**DIVISION**

Central controller
industrial and home automation system control
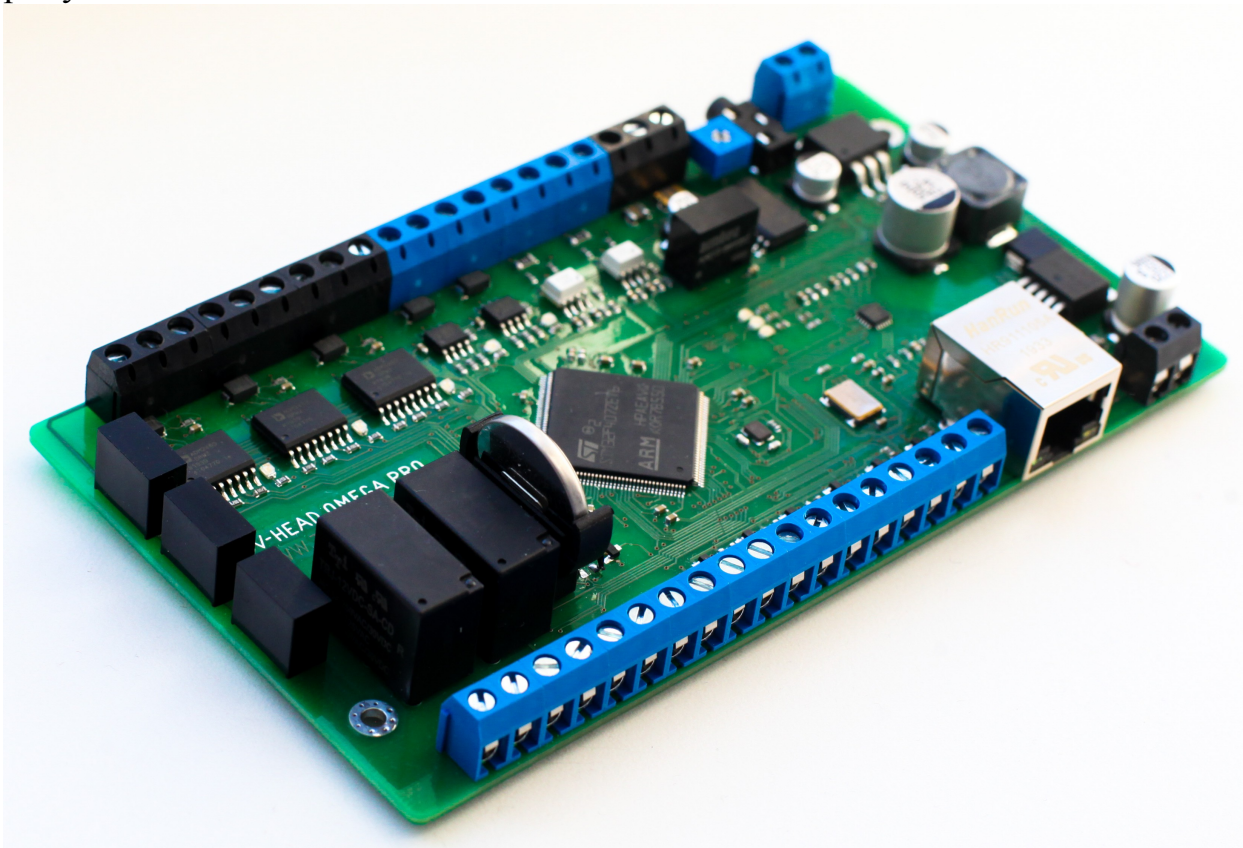
# DVC-HEAD PRO

# Technical certificate

# Contents

## Purpose and scope

DVC-HEAD PRO is a central controller (hereinafter referred to as the controller) for managing industrial and home automation systems, as well as various access control systems, fire and security alarms. The controller can be used both independently, for small control systems, and in combination with external peripheral controllers of the DIVISION system, as well as for controlling third-party devices via the RS-485 interface.



The device is made in a standard housing for installation on a DIN rail (9 DIN). The appearance of the DVC controller - HEAD PRO is shown in Figure 1.

Pic. one

## Functions performed by the controller

Controller DVC-HEAD PRO implements the automation control functionality according to the "configuration file", which is created by the user using a special program - "Division Constructor". In this case, you can program almost any control logic for various actuators.

The controller has:
- interfaces (ports) of the RS-485 standard for connecting peripheral lighting control controllers, inputs/outputs, infrared banks, addressable weather sensors, etc. (more information about DIVISION controllers can be found at the

link:http://division.business/product-category/controllers/), and it is also possible to connect third-party controllers (operating via the Modbus protocol);
- relay outputs for switching by external load;
- ADC inputs for measuring low-voltage voltage;
- discrete inputs;
- audio output for voice notification of events;
- Ethernet interface 100 Mb/s.

      To connect the DVC-HEAD PRO automation controller to the global network, a regular Internet router can be used. The controller allows you to centrally update your own software, write a "configuration file", settings using a connection to the DIVISION.BUSINESS (DVC) cloud server. The user controls his automation system through mobile applications for iOS / Android, Android application for tablet (PU), small control panels (MCP) from the local network, connecting via WIFI or the Internet via the www.account.division.business cloud server, as well as using the usual control keys (buttons).

      The advantage of this controller over similar devices is that in the absence of Internet connection, the automation system will continue to operate normally thanks to the logic block stored inside the controller, and not just on the cloud service.


## Specifications

      ControllerDVC-HEAD PROis a complete device, can be used both independently and in combination with peripheral controllers. Technical characteristics of the controller are given in Table 1

Table 1

| Characteristic name | Unit rev. | Meaning |
| --- | --- | --- |
| Supply voltage | V | 9 - 14 |
| Power consumption | VA | 0.3 |
| Communication interface type | | ethernet |
| Number of RS-485 optoisolated ports | | 3 |
| Number of RS-485 ports | | 2 |
| Maximum number of connected peripheral controllers per RS-485 interface | | up to 32 |
| RS-485 line length limit | m | 1000 |
| Number of ADC inputs | | 3 |
| Voltage range at ADC inputs | V | 0..18 |
| Permissible voltage measurement error | V | ±0.1 |
| Number of digital inputs | | 3 |
| Number of digital optoisolated inputs | | 4 |
| Thresholds for switching a discrete input to a state: "one" "0" | V | 2.5 .. 3 |

| | | 0 .. 0.8 |
|---|---|---|
| Number of relays, normally open contact (NO) | | 2 |
| Number of solid state relays, normally open contact (NO) | | 4 |
| Switched voltage at outputs K1, K2 | V | 30 |
| Switching current at outputs K1, K2 | amp | 5 |
| Switched voltage at outputs K3 - K6 | V | 30 |
| Switched current at outputs K3 - K6 | amp | 0.1 |
| Audio line output voltage | V | 0.25 |
| Audio Output Power | W | 3 |
| Housing material | | plastic |
| Case protection degree | | IP20 |
| Case dimensions | mm | 160x90x80 |
| Size | | 9 DIN |
| Ambient temperature range | ºC | -20 .. +50 |
| Relative humidity | % | 30..80 |
| Device weight | G | 250 |
| Network connection type | | client/server |
| Number of simultaneously connected network clients | | 8 |
| Local IP address of the controller, port | | 192.168.1.191 :5014 |

## Pin assignment

The scheme of connection to the controller is shown in Figure 2. Cables with copper stranded conductors are used for connection to screw contacts, the ends of which are crimped with sleeves.



Pic. 2
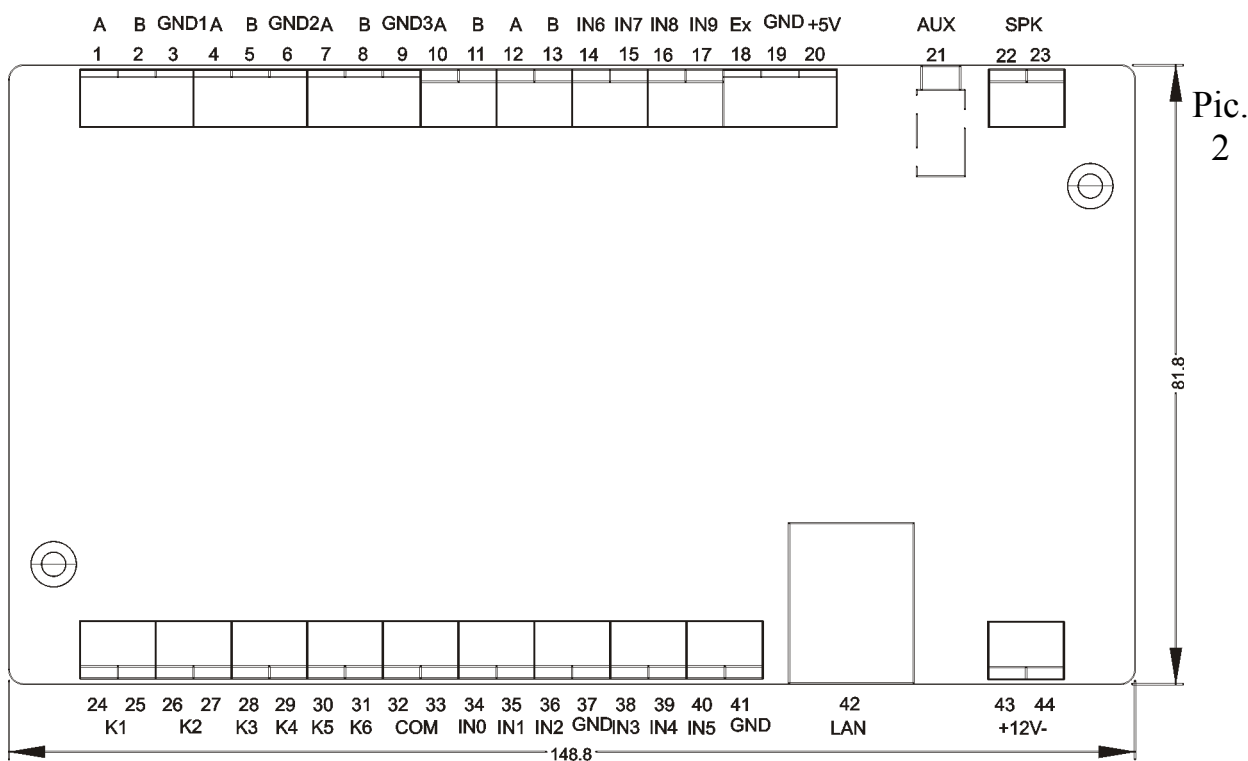
The purpose of the terminal contacts is shown in table 2.

table 2

| Number contact | Designation | Purpose |
|---|---|---|
| 1 | RS-485 "A" | Interface RS-485 port #1 optoisolated |
| 2 | RS-485 "B" | |
| 3 | RS-485 "GND1" | |
| 4 | RS-485 "A" | Interface RS-485 port #2 optoisolated |
| 5 | RS-485 "B" | |
| 6 | RS-485 "GND2" | |
| 7 | RS-485 "A" | Interface RS-485 port #3 optoisolated |
| eight | RS-485 "B" | |
| 9 | RS-485 "GND3" | |
| ten | RS-485 "A" | Interface RS-485 port No. 4 combined for connecting third-party devices |
| eleven | RS-485 "B" | |
| 12 | RS-485 "A" | Interface RS-485 port No. 5 combined for connecting MPU panels (DV-IPS) |
| 13 | RS-485 "B" | |
| fourteen | IN6 | Discrete optoisolated inputs |
| fifteen | IN7 | |
| 16 | IN8 | |
| 17 | IN9 | |
| 18 | PWR_ISOL | Galvanically isolated power supply for operation with digital opto-isolated inputs |
| 19 | GND | Optional: power supply for external devices 5 V 0.2 A |
| 20 | +5AT | |
| 21 | Lin. audio | Linear audio output (audio jack 3.5) |
| 22 | SPK+ | Speaker output 3W 8 ohm |
| 23 | SPL- | |
| 24 | COM-1 | Relay output K1 |
| 25 | NO-1 | |
| 26 | COM-2 | Relay output K2 |
| 27 | NO-2 | |
| 28 | NO-3 | Relay outputs K3-K6 (solid state relays) |
| 29 | NO-4 | |
| 30 | NO-5 | |
| 31 | NO-6 | |
| 32 | COM3-6 | Common contacts for relay outputs K3-K6 |
| 33 | COM3-6 | |
| 34 | IN0 | ADC inputs |

| Number contact | Designation | Purpose |
|---|---|---|
| 35 | IN1 | |
| 36 | IN2 | |
| 37 | GND | Common (GND) for ADC |
| 38 | IN3 | Digital inputs 1-3 |
| 39 | IN4 | |
| 40 | IN5 | |
| 41 | GND | Common (GND) for digital inputs |
| 42 | LAN | Ethernet connector XS4 |
| 43 | + 12AT | Power supply of the controller from the power supply unit 12V, 1A |
| 44 | GND | |

## DV-Head PRO controller firmware

To write the control program (CP) to the memory of the DV-HEAD PRO controller, you must perform the following steps:

Connect the 12V supply voltage to the DV-HEAD PRO controller (see.

Technical certificate). We connect the programming interface cable from the 4pin programmer (SWD) to the connector to connector No. XS1. Using the program "STM32CubeProgrammer" we write the UE "boot.bin" for a large microcontroller (STM32F407ZET6) control No. 1. At this stage, the DV-HEAD PRO controller has a basic UE with a bootloader for further loading the main firmware.

We connect the Ethernet cable to the LAN port (XS4). Launch the BootLoaderHead.exe application. The server module of the DV-HEAD PRO controller has a static network address of 192.168.1.11:54321. Using a computer and the program "BootLoaderHead.exe" in Figure 3
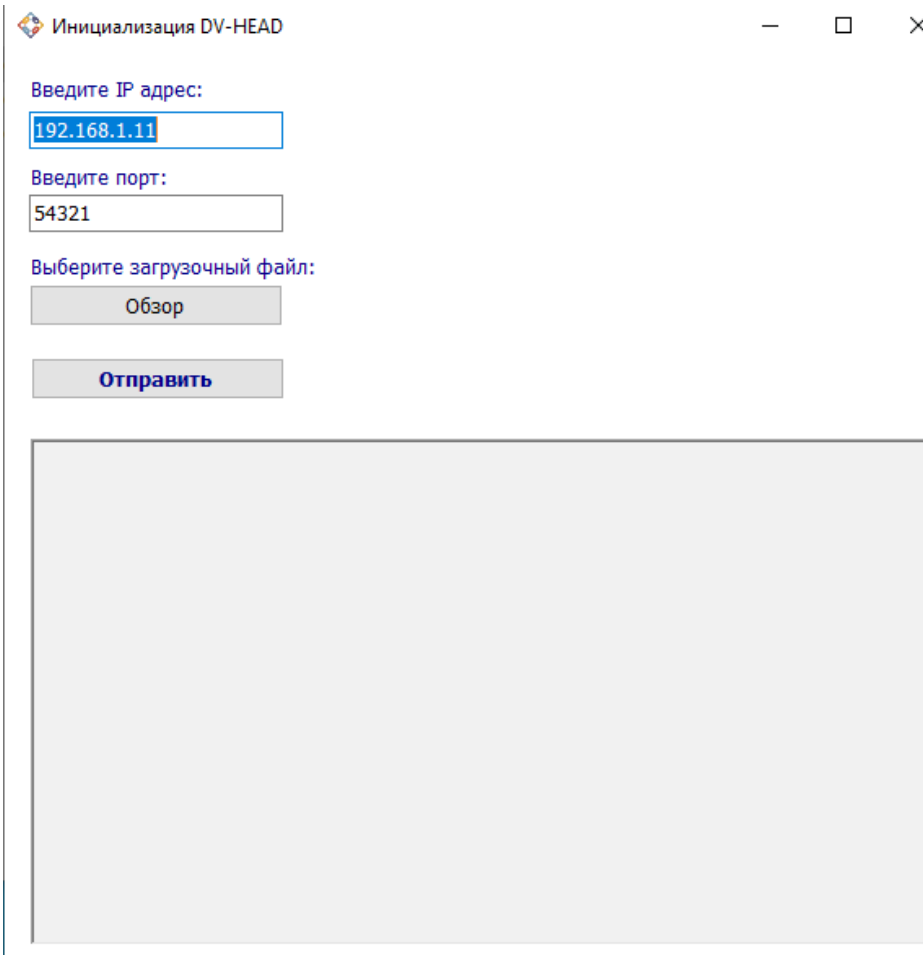
we write the current version of the main UE "head_v007_2.bin", for this, in the program window, select the IP address → 192.168.1.11, port → 54321. Click "Select boot file" → select the current version of the CP ("head_v007_1.bin"). Attention! The controller will only accept the firmware for the first 30 seconds after being turned on, so you must restart the controller and press the submit button. The log of the CP recording procedure will be displayed in the window. The initial initialization of the DV-HEAD PRO controller has been completed.

It is necessary to print the serial number (S/N) of the controller generated by the "BootLoaderHead.exe" program and stick it on the product case, to see (S/N), you need to go down to the bottom of the program event log

At this stage, the controller does not have a configuration file (CF) and no audio files. Further configuration of the controller (recording of CF and audio files) is performed directly from the web interface http://account.division.business/

**Errors, features and ways to solve them:**

1) When building (assembling) a new firmware project, head_v7.2, (for example, to change the IP address of the controller located in the main.h file), assembly must be carried out in the program / studio / STM32CubeIDE 1.7.0

2) CF for the controller must have two or more user authorization passwords written in English.

3) All working files are in the archive with this instruction.

4)!!!The DVC Head Galaxy and DVC Head PRO firmware has one source file, but for each controller you need to change the line in the main.h file

```
 9⊖ /* ------------------------- Select Board */
10   //#ifndef DV_HEAD_PRO
11   //#define DV_HEAD_PRO
12   #ifndef DV_HEAD_2
13   #define DV_HEAD_2
```

## Registering the controller on the server

After installing the controller and making all the necessary electrical connections, you must perform the initial initialization - register the controller on the server http://account.division.business  To do this, the user registers his account in the personal account of the http://account.division.business  server and adds a new controller (the serial number of the controller is located on the back of the case)

## Setting up a controller using the constructor

To set the logic of the controller for managing a smart home, the program "Division Constructor" (a description of how to work with this program can be found on the website: https://division.business/product/division-constructor_en/.

### Turning on the controller

After the power is turned on, the controller initialization process starts. At the same time, the power indicator (green) on the controller board is on. The initialization process takes about30 seconds. When the controller is ready for operation, a voice message "The DIVISION system welcomes you!" is played.
In the presence of any malfunctions, the red indicator on the controller board lights up.

## Controller Installation and Maintenance Instructions

### Security measures

According to the method of protection against electric shock, the controller corresponds to class "3" in accordance with GOST 12.2.007.0.

During operation, maintenance, it is necessary to comply with the requirements of GOST 12.3.019, "Rules for the operation of electrical installations of consumers" and "Rules for labor protection during the operation of electrical installations of consumers". The open contacts of the controller terminal blocks are under voltage of no more than 12V, which is not dangerous to human life.

Do not allow moisture to enter the contacts and internal electrical elements of the controller. It is forbidden to use the controller in aggressive environments containing acids and alkalis in the atmosphere. oils, etc.

Connection, maintenance of the controller must be carried out only by qualified specialists who have studied this passport or operating instructions.

To avoid controller failure, any connections to the controller should be made only when the power is off.

### Instructions for use and maintenance

The controller must be operated within the parameters specified in the technical specifications.

Avoid rough mechanical impacts on the body of the product, as well as contact with acids, alkalis, solvents. Keep the controller clean, do not allow dirt, liquids, insects to enter the product.

### Mounting Recommendations

To ensure the reliability of electrical connections, it is recommended to use cables with stranded copper conductors with a cross section of 0.5 - 1.0 mm², the ends of which must be stripped and crimped with sleeves before connection so that their bare ends do not protrude beyond the terminal block after connection to the controller.

When laying linesRS-485 should be separated into an independent route separately from power cables, as well as cables that create high-frequency and impulse noise.

Controller mounting:

- fasten the housing base to the DIN-rail of the switching cabinet;
- connect all necessary cables to the controller terminals;

## Connecting Peripheral Controllers

Peripheral controllers are connected to the ports
RS-485 No. 1 - No. 5 according to the following recommendations:
- port No. 5 is allocated for connecting small panels (LPA) of DV-IPS controllers, or if there are no LPAs in the configuration file - as a standard port;
- port No. 4 - combined for connecting peripheral DV controllers and for sending commands to third-party devices (*);
- to reduce the response time of the controllers and increase the system performance, they should be distributed as evenly as possible between the ports.

## Contents of delivery

| No. | Name | Unit rev. | Qty |
|-----|------|-----------|-----|
| | Central Controller DV-HEAD PRO | PCS | one |
| | Mounting screw kit | PCS | one |
| | Technical certificate | PCS | one |
| | Package | PCS | one |

## Storage and transportation conditions

The product must be stored in the manufacturer's packaging according to storage conditions 3 in accordance with GOST 15150. Products must be transported in accordance with conditions 5 in accordance with GOST 15150.

## Conservation

Preservation of the product is carried out in a closed ventilated room at an ambient temperature of 15 to 40°C and a relative humidity of up to 80% in the absence of aggressive impurities in the environment.
Preservation of the product is carried out in accordance with the requirements of GOST 9.014
The term of protection without re-preservation is 10 years.

## Disposal

Disposal of the product (remelting, burial, resale) is carried out in accordance with the procedure established by the Laws of the Russian Federation of May 04, 1999 No. 96-F3 "On the protection of atmospheric air" (as amended on December 27, 2009), dated June 24, 1998 No. 89-FZ (as amended on January 1, 2010) "On production and consumption waste", dated January 10, 2002 No. 7-FZ "On Environmental Protection", as well as other Russian and regional norms, acts, rules, orders, etc., adopted in pursuance of these laws.

## Warranty

The manufacturer guarantees that the product complies with safety requirements, provided that the consumer observes the rules for use, transportation, storage, installation and operation. The warranty covers all defects caused by the manufacturer. The warranty period of the product is 36 months from the date of commissioning, but not more than 40 months from the date of shipment.

The warranty does not cover defects arising from:
- violations of passport modes of storage, installation, testing, operation and maintenance of the product;
- improper transportation and loading and unloading operations;
- the presence of traces of exposure to substances aggressive to the materials of the product;
- the presence of damage caused by fire, natural disaster, force majeure;
- damage caused by incorrect actions of the consumer;
- the presence of traces of foreign interference in the design of the product.

The manufacturer reserves the right to make changes to the design that improve the quality of the product while maintaining the basic performance characteristics.

## Warranty Terms

Claims to the quality of the goods can be made during the warranty period.

Defective products are repaired or exchanged for new ones free of charge during the warranty period. The decision to replace or repair the product is made by the service center. The replaced product or its parts obtained as a result of repair become the property of the service center

The costs associated with the dismantling, installation and transportation of a defective product during the warranty period are not reimbursed to the Buyer.

If the claim is unfounded, the costs of diagnostics and examination of the product are paid by the Buyer.

Products are accepted for warranty repair (as well as for return) fully equipped.

## Manufacturer information

DVC Technologies
Email:info@division.bussines,
Website: www.division.business

# Warranty card No.____

### Name of product
## DV-HEAD PRO CENTRAL CONTROLLER

| No.   brand | Quantity |
| --- | --- |
| one | |
| 2 | |

Controller serial number _____

Name and address of the trading organization _____

_____

Date of sale _____ Seller's signature _____

Print Acceptance stamp

### *I AGREE WITH THE WARRANTY TERMS:*

BUYER _____ (signature)
### *Warranty period - Thirty-six months from the date of sale*

For warranty repairs, complaints and quality claims, contact the service center at the address: Rostov-on-Don, st. Krasnoarmeyskaya, d. 7/97 of. 16, tel. (863) 283-09-00.

When making a claim to the quality of the goods, the buyer submits the following documents:
1. An application in any form, which indicates:
- name of the organization or full name buyer, actual address and contact numbers;
- name and address of the organization that carried out the installation;
- the main parameters of the system in which the product was used;
- a brief description of the defect.
2. A document confirming the purchase of the product (invoice, receipt).
3. This completed warranty card.
Return or exchange note:
Date: "__"_____20___ Signature_____