# IntuiLink connectivity software and USB/GPIB interface for Windows
(... what is in the background)

Agilent **IntuiLink** is a free connectivity software solution that links test and measurement instrument data to PC applications. IntuiLink consists of three key elements:

- PC Application **toolbar**: allows easy transfer of measurement data and images from instruments into PC (Microsoft® Word and Excel) with little or no programming.
- Standalone **programs** (Data Capture from scope, Waveform Editor for ARB generator)
- Active X/COM *programming* objects to simplify automating test.

The Agilent 82357A **USB/GPIB Interface** provides a direct connection from the USB port on your laptop or desktop PC to GPIB instruments. There are no switches to set, no PC cards to install, and no external power supplies required. Since the 82357A is a standard *Plug and Play* device, it is automatically detected and configured when connected to the computer USB port. The interface is supported ONLY on Windows 98(SE)/Me/2000/XP Professional. Supported languages and applications:

- Applications (with **IntuiLink**) – Excel 97 and 2000; Word 97 and 2000
- Software development – VB 6.0, VC++ 6.0, Visual Studio 6.0, VEE 6.0 or greater, Basic for Windows, LabVIEW 6.0 or greater
- Problems have been observed with *standby mode* operation (laptop PCs). You should **turn off standby mode** on your computer when using the Agilent IO Libraries.
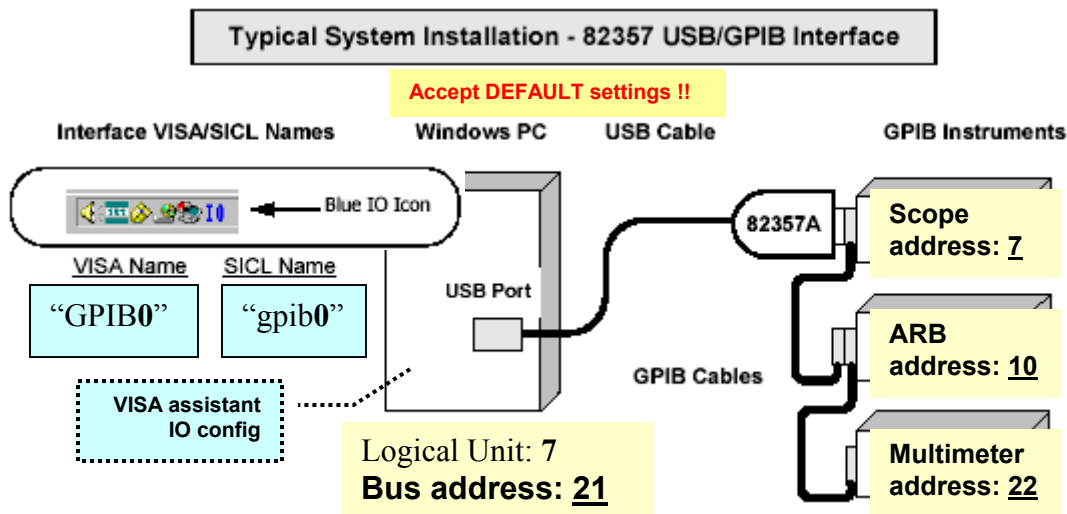
After the 82357A is successfully installed and configured, the interface should act as a **transparent** interface for programming GPIB instruments.

Note:

VISA = **V**irtual **I**nstrumentation **S**oftware **A**rchitecture is an IO library designed according to the VXI*plug&play* System Alliance that allows software developed from different vendors to run on the same system.

SICL = **S**tandard **I**nstrument **C**ontrol **L**ibrary is an I/O library developed by Agilent that is portable across many I/O interfaces and systems. SICL is a modular instrument

communications library that works with a variety of computer architectures, I/O interfaces, and operating systems.

The recommended method for connecting a GPIB system is linear with the system controller (PC) at one end of the system. However, a GPIB system can also be connected together in a star, linear, or a combination configuration as long as the total number of devices on the system is <15. You may want to record the primary **GPIB address** of the attached instrument for future programming use.

VISA Interface Name Symbolic name that VISA uses to uniquely identify this GPIB interface. The default VISA Interface Name is **GPIB0**.

SICL Interface Name Symbolic name that SICL uses to uniquely identify this GPIB interface. The default Interface Name is **gpib0.**

Logical Unit Number (default **7**) that SICL uses to uniquely identify this interface.

Bus Address It is address of this GPIB interface *controller* on the GPIB bus. It is usually **21** if the GPIB interface is a System Controller.

If several devices exist on a bus, be sure each has a unique **GPIB bus address**.

A survey of the ATE (automatic test equipment) standards:
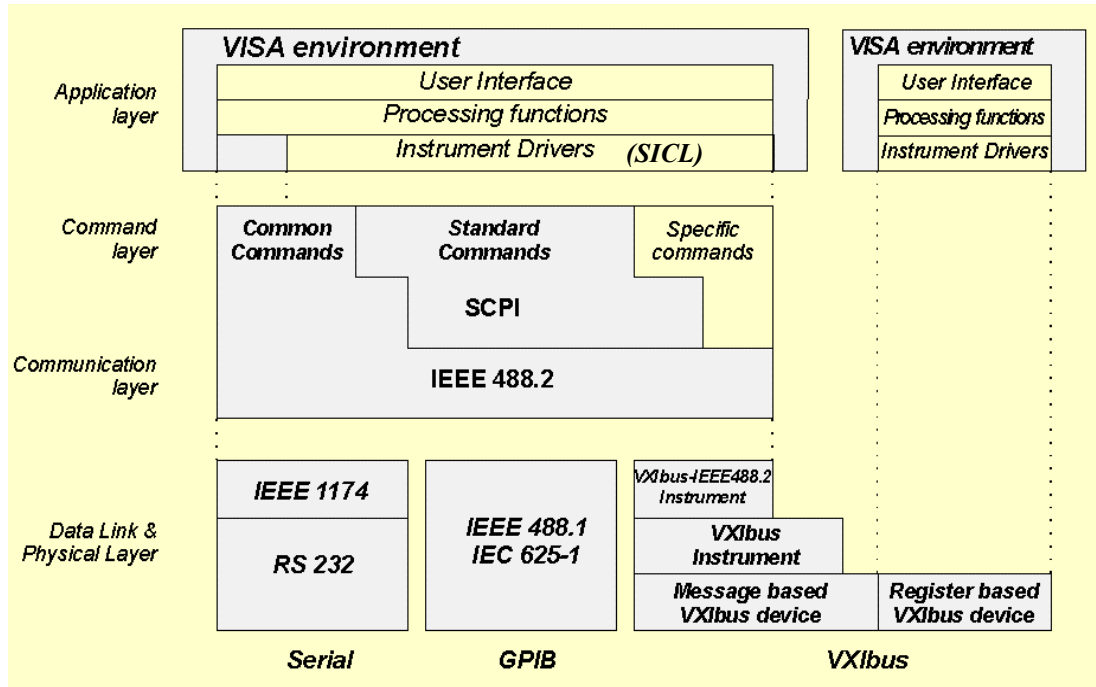
Note:

Key technologies for the remote operating of instruments are the **SCPI** (**S**tandard **C**ommands for **P**rogrammable **I**nstruments) and its underlying **IEEE 488.2** standard

VXI = VMEbus Extension for Instrumentation

On the lowest level there is the definition of the interface platform itself. This can be the well known **IEEE 488.1/IEC 625-1** interface, commonly called **GPIB (General Purpose Interface Bus)**, but other type of interface media of later date, like VXI or RS 232 with IEEE 1174, can be associated also with this layer. The functionality found in this layer, defines the electrical and mechanical properties of the interface medium and contains protocols for establishing the data path between the controller and the instruments. These lower layer standards do *not* deal with the contents of the data itself.

By defining the message syntax (spelling), the **IEEE 488.2** provides a concept that meets the demands for instrumentation systems. But IEEE 488.2 is more than a syntax definition only. It

was clearly shown by the experiences of the instrument manufacturers who took the initiative to this standard, that a protocol was needed to guarantee a reliable communication, which would not hang up under any condition. Therefore, the so called <u>Message Exchange Protocol</u> - MEP - was established. This protocol is based on the principle that 'an instrument may not send data until it is asked for'. For that purpose, IEEE 488.2 distinguishes between commands and queries. This concept is anchored in the language construction, since commands and queries follow different syntax's.

The definition of the semantics (meaning) of program messages is *not* part of the IEEE 488.2 standard. This was left to <u>higher level</u> standards like **SCPI**, or to the instrument designer. However, the so called 'common commands' is the exception to this rule.

The main benefit of the **VISA** concept is that it establishes a solid and rigid hard and software environment for <u>virtual instrumentation</u> and allows end users to port their applications among different tools. The VISA I/O drivers access the interface boards regardless their manufacturers.

One way to select the I/O software for your application is to use the product life cycle approach. As shown in this figure, as the product life cycle moves from R&D to Manufacturing, tasks for the product typically change from Product Design to Product Characterization to Product Test. The associated programming levels range from **no** programming to *minimal* programming to **extensive** programming.

Agilent **IntuiLink** is typically used for Product Design or Product Characterization:
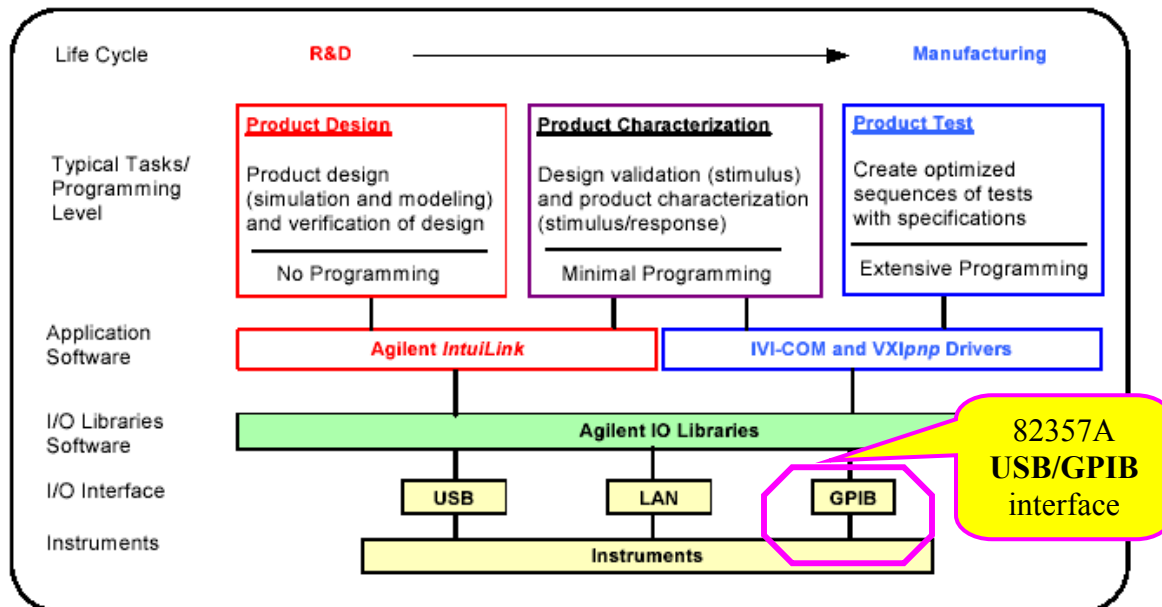
Note:

IVI = **I**nterchangeable **V**irtual **I**nstruments

  IVI-COM is the IVI driver architecture standard that is based on Microsoft's ubiquitous COM standard. IVI-COM drivers work in industry standard software development environments, like Visual Basic and Visual C++, and proprietary test and measurement software development environments, like National Instruments LabVIEW, which supports COM.

VXIpnp = VXI plug and play

A **LAN** is the recommended method to connect instruments together in applications such as new test systems. **USB** is a quick and easy way to connect instruments to PCs on a benchtop. Typically, you can use USB to connect instruments to a PC for benchtop R&D testing.
GPIB should be used only in a system that is **already** using GPIB to connect instruments.

1) _Software and IO libraries:_

Download sources

- '**IntuiLink** Connectivity Software' WEB page,
- 'Function/ARB generator' WEB page (ArbGen SW), and
- '82357A USB/GPIB Interface for Windows' (**IO libraries**) WEB page

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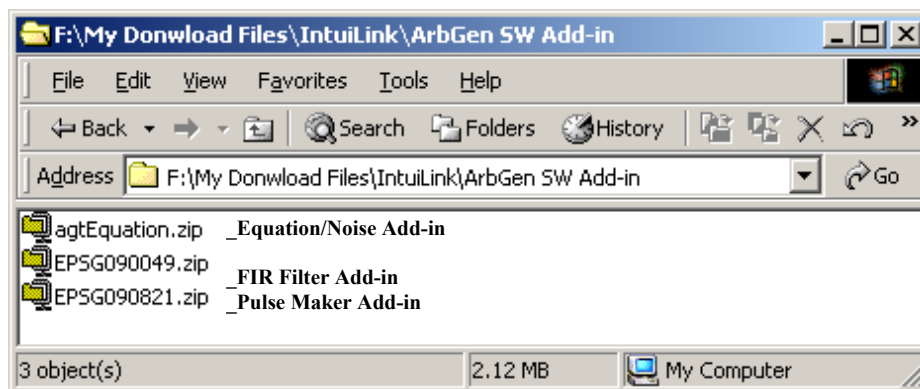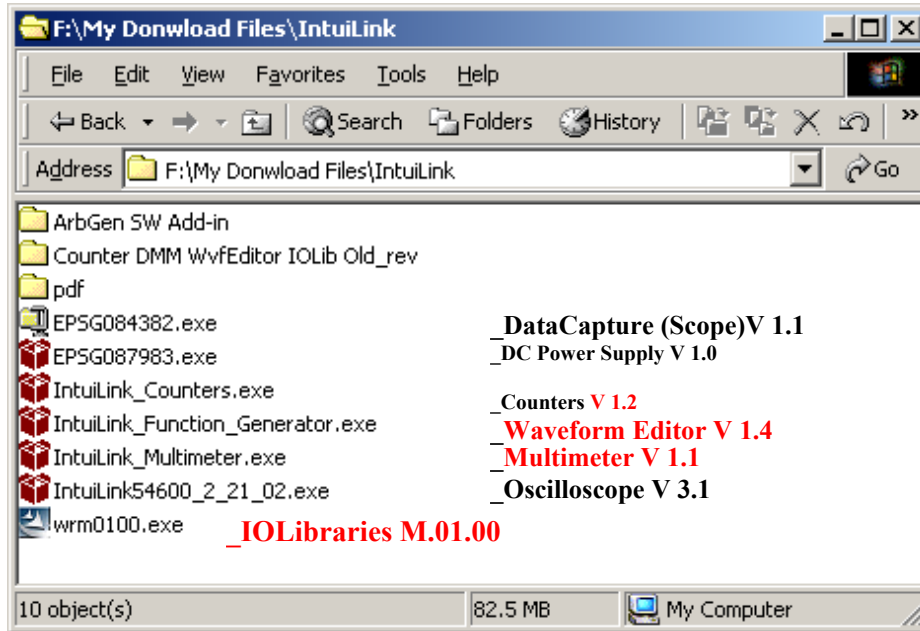
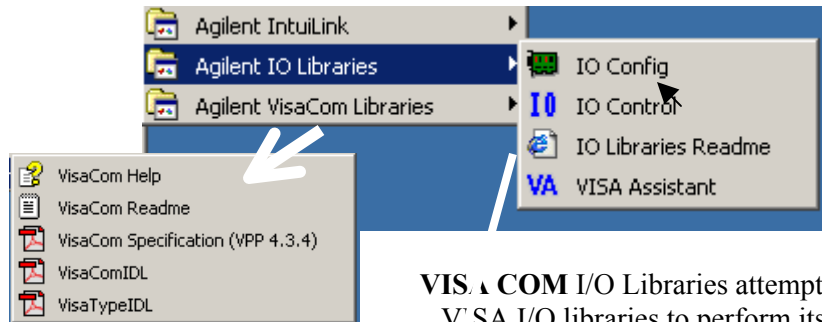Links to instruments and software, see:

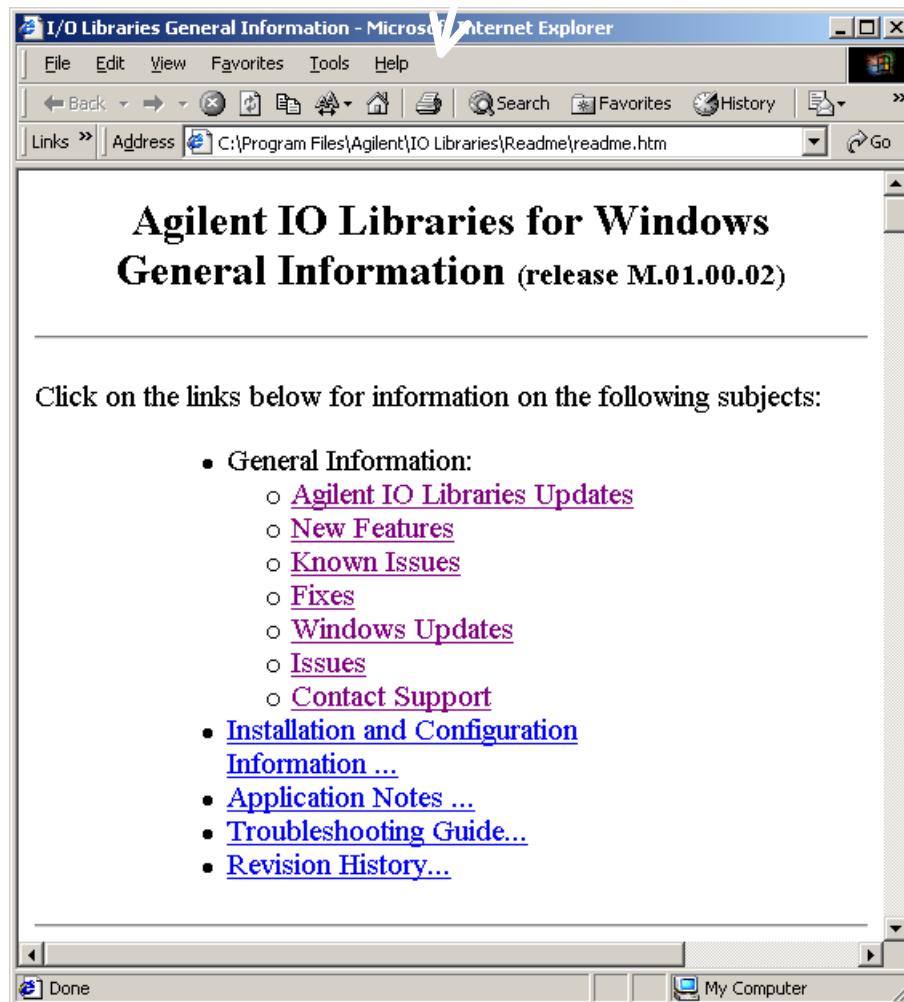**http://www.hit.bme.hu/people/papay/edu/lab/tools.htm**

2) A sample configuration:

Win2000, Office 2000

- ## *IO libraries*

(**a**) Start | Programs …

VISA COM I/O Libraries attempt to use the Agilent VISA I/O libraries to perform its I/O operations.

(**b**) Blue **IO** icon (IO control):
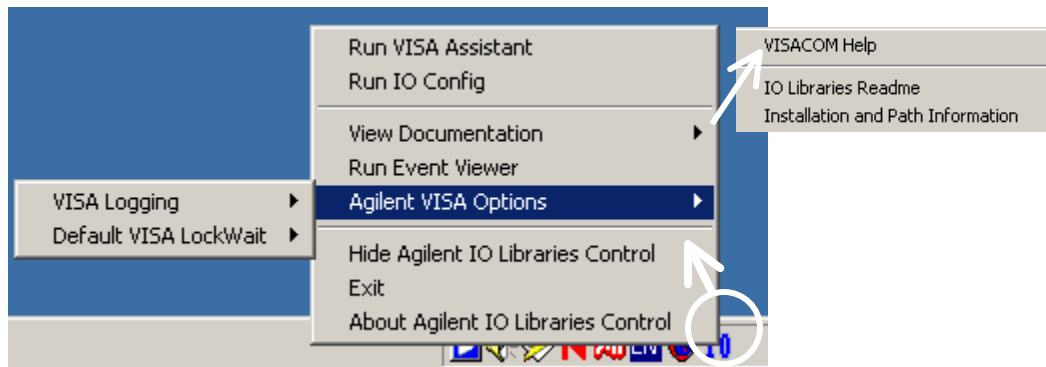
VISA <u>Assistant</u>:

> VISA Assistant can automatically detect and assign VXIplug&play
> Instrument Drivers to Instruments. VISA Assistant can also be used to
> send and receive strings to instrument, which support formatted I/O. (For
> other instruments, VISA Assistant allows you to read and write memory
> areas. VISA Assistant also describes attributes that are associated with an
> instrument.)
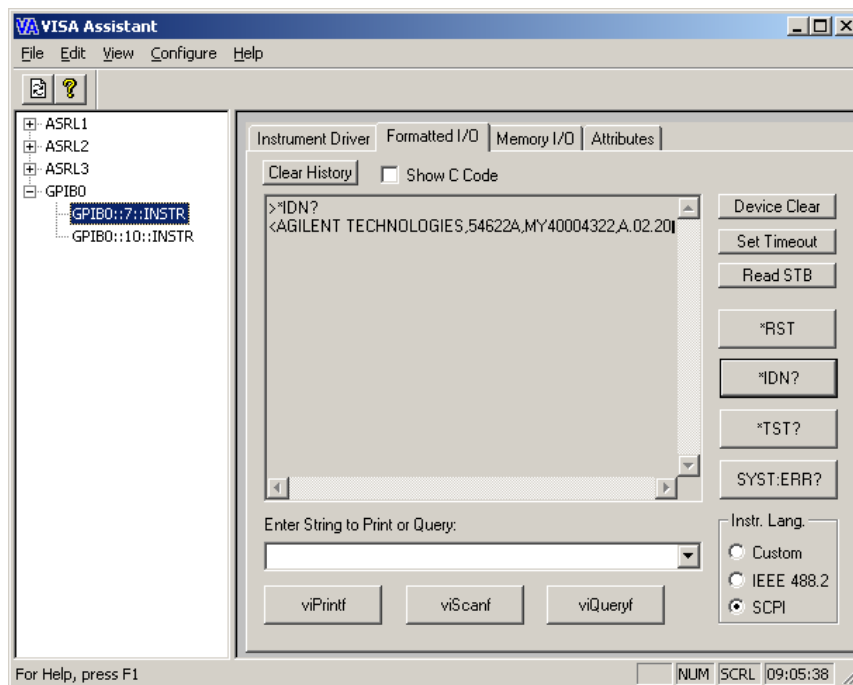
IO <u>config</u>:
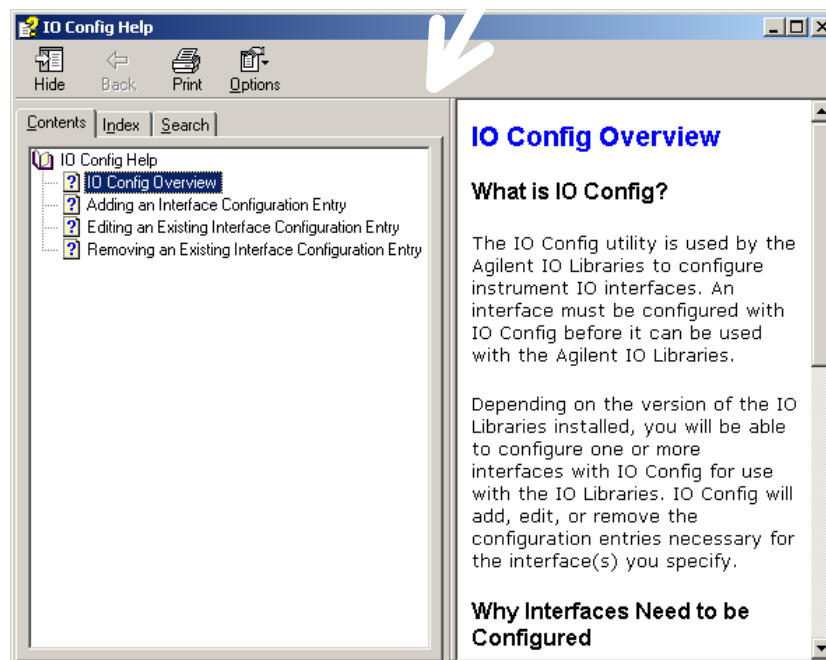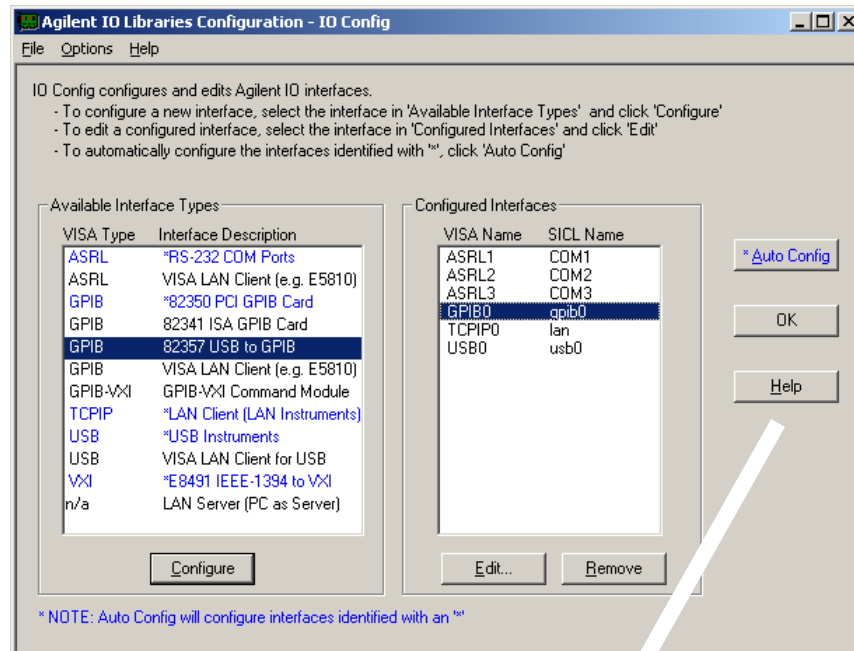
- ## *IntuiLink components*

  Start | Programs …

  - 54600 **Oscilloscop**e Toolbar | Data Capture:
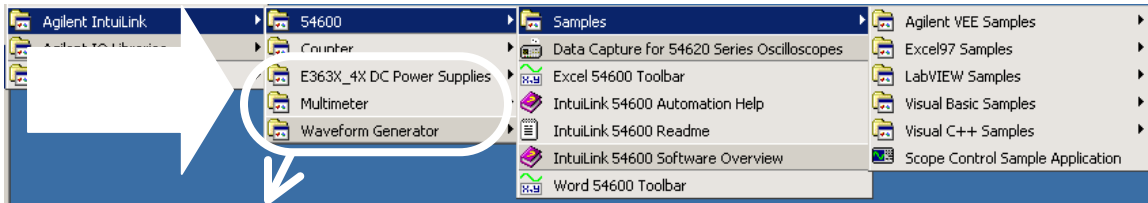
  - Function/ARB **Generato**r Waveform Editor:
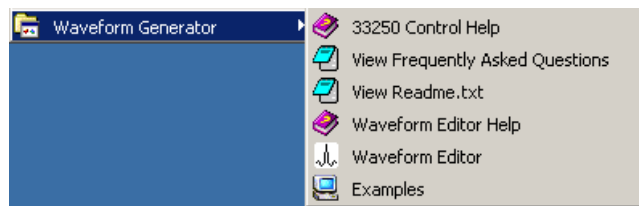
  - **Multimeter** Toolbar:
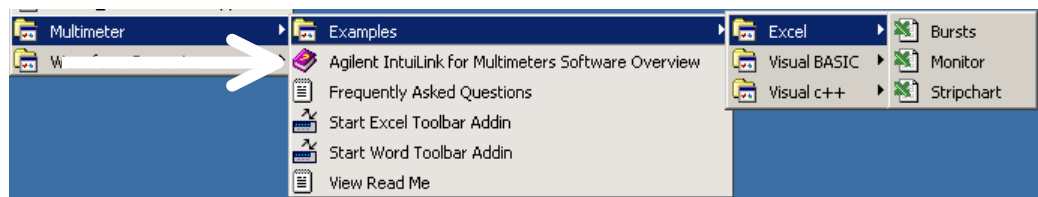
  - E363X_4X DC **Power Supply** Toolbar:
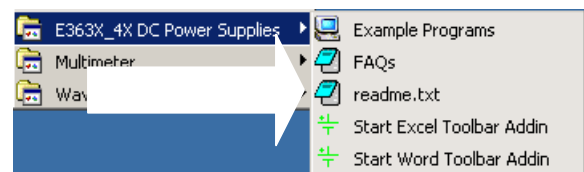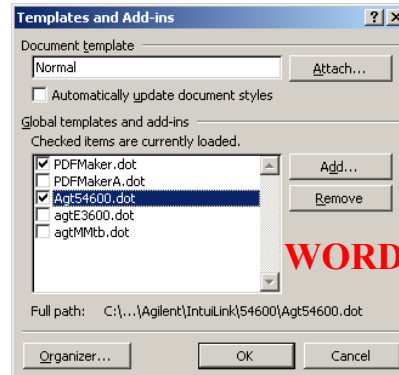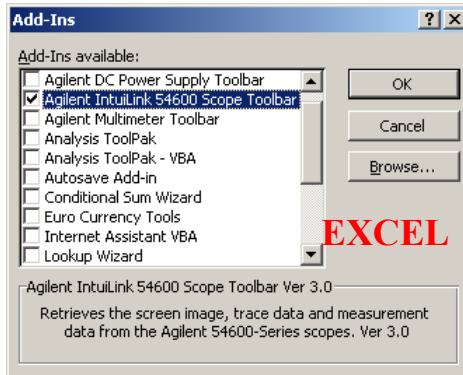
3) For the non progammer:

IntuiLink <u>folder</u> on desktop:
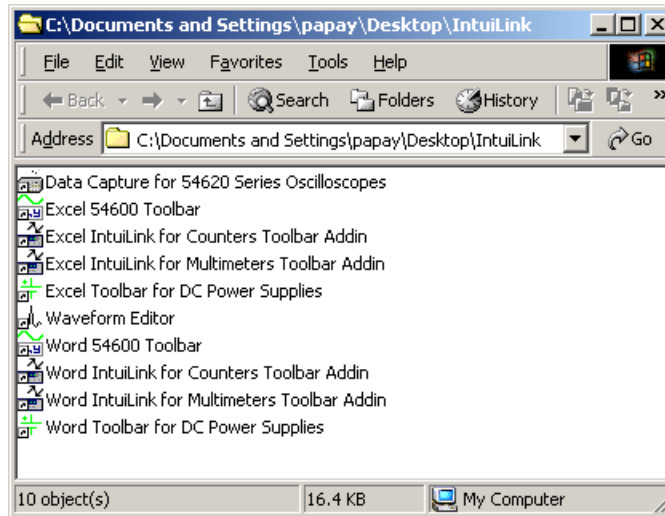
Using:

1. Simple **Toolbar** Add-Ins for <u>Excel</u> and <u>Word</u>.

> The Toolbar will automatically load when you open the application, or use the **Tools | Add-Ins** menu to *add* or *remove* the toolbar from the application.

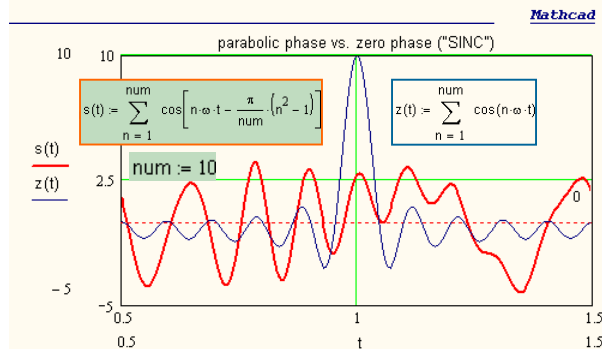2. **Standalone** programs:

<u>Data Capture</u> (oscilloscope):
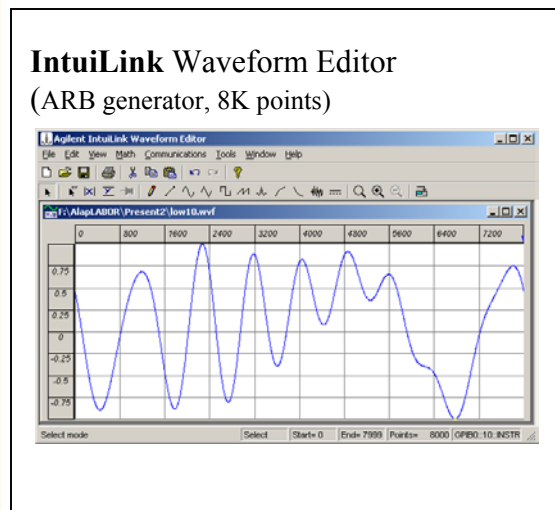

<u>Waveform Editor</u>
(ARB generator):
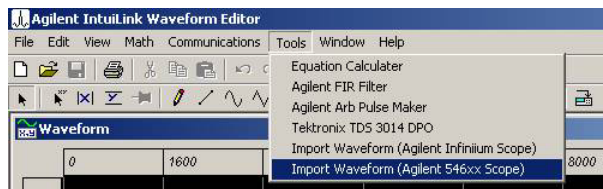
Example:

EXCEL /
IntuiLink Toolbar:

WORD /
IntuiLink Toolbar: