

MYC Command-router

Author: DK1RI

Version V01.11 20171109

This paper is published in <https://github.com/dk1ri> as well

Introduction

This paper describes the command-router and my principles when writing the program. I hope, that the documentation within program is sufficient.

Nevertheless for understanding the program you must understand the MYC principles and the protocol details. Description of working conditions for the command-router are distributed in the other documentation as well.

For more details of the MYC system please check the reference.

The program [12] is written in python and is developed using pycharm under windows

Definitions and formats

see <http://dk1ri.de/myc/Definitions.pdf>

Some limitations

This is my first python program, so enhancements are necessary.

Coding is done quite basic, so object oriented programming is rarely used.

The program is **not ready** and cannot be used as a command-router yet.

The code is not tested on a raspberry yet.

Main missing topics

see `_still_missing` in the program directory

Programming principles

The program uses polling. After initialization following functions are polled:

time-dependent task

read input devices (keyboard or network input)

check SK-input-buffer

send to LD

check LD-input-buffer

transmit command to device

read devices

check device-inputbuffer (answer or info)

send answers to SK-buffer

output to SK

The program should run on a raspberry pi with limited cpu resources.

Because the CR must analyze any incoming byte, many lists and arrays are created during initialization. They are defined as `v_XXX.py` global variables. I am not sure, whether the used data

structure is the most effective (in terms of speed). So enhancements may be necessary. Sometimes the program lines are quite long and subarrays are hard to read. So I sometimes introduces variables like temp with a “lifetime” over a few lines. This enhances the readability, but may reduce speed. I also used those variables, when they are needed a few times, because a call of a variable may be faster than an element of a subarray.

There are 3 input parser subprograms: `command_handling` -analyzing the SK-buffer for commands -, `ld_command_handling` -analyzing the LD buffer for commands and infos- and `device_handling` – anylizing the device buffer for answer and info. These subprograms are quite bulky and very similar. Nevertheless I used different subprograms to avoid unnecessary if – then selections. I hope, that this is the most speed effective solution. But I know, that servicing these lines is not comfortable.

Usage

The routing kernel is working for all commands and answers defined now.

Nevertheless the usage of the program now is suitable for tests only.

Input can be done by keyboard or via telnet by sending the ASCII numbers 0... 255 followed by a space.

A file can be used to send multiple commands.

Data, which should be send to the device, are send to the console.

Testing

For program testing the following is implemented:

Some tables generated at initialization are available as files in the `check_output` directory. So the created full announce-list can be checked easily.

There is a set of command-files. These are used to check the routing kernel and should check all command-types with different parameters. Files to check the error behavior will follow. These checks are initiated by `a<n><SPACE>` from the terminal. `<n>` is the number of the checkfile in the `checkfiles` directory.

`r<SPACE>` initiate a random input to the SK and device input. This will produce error messages but should not crash the program.

Implementation of the Hardware

The CR should be implemented on a Raspberry PI. A Raspberry has ethernet access and a complete operating system. Power consumption an price is also acceptable.

May be that a web server for the SK can also run on the same machine..

not yet tested.

Hierarchical MYC System

In a hierarchical system the CR resolves the announcements of lower level CR but otherwise keep the sequence. So only the actual CR delivers the announce-list with the basic announcement at start and the reserved tokens and the I-line of the CR at the end (tabs for clarification only):

```
<0>;c;...           #CR
    <c><m>...         #normal device
    ...
    I; ..           # I-line
```

```

...
<c>;c;...           #lower level CR start
    <c><m>...         #normal device
...
    I;...           # I-line
    <c><m>...
...
I;...               # I-line, end of lower level CR
...
<c><m>..
I;...              # I-line
...
I;...              # I-line of CR

```

Identical device-types with identical individualization are not allowed within a CR but for CR in different levels.

Error handling

The routing kernel of the CR uses bytearray. Any character is allowed as input.

The CR do some checks on the inputs:

- for correct command-token
- for positional parameters and element number lower than maximum
- for correct length of string

<data> fields are not checked (with few exceptions), especially restriction of <ty> given in <des> error messages are sent to logfile only.

If a error is detected, received characters are ignored and the next byte byte is seen as the start of the next command / answer.

Following messages are defined now:

re-read my devices	sent to log
SK timeout...	data missing, data ignored, info to SK
dev timeout	data missing, data ignored
new announcelist	sent to log
value too high	data ignored, if command from SK: info to SK; if in info from dev: -
non valid token	data ignored, if command from SK: info to SK; if in info from dev: -
stringlength overflow	data ignored, if command from SK: info to SK; if in info from dev: -

Copyright

Dieses Dokument darf unverändert kopiert werden.

Die Ideen in diesem Dokument unterliegen der GPL (Gnu Public Licence, V2) soweit keine früheren, anderen Rechte betroffen sind.

Die Verwendung der Unterlagen erfolgt auf eigene Gefahr; es wird keinerlei Garantie übernommen.

This document can be copied without changes.

The ideas of this document can be used under GPL (Gnu Public License, V2) as long as no earlier other rights are affected.

The usage of this document is on own risk, there is no warranty.

Reference

- [1] <http://dk1ri.de/myc/MYC.pdf> (german)
- [2] http://dk1ri.de/myc/MYC_en.pdf
- [3] <http://dk1ri.de/myc/Description.pdf>
- [4] <http://dk1ri.de/myc/commands.pdf>
- [5] http://dk1ri.de/myc/Reserved_tokens.pdf
- [6] <http://dk1ri.de/myc/Rules.pdf>
- [7] <http://dk1ri.de/myc/commandrouter.pdf>
- [8] http://dk1ri.de/myc/Rules_device.pdf
- [9] <http://dk1ri.de/myc/skin.pdf>
- [10] <http://dk1ri.de/myc/logicdevice.pdf>
- [11] <http://dk1ri.de/myc/Definitions.pdf>
- [12] <http://dk1ri.de/myc/commandrouter.zip>