Servodrive Finedrive FN760R1
RS-485 protocol specification

v1.03

Table of Contents

1. Packet structure

Servodrive is a slave device.
All packets have the same format shown in the Table 1.

Table 1 - Packet structure

offset	type	value
0	**UINT8**	**ADDR —** slave address
1	**UINT8**	**ID** — packet mode LSB = 0 - request, 1 - response
2	**UINT8**	**SIZE** — packet size
3	-	data, length = SIZE - 4
SIZE - 1	**UINT8**	**CRC8** — cycling redundancy check - through all bytes in the packet

Data format: llittle endian.

CRC8 calculation:

```
/*
  Name  : CRC-8
  Poly : 0x31 x^8 + x^5 + x^4 + 1 Init
  : 0xFF
  Revert: false
  XorOut: 0x00
  Check : 0xF7 ("123456789")
*/
unsigned char Crc8(unsigned char *pcBlock, unsigned char len)
{
    unsigned char crc = 0xFF;
    unsigned char i;
    while (len--)
    {
        crc ^= *pcBlock++;

        for (i = 0; i < 8; ++i)
            crc = crc & 0x80 ? (crc << 1) ^ 0x31 : crc << 1;
    }

    return crc;
}
```

2. Version request

Table 2 Version request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x00)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

Table 3 Version response

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x01)**
2	**UINT8**	**SIZE**
3	**STRING**	**String: <Model name>, <Version>**
SIZE - 1	**UINT8**	**CRC8**

3. Status request

Table 4 Status request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x02)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

Table 5 Status response

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x03)**
2	**UINT8**	**SIZE (12)**
3	**INT16**	**Current position -1500 .. +1500 - absolute position, corresponds to -90.. +90 deg range with maximal resolution of ~ 0.06 deg**
5	**INT16**	**Current velocity, scale factor: *3 deg/s**
7	**UINT16**	**Supply voltage, scale factor: *0.012V**
9	**UINT16**	**Instant current (* 0.001 A) peak current, *0.001A**
11	**UINT8**	**CRC8**

4. Set position

4.1 Set position without acknowledge

Table 6 - Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x10)**
2	**UINT8**	**SIZE (6)**
3	**INT16**	**Position: -32767..+32767 (converted)**
5	**UINT8**	**CRC8**

No acknowledge.

4.2 Set position with acknowledge

Table 7 - Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x12)**
2	**UINT8**	**SIZE (6)**
3	**INT16**	**Position: -32767..+32767 (converted)**
5	**UINT8**	**CRC8**

Table 8 - acknowledge

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x13)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

4.3 Set position with status response

Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x04)**
2	**UINT8**	**SIZE (8)**
3	**INT16**	**Absolute position setpoint -1200... 1200 (=/-70 deg)**
5	**UINT8**	**reserved**
6	**UINT8**	**reserved**
7	**UINT8**	**CRC8**

Response

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x05)**
2	**UINT8**	**SIZE (14)**
3	**INT16**	**Absolute position -1500 .. +1500 - absolute position, corresponds to -90.. +90 deg range with maximal resolution ~ 0.06 deg**
5	**INT16**	**Velocity, scale factor: *3 deg/s**

7	**INT16**	**Supply voltage, scale: *0.012V**
9	**INT16**	**Instant (peak) current, scale : * 0.001 A**
11	**INT16**	**Temperature (C) =(value-1474)/4.38328**
13	**UINT8**	**CRC8**

The servo automatically switches to "position without command" mode after timeout of 100ms with the absence of any of set position command sequence.

5. Set address.

Table 9 - Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x20)**
2	**UINT8**	**SIZE (10)**
3	**UINT32**	**reserved**
7	**UINT8**	**Device address (comparing with ADDR)**
8	**UINT8**	**reserved**
9	**UINT8**	**CRC8**

Table 10 - Acknoledge

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x21)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

6. Parameters.

6.1 Read parameters

Table 11 - Request

Offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x30)**
2	**UINT8**	**SIZE (5)**
3	**UINT8**	**Index**
4	**UINT8**	**CRC8**

Table 12 - Response

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x31)**
2	**UINT8**	**SIZE (6)**
3	**INT16**	**Value**
5	**UINT8**	**CRC8**

Parameter's values are stored in nonvolatile memory.

6.2 Write parameters

Table 13 - Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x32)**
2	**UINT8**	**SIZE (7)**
3	**UINT8**	**Index**
4	**INT16**	**Value**
6	**UINT8**	**CRC8**

Таблица 14 - Acknowledge

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x33)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

6.3 Parameter list

Table 15 - Parameter list

Index	Description
0	Calibration: 1 — calibrated, 0 — not calibrated *
1	Position reverse: 1 — reversed, 0 — not reversed *
2	Velocity limit *
3	Lower margin
4	Upper margin
5	Center position
6	Mode without command: 0 — keep current position, 1 — preset position , 2 — released , 3-break
7	Preset position without command
8	Dead zone *
9	Current limit (* 0.001 A)
10	reserved
11	reserved
12	reserved
13	reserved
14	reserved
15	reserved
16	reserved

* not in use in **v1.03**

7. Manual setup

With activation of manual setup mode, the control is off and one can set the margins manually.

Table 16 - Request

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x38)**
2	**UINT8**	**SIZE (5)**
3	**UINT8**	**Command index (table 18)**
4	**UINT8**	**CRC8**

Table 17 - Acknowledge

offset	type	value
0	**UINT8**	**ADDR**
1	**UINT8**	**ID (0x39)**
2	**UINT8**	**SIZE (4)**
3	**UINT8**	**CRC8**

Table 18 - Command list

Index	Description
0	Activation of manual setup
1	Set lower margin
2	Set central position
3	Set upper margin
4	Exit manual mode, save parameters in nonvolatile memory, restart device.