Central controller
industrial and home
automation system control

DVC-HEAD Galaxy

Technical certificate

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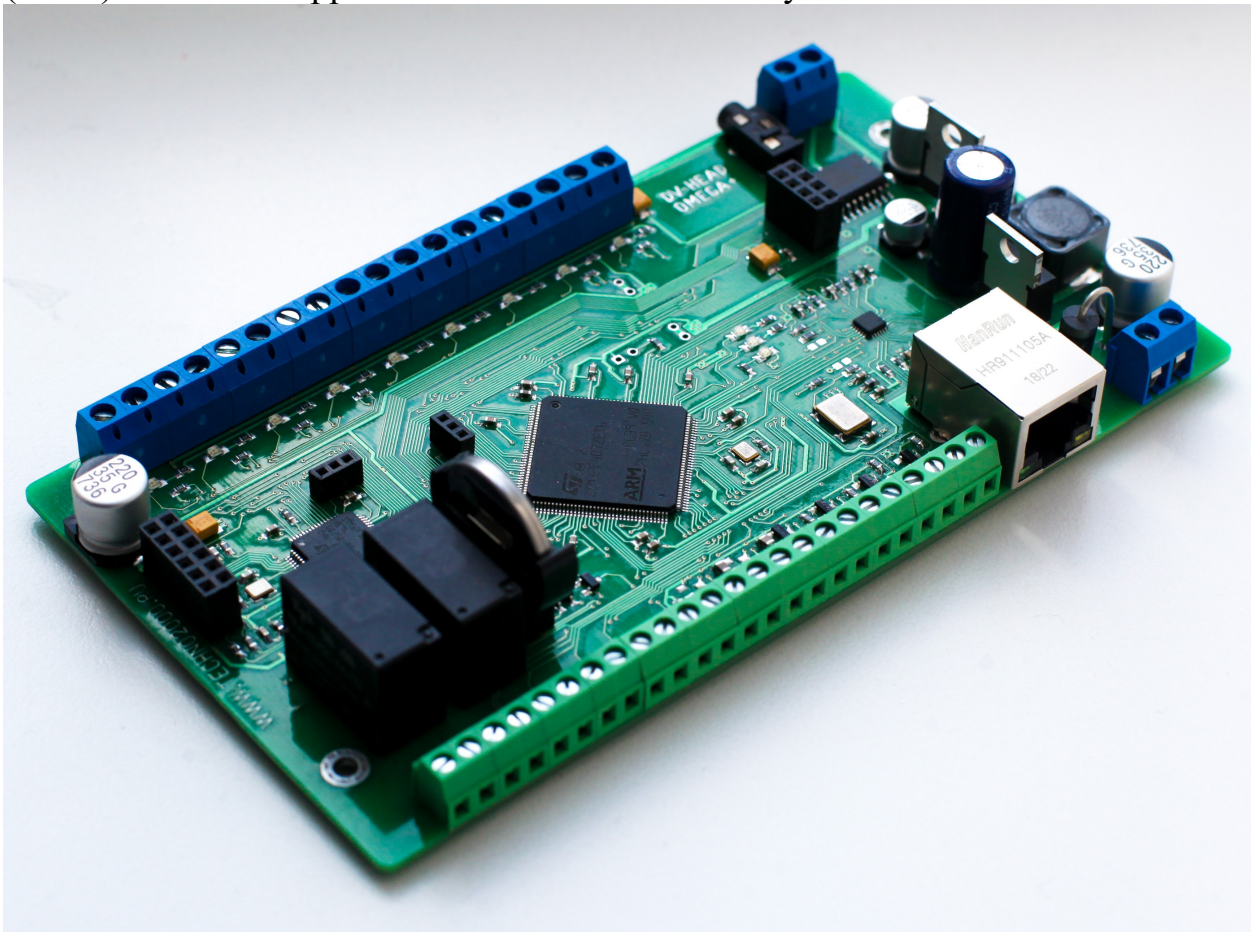
Purpose and Fields of application

DVC-HEAD Galaxy 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 alone, for small control systems, or in combination with external peripheral controllers of DIVISION system, as well as to control third-party devices via the interface RS-485.

The device is made in a standard housing for installation on a DIN-rail (9DIN).Controller Appearance DVC - HEAD Galaxy shown in a Picture 1.



DVC - HEAD Galaxy

Functions performed by the controller

Controller DVC-HEAD Galaxy implements the functionality of automation management, 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 standard RS-485 for connecting peripheral lighting controllers, inputs/outputs, IR, addressable weather sensors, etc. (more details with DIVISION controllers can be found at the link:DVC Technologies Website:

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

To connect an automation controller DVC-HEAD Galaxy to the global network an ordinary Internet router can be used. The controller allows you to perform a centralized update of your own software, writing a “configuration file”, using a connection to a cloud server DIVISION.CENTER (DVC).The user controls his automation system through mobile applications for iOS / Android, Android application for tablet (Control Panel), small control panels (Local Control Center) from the local network, connecting via WIFI or the Internet through the DIVISION.CENTER cloud server, as well as using ordinary keys controls (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 Galaxy is a complete device, can be used both independently and in combination with peripheral controllers. Technical characteristics of the controller are given in Table 1

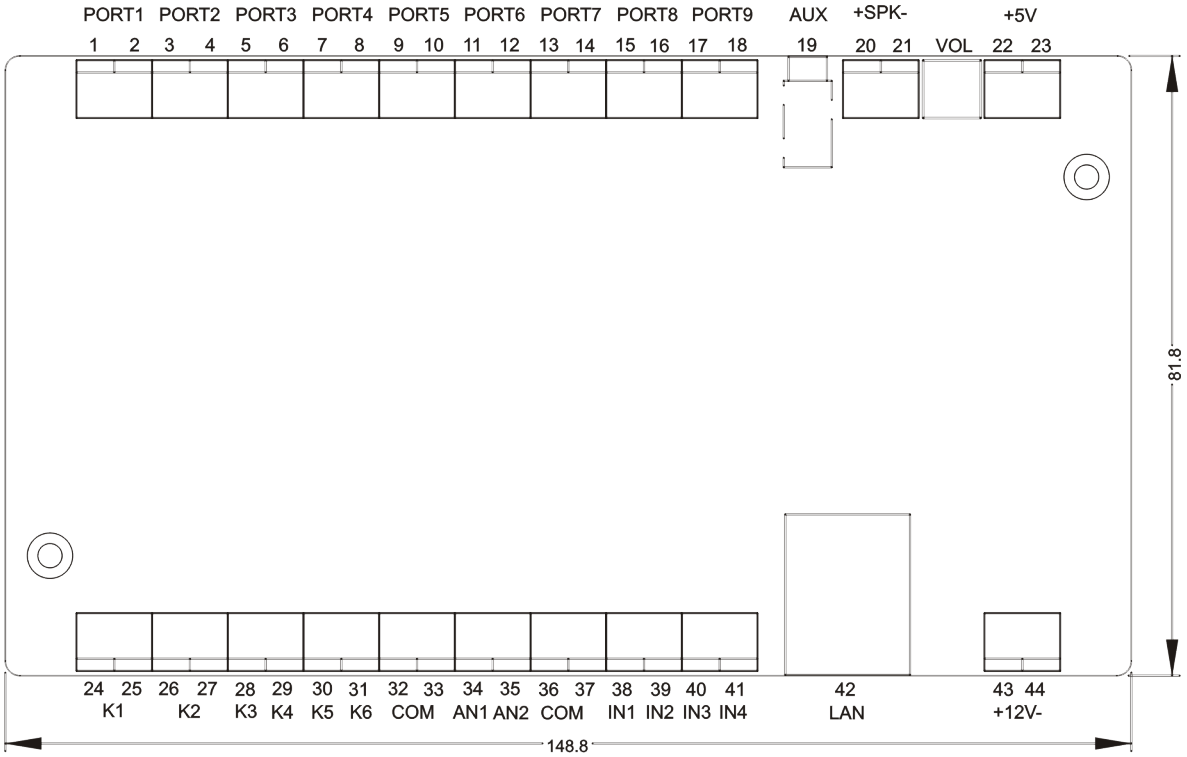
Table 1

Characteristic name	**Unit of measure**	**Meaning**
Supply voltage	V	9 - 14
Power consumption	W	0.3
Communication interface type		ethernet
Number of ports RS-485		9
Maximum number of connectable peripheral controllers per interface RS-485		up to 32
Line length limit and RS-485	m	1000
Number of ADC inputs		2
Voltage range per ADC inputs	V	0..18
Permissible voltage measurement error	V	±0.1
Number of digital inputs		4
Thresholds for switching a discrete input to a state: "one"		

"0"	V	2.5 .. 3 0 .. 0.8
Number of relays, normally opencontact (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	amps	5
Switched voltage at outputs K3 - K6	V	30
Switched current at outputs K3 - K6	amps	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		9DIN
Ambient temperature range	ºC	-20 .. +50
Relative humidity	%	30..80
Device weight	gr	165
Network connection type		client/server
Number of simultaneously connected network clients		8
Local IP controller address, port		192.168.1.191 :5014

Contact assignment

The scheme of connection to the controller is shown in Picture 2. Cables with copper stranded conductors are used for connecting to multi-wired contacts, the ends of which are crimped with sleeves.



Picture 2. Connection diagram to the controller.

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

Table 2

Number contact	Designation	Purpose
one	RS-485 "B"	Interface RS-485 port №1, Port for connecting MPU DV-IPS
2	RS-485 "A"	
3	RS-485 "B"	Interface RS-485 port №2, combined port DV-controllers/3rd party Modbus devices
4	RS-485 "A"	
5	RS-485 "B"	Interface RS-485port № 3
6	RS-485 "A"	
7	RS-485 "B"	Interface RS-485port №4
8	RS-485 "A"	
9	RS-485 "B"	Interface RS-485port № 5
10	RS-485 "A"	
11	RS-485 "B"	Interface RS-485port № 6

Number contact	Designation	Purpose
12	RS-485 "A"	
13	RS-485 "B"	InterfaceRS-485 port№ 7
14	RS-485 "A"	
15	RS-485 "B"	Interface RS-485 port № 8
16	RS-485 "A"	
17	RS-485 "B"	Interface RS-485 port № 9
18	RS-485 "A"	
19	Line audio	Audio Line Out (audio jack 3.5)
20	SPK+	Speaker output 3W 8 ohm
21	SPL-	
22	+5V	Optional: power supply for external devices 5 V 0.2 A
23	Total	
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	AN1	InputsADC
35	AN2	
36	COM	Common (GND) for ADC and digital inputs
37	COM	
38	IN1	Digital inputs 1-4
39	IN2	
40	IN3	
41	IN4	
42	LAN	Ethernet Connector
43	+ 12IN	Controller power from the power supply 12V, 1A
44	GND	

Controller Firmware

DVC-HEAD Galaxy

In order to write the control program (CP) to the memory of the DV-HEAD 2 controller, you must perform the following steps:

-We connect the supply voltage 12V to the controller DVC-HEAD Galaxy(see technical data sheet).

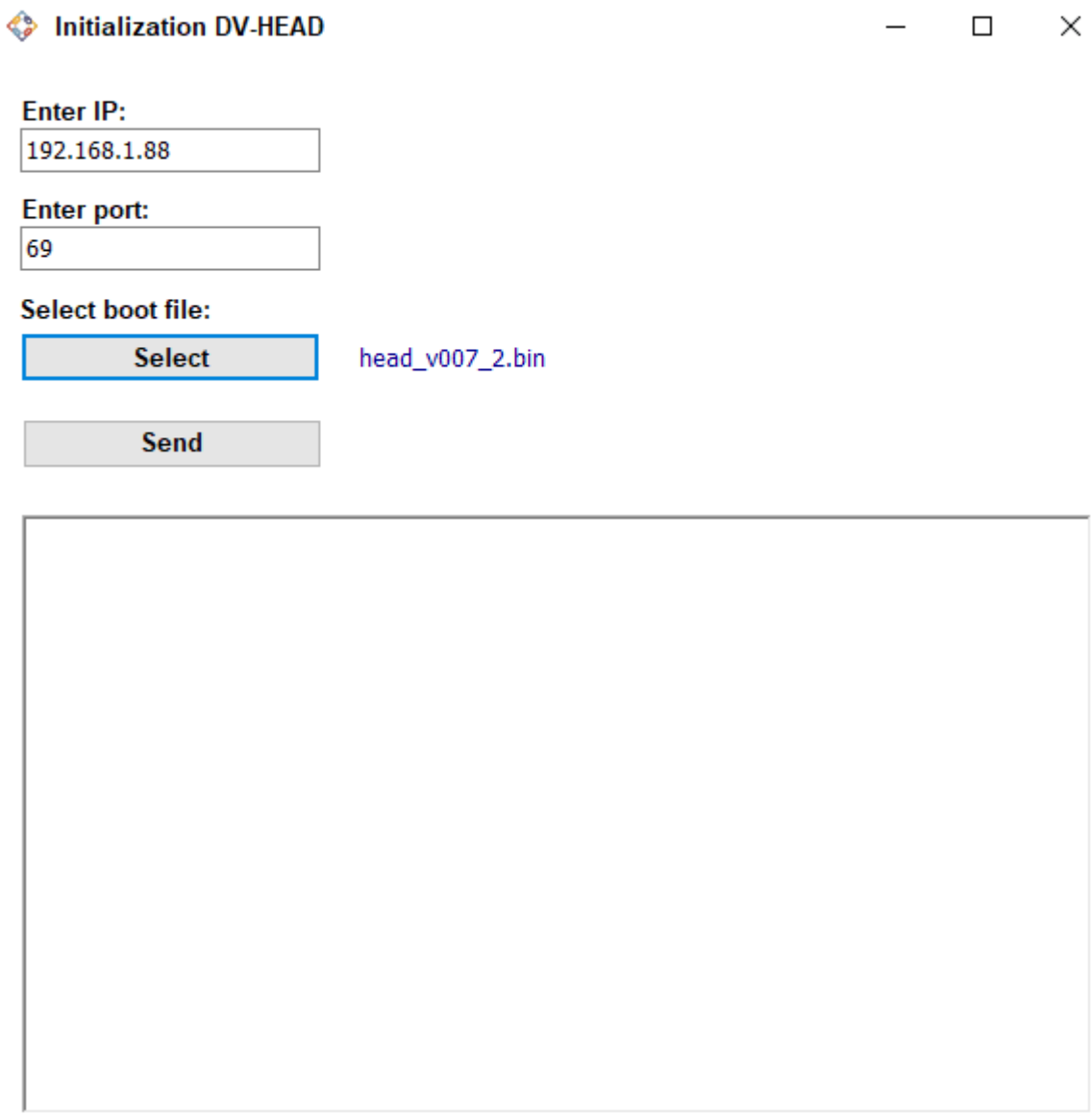
-We connect the programming interface cable from the 4pin programmer (SWD) to connector No. XS3.

-Using the public program "STM32 ST-LINK Utility" we write the control program "dvslave.bin" for the microcontroller (STM32F103RET6) № 2, (its purpose is to expand the RS485 ports).

-Then we connect the programming interface cable (SWD) to connector № XS1.

- Using the program "STM32 ST-LINK Utility" we write the control program "boot.bin" for a large microcontroller (STM32F407ZET6) control №1. At this stage, the controller DVC-HEAD Galaxy has a basic control program with a bootloader, for further downloading the main firmware.

We connect the Ethernet cable to the LAN port (XS4). Launch the BootLoaderHead.exe application. Controller Server Module DVC-HEAD Galaxyhas a static network address 192.168.1.88:69. Using a computer and the program "BootLoaderHead.exe" in Picture 3.



we write the current version of the main CP

Picture 3. Interface BootLoaderHead.exe

“head_v007_2.bin”, for this, in the program window, select the IP address → 192.168.1.88, port → 69. Click “Select boot file” → select the current version of the CP (“head_v007_1.bin”). We press the send button. The log of the CP recording procedure will be displayed in the window. Initial controller initialization DVC-HEAD Galaxy 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 body. (Currently, the SN application does not unload and can be seen in the Hercules terminal program when trying to connect controller DVC-HEAD Galaxy to the server) Requires some additional work "BootLoaderHead.exe".

At this stage, the controller does not have a configuration file and audio files. Further configuration of the controller (recording of FC and audio files) is performed directly from the server,*both from the web interface (not implemented*

yet) and using the "Controller Utilities" program, which must be placed on the server that is being knocked on byDVC-HEAD Galaxy

Instructions for working with the program "ControllerUtilities"

Loading audio files and configuration file in DVC-HEAD Galaxy using the "Controller Utilities" utility:

1. In the same folder with the application, there must be a configuration file config.txt (generated when uploading to the server with the DV Constructor application)

After reading it by the "ControllerUtilities" program will be additionally created in cnf.txt (Russian letters will be changed into English)

2. In the same folder with the application there should be a WAV folder, in this folder there should be audio files with the name XXXX.wav, where XXXX is the file number.

3. To run the application, you need to run the executable file ControllerUtilities.exe

4. After starting, the application on the server will wait for a socket connection, by port 6004. The server IP is explicitly registered in the firmware DVC-HEAD Galaxy

5. After a successful connection, all audio files will be sent, in parts by 10240 byte.

6. After sending the audio files, the configuration file will be sent, the application will automatically close, the controller will reboot.

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), the assembly must be carried out in the program /studio/**IAR Systems Workbench**v7.3

2) The "BootLoaderHead.exe" program has two versions, the one that does not have a serial number input field works.

3) The "BootLoaderHead.exe" program may not upload the firmware the first time, you need to restart the program and try again.

4) FC for the controller must have two or more user authorization passwords.

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

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 84 server.201.165.76:82 (old version)84.201.160.34:8000) In order do this, the user registers his account in his personal account and adds a new controller (the serial number of the controller is located on the back side of the case)

Setting up a controller using the constructor.

To set the logic of the automation controller DVC-HEAD Galaxy, the program Division Constructor is used» (description of work with this program can be found at:DVC Technologies Website: https://division.business).

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 about 20 seconds. When the controller is ready for operation, the voice message “System DIVISION welcomes you!".

In case of presence of any malfunctions, the red indicator on the controller board lights up.

Controller Installation and Maintenance Instructions
Security measures.

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 and insects to enter the product.

Mounting Recommendations

To ensure the reliability of electrical connections, it is recommended to use cables with copper multi-wired strands with a cross section of 0.5 - 1.0 mm², the ends of which should 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 lines RS-485 they should be singled out as a separated from power cables track, as well as cables that create high-frequency and impulse noise.

Controller mounting:

- fasten the base of the housing to DIN- the 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 №1 - №9 according to the following recommendations:

- port № 1 is dedicated to connecting only small panels (SP)controllers DV-IPS;
- port number 2 - combined for connecting peripheral controllers DV and for sending commands to third party devices (*);
- to reduce the response time of controllers and increase the speed of the system,they should be distributed as evenly as possible among the ports.

Contents of delivery

Table 3

No.	**Name**	**Measure unit.**	**Qty**
	Central Controller DVC-HEAD Galaxy	piece	1
	Mounting screw kit	piece	1
	Technical certificate	piece	1
	Package	piece	1

Storage and transportation conditions

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 handling 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 outside 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 connected 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 Website: https://division.business

Warranty card No.____

Name of product
CENTRAL CONTROLLER DVC-HEAD Galaxy

No.	brand	Quantity
1		
2		

Controller serial number _____

Name and address of the trading organization _____

_____

Date of sale _____ Seller's signature _____

Stamp Acceptance stamp

I AGREE WITH THE WARRANTY TERMS:

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

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 buyer's name, 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_____