Cable Tester design for NICA-MPD Platform

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Overview

The NICA-MPD experiment comes along with a lot of multi-device cable connections, therefore the results of research may depend on their quality.
Cable Tester - Requirements

- Conducting tests on most popular signal cables
- Software made using LabVIEW
- User interface for reviewing and managing test results
- May be implemented in standard RACK cabinet
NI myRIO board comes with 40 digital programmable input/output lines which will be used for the testing purposes.
The core of the algorithm checks response of digital input lines for each output pin set to HIGH, while other being set as LOW. Then it creates a resulting matrix that represents tested cable.

**LabVIEW – testing algorithm**
Connection Matrix

- Output of cable test
- Visual representation of connections
- Unique representation for each type of cable
User interface

EXECUTION OF TESTS

INDICATION OF RESULTS

MANAGEMENT OF CORRECT PATTERNS

ERROR INDICATION
NICA-MPD Platform
Cable Tester 1.0

Press "Start Test" button or myRIO physical button0 to conduct a cable test

"STOP" - Abort VI execution

Yellow Indicator - indicates whether testing is in progress

Run section
Engineer section
Service section
Printed circuit board

- 2 layer PCB, with THT-mounted connectors
- Identical PCBs: for input and output lines
- Connected with myRIO MXP connectors using 34-pin ribbon cable

Grzegorz Nakielny, WUT
RACK cabinets

• Standarized mounting of electronical equipment
• Used widely in teleinformatics
Front panel

• Two rows of connectors for cable testing purposes
• LED indicators and physical button for tests without PC
• USB socket for PC-myRIO connection
Front panel

- 1U height – RACK cabinet mounting
- Widened connector gaps for manufacturing imprecisions
- Joined with mounting plate using 7 M2 screws
Mounting plate

- Used as a base for mounting PCBs, myRIO and front panel
Assembly process
Assembly process
Assembly process
Assembly process
Summary
What has been accomplished?

• A complete design of Cable Tester for NICA-MPD Platform, including:
  • Software for myRIO board, made using LabVIEW
  • PCB layout for connecting cables for testing
  • Mechanical details for mounting in standardized RACK cabinets
Tasks to be done

• Manufacturing of a prototype
• Implementation of cable database for integration with EqDb
• Evaluation of designed solution
• Implementation of prototype in NICA-MPD Platform
Thank you for your attention

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Questions?

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