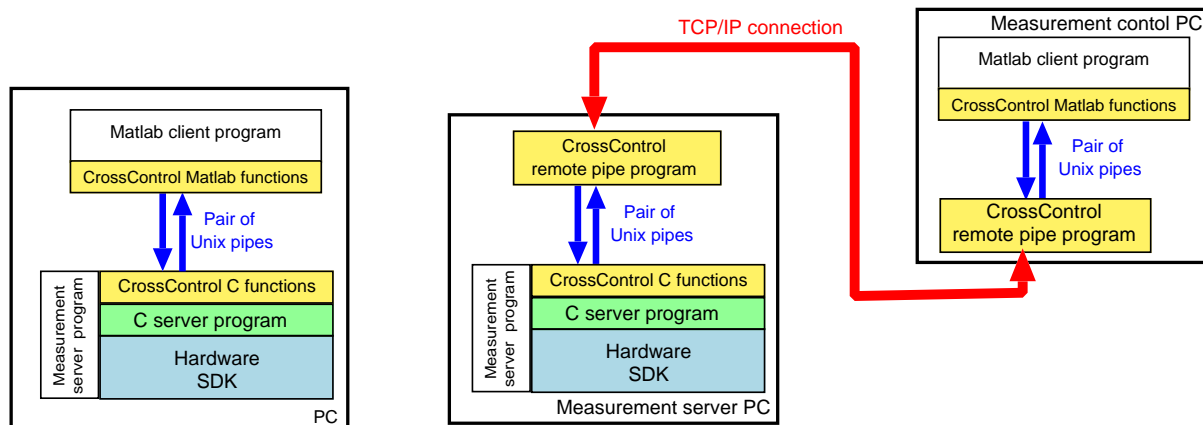


Overview

CrossControl is a software kit for communication and especially controlling measurement hardware and acquiring data from various high-level data evaluation languages over a computer network. Its purpose is to help building abstract and easily programmable IDL¹ and Matlab² interfaces for engineers and physicists and hiding the programming and control details of the hardware at a C server program level. The communicating programs can reside in one computer or on interconnected ones running the same or different different operating systems. The package is available for Linux and Windows³ NT, 2000, XP.

A modern measurement hardware is usually delivered with a C/C++ language Software Development Kit (SDK) for programmable control. Building a system of multiple hardware components distributed in many computers over a network needs substantial programming skills. On the other hand engineers and physicists need a flexible interface where procedures can be easily modified without need to know hardware details.

CrossControl helps this layering of tasks by providing sets of inter-operable communication routines in IDL, Matlab and C and a network server program, which enables communication between these interfaces over Internet. Low-level hardware control programs can be written in C, while control to these hardware server programs is available in IDL/Matlab/C. The server and client programs can be run on the same or different machines. Connection to multiple servers from a single client program is also possible.



Local (left) and remote (right) connection using CrossControl.

The interface between the C, IDL and Matlab routines is implemented as a pair of pipes. This method ensures access from many languages as only simple file read/write operations are needed. The **CrossControl** remote pipe program extends this local connection over a TCP/IP network without need for any change of the programs. Pipe and machine names and other parameters can be set using configuration files. The measurement server program and the remote pipe program can be configured to run automatically and thus implement a network measurement server.

¹IDL is trademark of Research Systems Inc.

²Matlab is a trademark of Mathworks Inc.

³Windows is a trademark of Microsoft Corp.

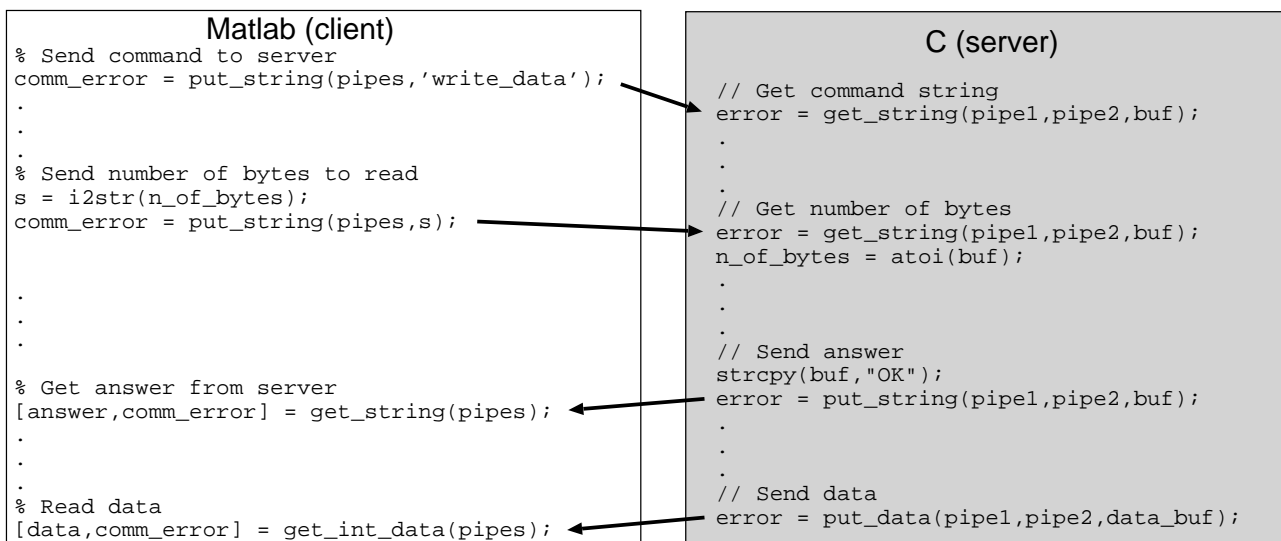
Package contents

All programs are provided with source code and examples. Communication routines implement acknowledged, error-free transmission. Both blocking and timeout modes are available.

- C pipe access routines: `get_string`, `put_string`, `get_data...` and test program.
- Matlab pipe access routines and test program.
- IDL pipe access routines and test program.
- Configuration file access routines.
- Remote pipe program.
- Example programs and documentation.

Example

The following code fragment shows an example for communication between C and Matlab using CrossControl.



Example program code for reading measurement data from Matlab program.

Performance As an example measured local communication speed is shown in the table below. The values were measured on an 850 MHz Pentium processor.

System	Message round trip delay	Data transfer rate
Linux 2.4.18	50 μ s	360 Mbyte/s
Windows 2000	100 μ s	50 Mbyte/s

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