

## Linux GUI Program for control of Mesytec Modules using GLADE Interface Designer

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### Introduction

Mesytec modules are used extensively in Nuclear physics experiments. Control of heterogeneous Mesytec devices can be effected using Mesytec's MRC-1 [1] which acts akin to a central controlling module.

In the present work, design and development of a Linux based GUI program for controlling Mesytec devices using GLADE [2] interface designer (version 3) and C programming language is described.

The developed program provides an integrated interface for setting and retrieving various parameters of Mesytec modules, in addition to the features of controlling MRC-1 itself.

### GUI design using GLADE

GLADE is a rapid application development tool for GTK+ toolkit and GNOME desktop environment. Glade is free and open-source software distributed under the GNU General Public License. It allows you to design interface using a visual approach and has bindings for numerous programming languages.

GLADE 3, used for designing the interface of Mesytec control program, describes the designed user interface using a XML file in GTKBuilder Format. GTKBuilder GTK+ object is thereafter used to build an interface from XML user interface definition. This approach allows loose coupling between user interface and logic of the program. Design changes can be made without tinkering with logic portion of program.

Mesytec Control program GUI is subdivided into four subsections. MRC Global settings and response window (Fig.1), amplifier control and neutron-gamma discriminator control and status bar. MRC-Global settings pane comprises of a group of controls which are used, inter-alia, to open a connection to MRC-1, scan

the two buses of MRC-1 for probing and listing the presence of Mesytec devices.

Further, it allows switching on/off the remote control feature of Mesytec device connected to MRC-1 on any of its two buses.

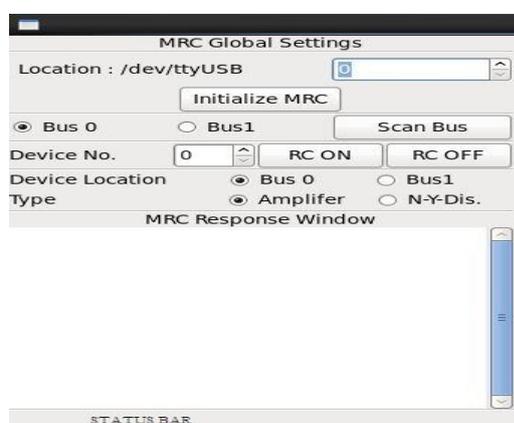


Fig. 1: Program pane comprising the MRC Global settings and Response Window

Inputs to MRC-1 and outputs from MRC-1 are displayed in the MRC response window pane. Status of performed operations is available on status bar of the program.

### Program features

The Mesytec control program allows control of Mesytec MRC, Amplifier and Neutron-Gamma discriminator module.

For Mesytec amplifiers (MSCF-16) [1], the program allows to read as well as set values for threshold and pole-zero compensation for each of the channels. Shaping time and Gain can be set for amplifier in group of four channels. Also parameters like multiplicity, coincidence time, threshold offset, shaper offset and BLR mode and BLR threshold value can be read back and set.

For Mesytec neutron-gamma discriminator module (MPD-4) [1], the program, inter-alia, allows to set and read gain, threshold parameters. In addition, it supports fast mode activation and deactivation.

**Operational requirements**

MRC-1 has the capacity to control up to 32 Mesytec peripheral devices, maximum 16 on each of its two buses. Address of each of the peripheral device can be set through a rotary switch available on the device. On any MRC-1 bus, all peripheral devices should have a unique address to avoid collision. Hardware arrangement of computer, MRC-1 and peripheral devices is described in Fig. 2. The connection between computer and MRC-1 is through a USB connection. MRC-1 and peripheral devices are chained together through LEMO cables, T-connectors. Last Mesytec device at the end of the chain must be terminated with a 50 Ω resistance.

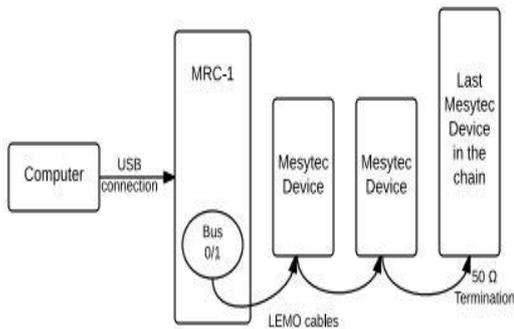


Fig.2 Physical connection between computer, MRC-1 and Mesytec devices

Mesytec control program resides in the computer. The flow of operation for controlling peripheral device is described in Fig. 3. Program establishes a connection to MRC-1 module by opening a channel of communication with it. Typically, a scan bus operation is, thereafter, done on a given bus of MRC-1 to get a listing of device type and remote control status.

Remote control (RC ON/OFF) feature (Fig.1), should be switched ON for a Mesytec peripheral device through the program before it can be controlled using MRC-1. Bus number, device number and module type is input for the desired peripheral device and parameters are read back/written from/to it.

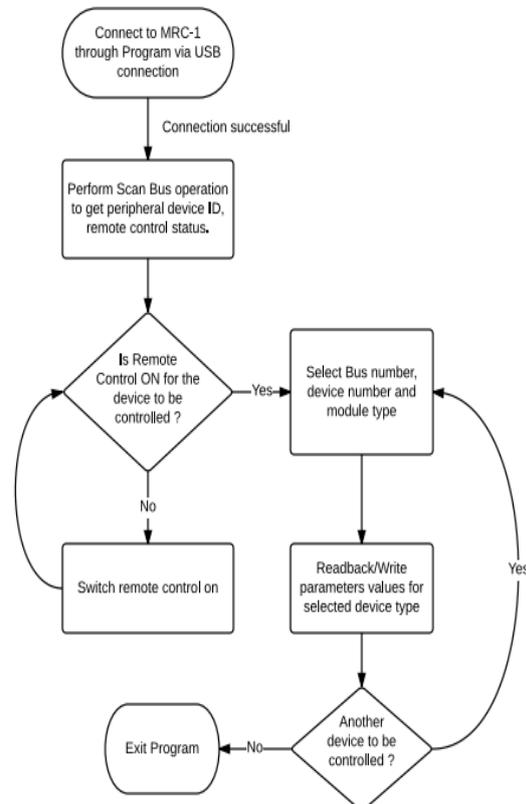


Fig. 3 Flowchart of program operation

**Conclusion**

The development was undertaken with the objective of simplifying the control of Mesytec modules viz. Amplifier (MSCF-16) and Neutron Gamma Discriminator (MPD-4) via Mesytec MRC1 module. Developed program, along with full source code, is available at [http://www.tifr.res.in/~pell/lamps\\_files/download.html](http://www.tifr.res.in/~pell/lamps_files/download.html).

**Acknowledgement**

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**References**

- [1] Mesytec MRC-1,MPD-4, MSCF-16, <http://www.Mesytec.com>
- [2] GLADE, <https://glade.gnome.org/>