

Reliable Communications Protocol

–DRAFT–

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RCP is designed as a standard protocol for general purpose needs. It is specifically crafted to work on a processor with word-based addressing and a word size of 16 bits – yes you guessed right, I’m talking about the DCPU-16.

It provides a few features that are important in this environment:

- Small header size for low memory consumption
- Word alignment
- Out-of-order proction via sequence numbering
- Extensible design

1 Paket flow

As the structure of 0x10c’s network is completely unclear, no routing mechanism are specified so far.

2 Header

| loword | | | | hiword | | | | # |
|----------------------|----------|--------------|----------|-------------|----------|-----------------|----------|---|
| lobyte | | hibyte | | lobyte | | hiword | | |
| lonibble | hinibble | lonibble | hinibble | lonibble | hinibble | lonibble | hinibble | |
| “RP” (literal value) | | | | Port number | | Sequence number | | 0 |
| source address | | | | | | | | 1 |
| target address | | | | | | | | 2 |
| Flags | Version | Paket length | | Checksum | | | | 3 |
| | | | | | | | | 4 |
| | | | | | | | | 5 |
| | | | | | | | | 6 |
| | | | | | | | | |

Port number The port number designates a service on the target; if no service is bound the target is free to discard this packet. This field is only 8 bits wide, as the high memory constraints of the DCPU-16 won't allow many services at all, which means that there is just no demand for more than 250 services on a single computer.

Sequence number In common networks there is no guarantee that packets will be received in the order they are sent. For leveraging this we introduced the sequence number, a common element of "real" network protocols. The sender increases this number for every packet sent to the same target address. The target can then reconstruct the packets' ordering.

Source address The senders' address

Target address The targets' address

Flags So far no flags have been specified

Version The current version is 0x0. The version will be incremented when backwards-incompatible changes are made to the protocol.

Paket length The packet length *in doublewords* (32 bits/4 bytes). This does *not* include the eight words long header, which accounts for a payload of exactly 1024 bytes or 1K. The maximum packet size is thus 1040 bytes / 520 words.

Checksum A one word large cyclic redundancy check, optional. When not used, the provided value should be 0x0000.

Reserved space Reserved space should always be zero

3 Addressing

Addresses are made up of two words or 64-bits. The address space is completely linear. Currently two addresses are predefined:

0x0000 0000 is always the address of the local computer (equivalent to 127.0.0.1 in IPv4)

0xFFFF FFFF stands for invalid address, the packet should be discarded.

By the way, two words address space should be more than sufficient. 2^{64} addresses mean round about 18.4 *quintillion* computers.

"*But addresses normally don't equal to computers?*" you may now ask. And you're right, TCP/IP does not make assumptions about how many addresses a computer owns, but we make one. This specification prohibits use of multiple addresses on a single computer.

4 Todo-List

- Specify a way for computers to find their address
- Specify, if necessary, a routing mechanism
- Describe CRC algorithm