UNIVERSAL TEST SW FOR FIRE PANEL TESTER

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ABSTRACT

The goal of this project is to develop universal software for communication and testing of slave cards developed for Tyco fire panel. The solution consists of a standard RS232 or USB-based communication software servicing a standard set of commands and optional communication protocol of the system master unit, plus an extension, based on selected scripting language, allowing any HW engineer to be able quite simply and quickly create a new model of any new slave card and perform selected set of tests of the card at the maximal possible level. The test must include automatic testing of various code and data memory configurations and all results must be automatically logged.

1. INTRODUCTION

In this project, I'm dealing with the development of a new generation of test software. The project aims to develop universal software for communication and testing of plug-ins for Tyco fire panel. Microsoft technology .NET ("dot net") and C# programming language are the key technologies utilized during the design of the presented new generation of testing software.

This project was submitted by Tyco Fire & Integrated Solutions s.r.o. and is supervised by Petr Pfeifer from Tyco, and Ondřej Sajdl, the Department of Microelectronics FEEC VUT Brno.

2. ANALYSIS

The project description from Tyco Fire & Integrated Solutions s.r.o. includes development of a new test board for fire panels (both hardware and firmware), and development of a new generation of scanning software for the PC. Because the project is quite complex, it was divided into two main parts: PC software and hardware design including firmware for both microprocessors on the test board.

2.1. SOFTWARE

The main task of my work is to create a new generation of test applications for MS Windows. This application automatically searches for all available and responding cards on fire bus at selected communication speed. Applications should be universal and working under many versions of MS Windows.

2.2. COMMUNICATION WITH TEST BOARD

In our application, RS232C or USB can selected for communication between PC and test card (tester) with detectors connected to it. RS232C is kept in the design for backward compatibility issues; USB is widely used standard and it is available on all today's PCs. In the case of USB connection, HID (Human Interface Device class) was selected as the basic protocol. It supports easy implementation of the system functions and fully plug&play with automatic detection since Windows 98 while no special drivers are required.

2.3. XML LANGUAGE

Extensible Markup Language (XML) is a simple, very flexible text format derived from SGML (ISO 8879). XML's purpose is to aid systems in sharing structured data, to encode documents and to serialize data. XML, in combination with other standards (e.g. XSL), makes possible to define the content of a document separately from its formatting, making it easy to reuse that content in other applications or for other presentation environments. Most importantly, XML provides a basic syntax that can be used to share information between different kinds of computers, different applications, and different organizations without needing to pass through many layers of conversion. XML is planned to utilize for the main application settings (to adapt graphical interface and its functionality) and for exporting received data from devices.

2.4. GUI

As an important part of this project, my task was to develop a graphical interface for Windows which will integrate all functions necessary for testing of various plug-in cards for Tyco fire panel. The interface will allow automatic control of all available cards, configuration and testing procedure implementation and run for each tested module.
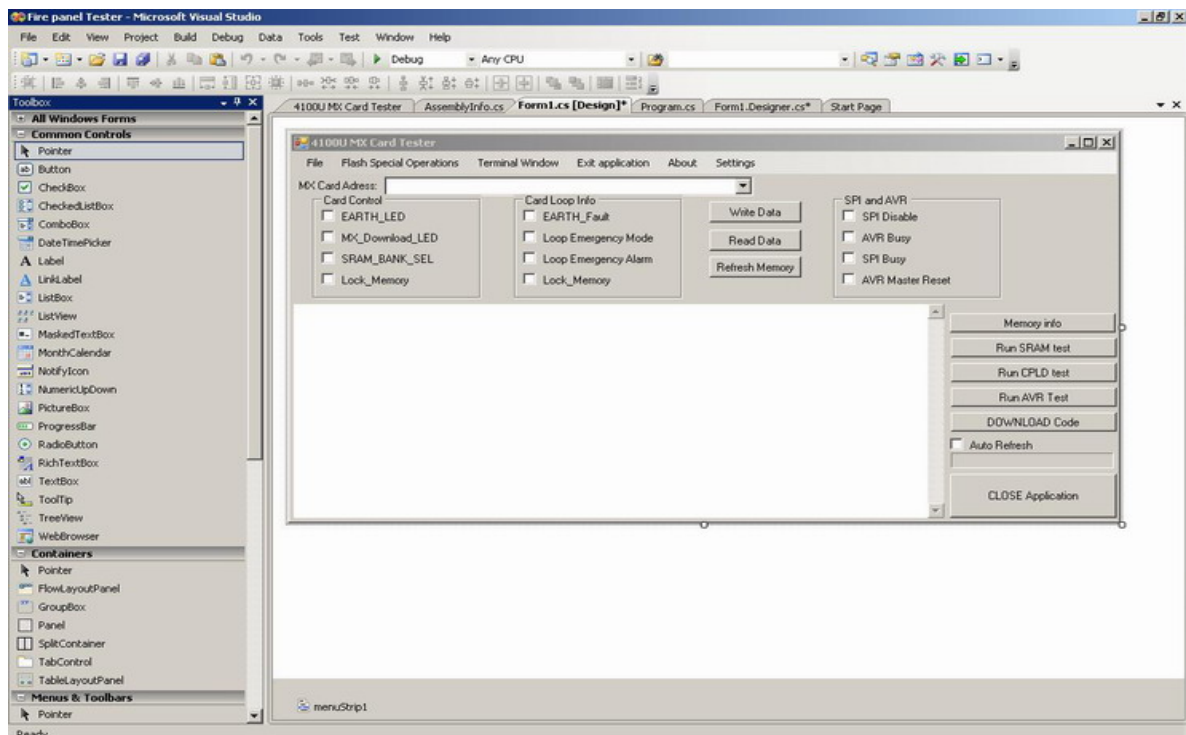

Figure 1: Visual Studio development environment with and example of GUI

2.5. DEVELOPMENT OF FIRMWARE

All the firmware for both microprocessors is quite complex. Hence, we have decided to write boot loaders for both microcontrollers as the first step. This small piece of software resides at the lower layers and any other or new software can be written into the FLASH memory without the need of compilation of the entire code. The code, servicing routines or various tables can be written separately utilizing USB or RS232 only, without the need of any special programmer for both processors. It speeds-up the firmware development, parallel programming of individual parts and also increases the code clarity.

3. CONCLUSION

The presented software for communication with various components of fire detection system, panel and sensors is just under development. When completed, it will replace the old solution while offering new GUI, automatic and simple creation of test procedures and important possibility of further extensions.

REFERENCES

[1]Žák, M. XML-začínáme programovat. Praha: Grada Publishing, 2003, ISBN 80-247-0565-6

[2]Kosek, J. XML pro každého-podrobný průvodce. Praha: Grada Publishing, 2000, ISBN 80-7169-860-1

[3]Sharp, J. Microsoft Visual C# 2005 krok za krokem. Brno: Computer Press, 2006, ISBN 80-251-1156-3