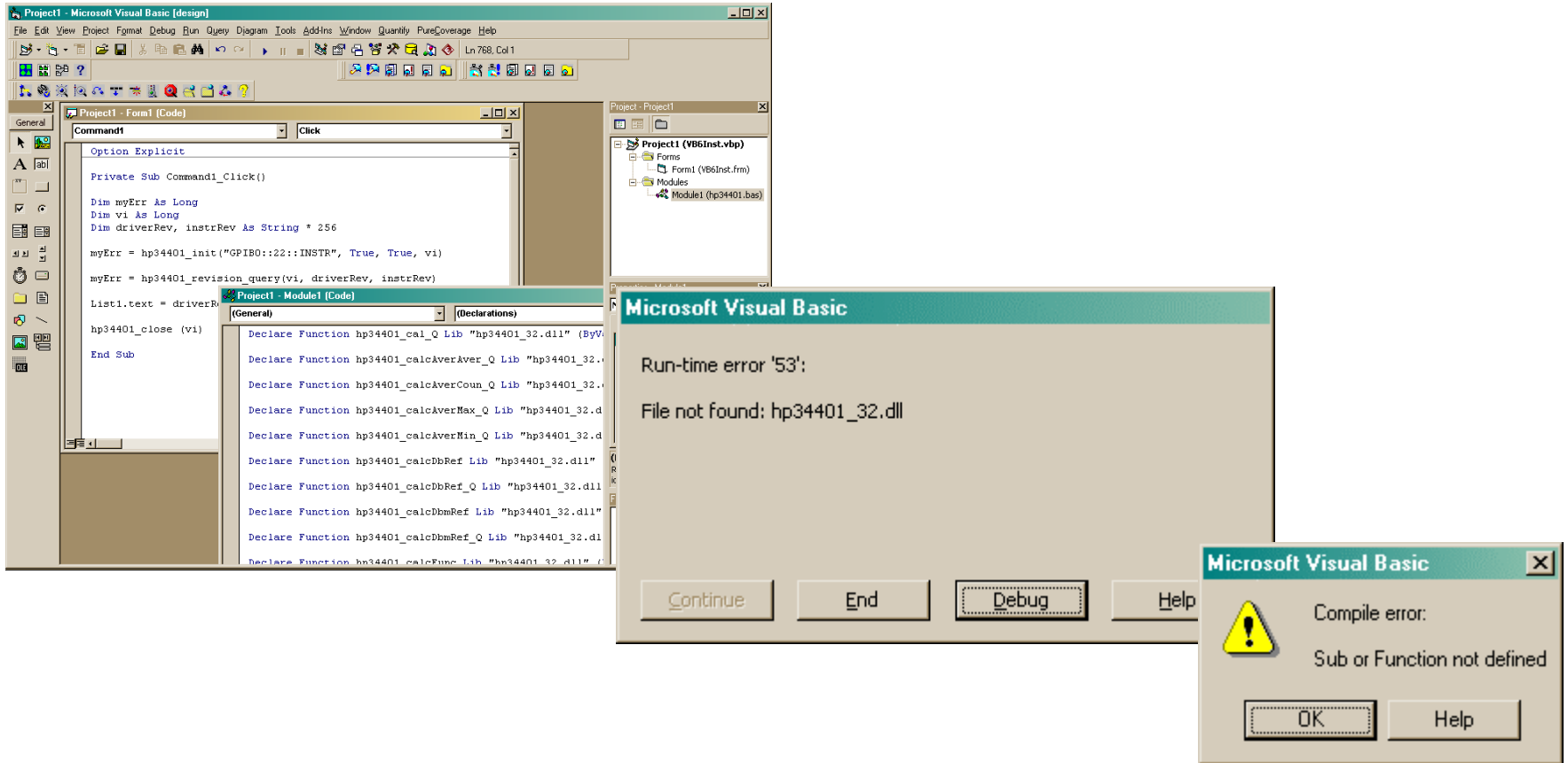


Troubleshooting I/O problems



Complicated?

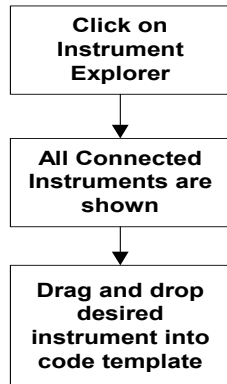
The Old Way



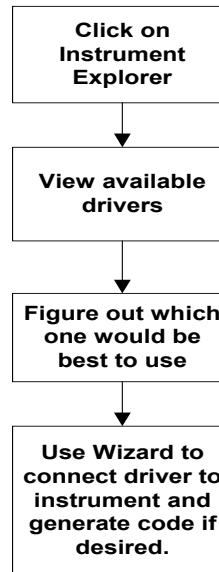
Manual Process

With the T&M Toolkit

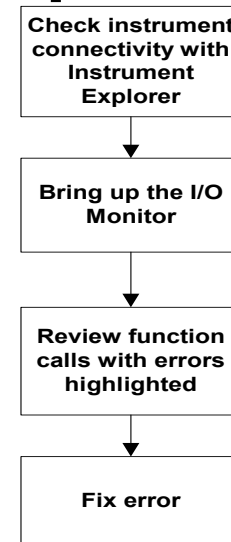
Connecting to an Instrument



Using Instrument Drivers



Troubleshooting I/O problems



Simpler!

T&M Programmers Toolkit

The screenshot displays the Microsoft Visual Basic .NET IDE with the T&M Programmers Toolkit integrated. The interface includes a menu bar (File, Edit, View, Project, Build, Debug, Tools, T&M Toolkit, Window, Help), a toolbar, and several panes:

- Agilent Instrument Explorer:** Shows a tree view of instrument configurations including GPIBO, ARB (:::10), DMM (:::22), DmmDirectIO, HP34401, PS (:::5), and HP661X. A blue circle highlights this pane.
- Configuration File Details:** A blue box showing details for the configuration file, including the path (C:\Program Files\IVI\Data\IviConfigurationStore.xml) and the config server revision (1.3.0.25).
- Code Editor:** Displays the code for Form1, including a Private Sub Button1_Click method. A red circle highlights the code editor.
- Class View:** Shows the class hierarchy for TMTToolkit1, including Form1 and its methods (Button1_Click, Dispose, InitializeComponent, New). A green circle highlights this pane.
- Solution Explorer:** Shows the project structure, including Visual Studio .NET, MSDN Library, VSIP, Help Integration Sample, and Agilent T&M Programmers Toolkit.
- Output and Debug Windows:** The Output window shows the application's execution, and the Debug window shows the loaded assemblies, including the Agilent T&M Framework.

The code in the code editor includes the following snippet:

```
Public Class Form1
    Inherits System.Windows.Forms.Form

    Windows Form Designer generated code

    Private Sub Button1_Click(ByVal sender As System.Windows.Forms.Button)
        ' Wizard Generated
        ' This code creates and initializes an instance of the instrument
        ' and looks up session settings from Configuration File
        Dim myHp34401 As Agilent.TMFramework.InstrumentIO.Configuration
        CType(Agilent.TMFramework.InstrumentIO.Configuration.FromFile(
            "HP34401"), Agilent.TMFramework.InstrumentDriver)

        ' User Generated
        Dim driverRev, instrRev As String

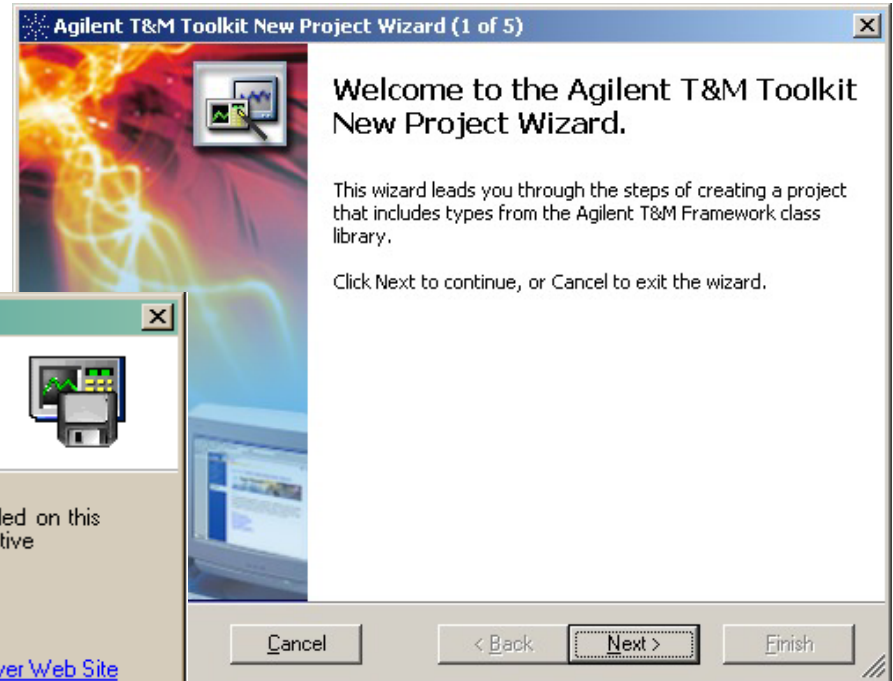
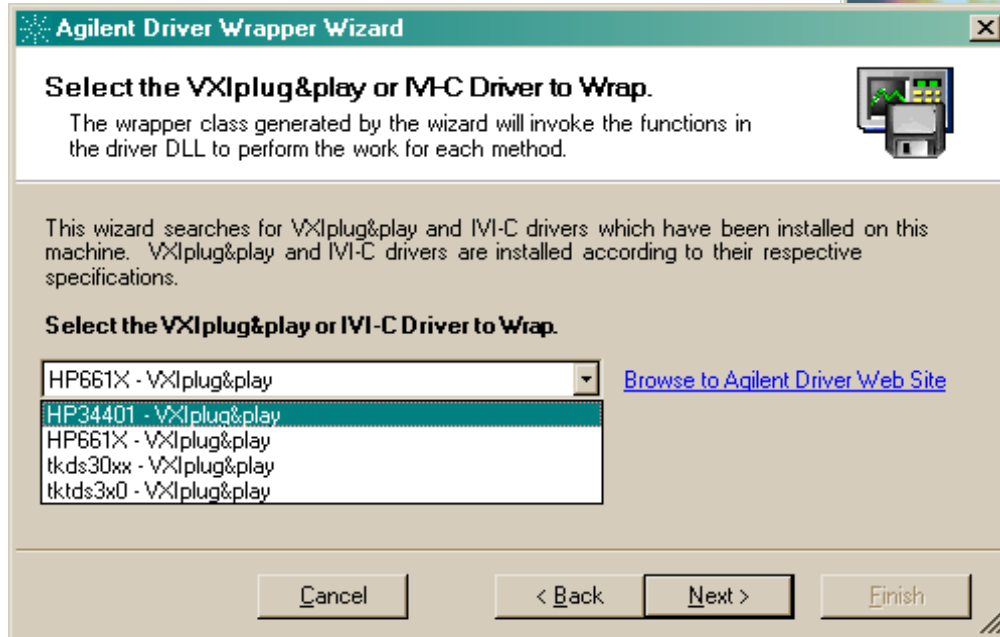
        myHp34401.rev = RevisionQuery(driverRev, instrRev)
    End Sub
```

Fully Integrated into the VS.NET IDE



Wizards

- New Project Wizard
- Instrument Session Wizards
- Driver Wrapper Wizard



Generate and Insert Code

Instrument Explorer

The screenshot shows two windows from the Agilent Instrument Explorer application. The main window, titled "Agilent Instrument Explorer", displays a tree view of instrument configurations under "JMH101 Master Configuration File *". The tree includes a "GPIB0" folder containing a "DMM (::22)" instrument. A context menu is open over the "DMM (::22)" instrument, showing options: "Instrument Properties", "Add Instrument Session...", and "Delete". Below the tree view is an "Instrument Details" panel for the selected "DMM" instrument, showing the following information:

- Name: DMM
- Description: My 34401
- Resource Name: GPIB0::22::INSTR
- Connection Status: Identified successfully
- IDN Response: HEWLETT-PACKARD,34401A,0,3-1-1
- Primary Address: 22
- Secondary Address: None

The second window, titled "Agilent Instrument Session Wizard for 'DMM'", is a wizard for selecting the session type. The title bar includes the text "Agilent Instrument Session Wizard for 'DMM'". The main heading is "Select Type of Instrument Session" with the instruction "Choose how you want to communicate with the instrument." There are two radio button options:

- Driver Session: Instrument not identified, unable to find installed driver. Recommend selecting from installed drivers or using DirectIO.
- DirectIO Session (using SCPI or ASCII commands)

Under the "Driver Session" option, there is a section titled "Select from All Installed Drivers:" with a dropdown menu. The dropdown menu is open, showing a list of drivers:

- <Select a Driver>
- HP34401 - V\Iplug&play
- HP661X - V\Iplug&play
- tkds30xx - V\Iplug&play
- tktds3x0 - V\Iplug&play

To the right of the dropdown menu is a link: [Browse to Agilent Driver Web Site](#). Below the dropdown menu is a link: [Help Choosing Between Driver and DirectIO Sessions?](#). At the bottom of the wizard window are four buttons: "Cancel", "< Back", "Next >", and "Finish".

Quickly Find and Connect to Instruments

Instrument Utilities

The screenshot shows the Agilent IO Monitor application window. The title bar reads "Agilent IO Monitor". The menu bar includes "File", "View", "Monitor", and "Help". Below the menu bar is a toolbar with icons for file operations and execution. The main area displays a log of I/O operations with the following columns: Time Stamp, Program, Address, I/O Layers, Function Call, I/O Data, Ret Val, and Time (ms).

Time Stamp	Program	Address	I/O Layers	Function Call	I/O Data	Ret Val	Time (ms)
15:01:08.463	InteractiveIO.exe	GPIB0::22::INSTR	Agilent VISA	VISA::vWrite	*IDN?	0	112.083
15:01:08.527	InteractiveIO.exe	gpib0,22	SICL	SICL::iwrite	*IDN?	0	31.122
15:01:08.551	InteractiveIO.exe	gpib0,22	SICL Detail	SICL_B::tulip_write	*IDN?	0	1.602
15:01:13.222	InteractiveIO.exe	GPIB0::22::INSTR	Agilent VISA	VISA::viRead	HEWLETT-PACKARD,3440...	0	53.533
15:01:13.223	InteractiveIO.exe	gpib0,22	SICL	SICL::iread	HEWLETT-PACKARD,3440...	0	40.447
15:01:13.230	InteractiveIO.exe	gpib0,22	SICL Detail	SICL_B::tulip_read	HEWLETT-PACKARD,3440...	0	29.147

Below the log, the application shows details for the selected operation: "SICL_B::tulip_read - Process ID 2424; Thread ID 2520".

Parameters:

Name	Type	Value
err	ret: int32	0
drvrddata	in: int32	48259496
flags	in: int32	74
timeout	in: uint32	5000
termchr	in: int8	0
*buf	out: *pointer...	0xbfec8c/*

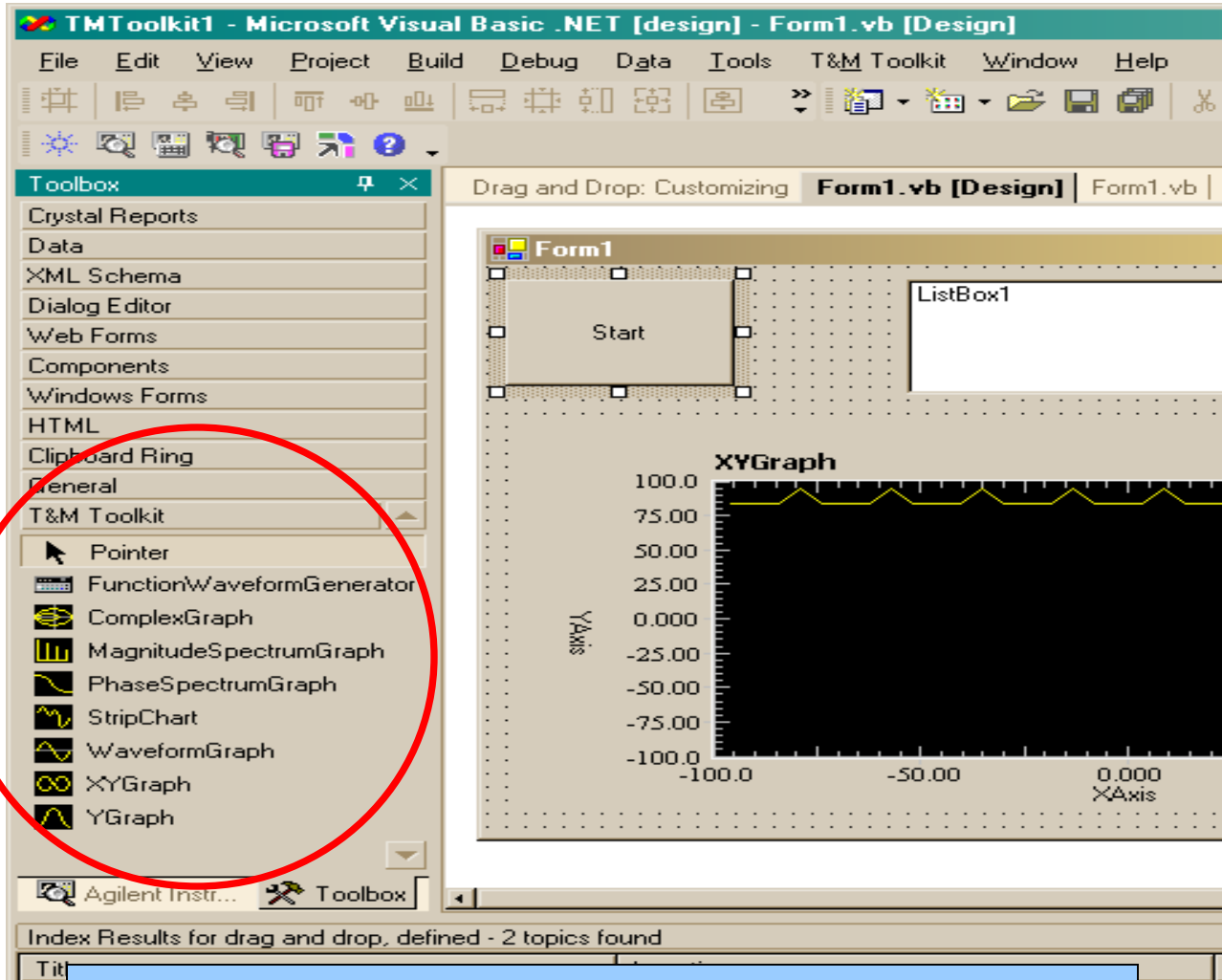
Output:

Offset	Hexadecimal	ASCII
00000000	48 45 57 4c 45 54 54 2d	HEWLETT-
00000008	50 41 43 4b 41 52 44 2c	PACKARD,
00000016	33 34 34 30 31 41 2c 30	34401A,0
00000024	2c 33 2d 31 2d 31 0a	,3-1-1

Easily Debug Instrument I/O



Data Visualization



Access to Components via the Toolbox

Summary

- **.NET provides the latest and most advanced Windows development environment**
 - Faster, easier, more robust application development
 - More capabilities to chose from
- **Agilent T&M Programmers Toolkit provides many new and important features:**
 - Instrument connectivity, debugging, and monitoring
 - Data Visualization

Visual Studio .NET with Agilent T&M Toolkit helps you be more productive and develop higher quality applications.