

# GNSSRK-M-DV4

- Four-System Satellite signal indoor coverage solution
- Installation and user guide



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## Contents

<b>GNSSRK-DV4 .....</b>	<b>3</b>
<b>System Schematic .....</b>	<b>4</b>
1 Functional Description .....	6
2 Typical Application .....	6
3 Standard Configurations: .....	6
4. Topological (Under standard configuration) .....	7
5. Kits include .....	8
5.1 Digital Display Step Adjustable Amplifier RGA30-DV4 .....	8
5.1.1 Function: .....	8
5.1.2 Specification .....	9
5.2 Antenna .....	10
5.2.1 Antenna (Receiving antenna) : S440 .....	10
5.2.2 Transmitting antenna:GRA10 .....	11
5.3 Cable Assembly .....	12
5.3.1 RG8(KSR 400) .....	12
5.3.2 KSR 240 .....	12
5.3.3 Select Connector .....	12
5.4 Model Naming Rules .....	13
5.5 Frequency Reference Table .....	14
6. Typical faults and solutions .....	14

## **GNSSRK-DV4**

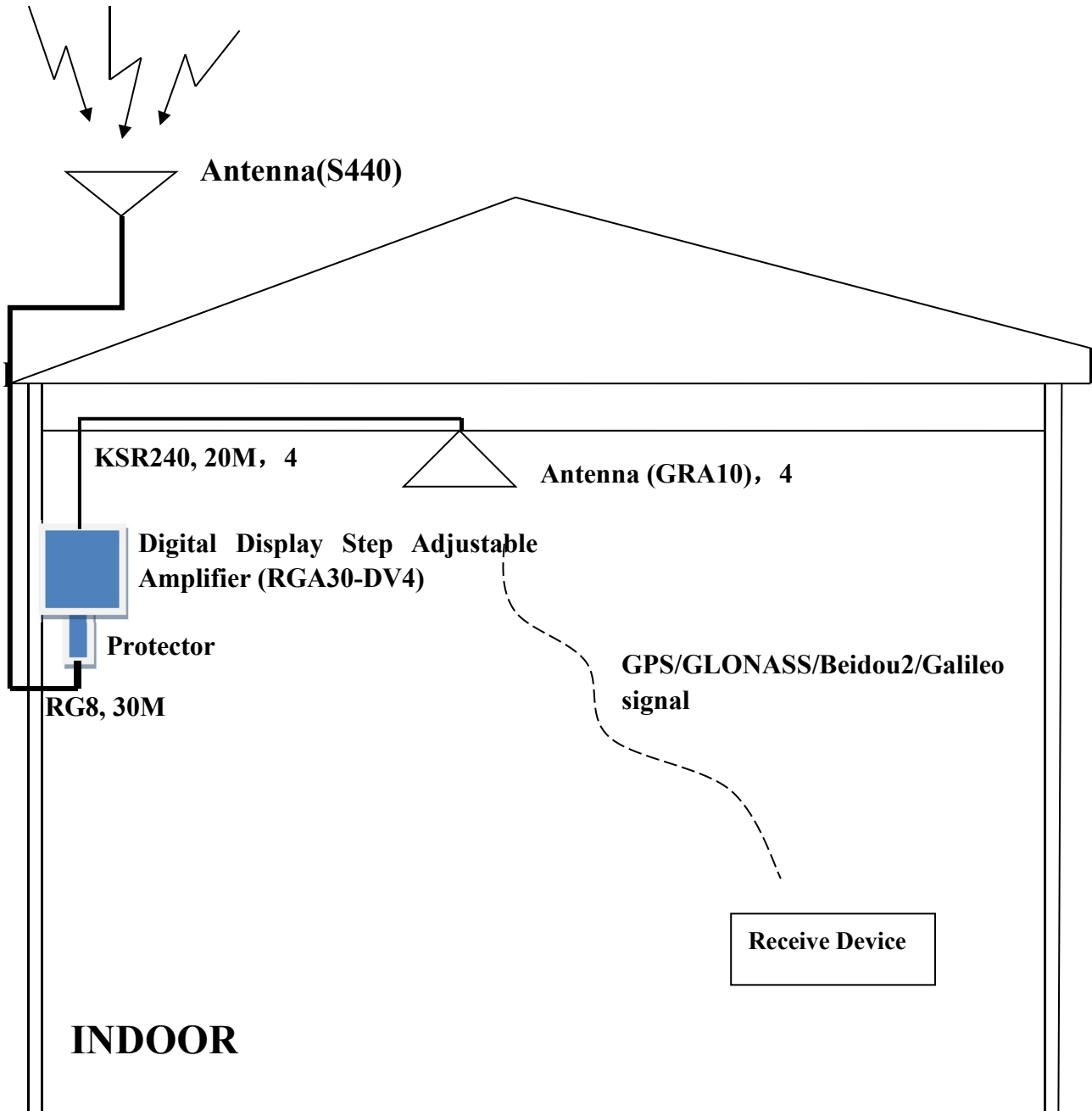
- ☆ System signal:
- ☆ GPS:L1,L2,L5;
- ☆ Glonass:G1,G2;
- ☆ Galileo:E1,E2,E5a,E5b;
- ☆ Beidou2:B1,B2,B3;
- ☆ Beidou3:B1,B2,B3;

- ◇ System gain: 0-30dB , digital display step adjustable ;
- ◇ Digital display gain: LED digital display clearly shows the current amplifier gain;
- ◇ Serial command control;
- ◇ Input and output port power settings;
- ◇ Multi-output;
- ◇ This system is a multi-point coverage scheme, and the indoor signal coverage range is 5-20 meters in radius (it can reach a radius of 20 meters under certain conditions such as adding amplifiers and based on site conditions and building height).

Note: Multi-point means many antenna be used to transmit GPS /GLONASS /Beidou2 /Galileo signal.

# System Schematic

GPS/GLONASS/Beidou2/Galileo





1. GPS/GLONASS/Beidou2/Galileo Antenna(S440) be installed on roof of the building;
2. Cable assembly RG8 fixed along the out wall, one terminator connects S440,the another to protector at the appropriate place. In some special environment, select PE or PVC material plastic pipe to protect the cable assembly is quite sensible;
3. Protector and Digital Display Step Adjustable Amplifier are fixed on ceiling or on the table;
4. Cable assembly KSR240 is fixed along the ceiling of the operating place;
5. Antenna GRA10 be fixed on the ceiling .

According to the actual environment, you can adjust positions of some parts, which can make you the adjust, change and overhaul more easily.

## **Quality Commitment**

All products have been strictly inspected, all are qualified products.

We promise one-year guaranty and 5-year available.

Under warranty, products gone wrong which be identified not be human factor, can be replaced free or repaired. Freight be charged by GEMS.

## **Return Policy**

Our product and its packaging have LOGO and Serial-number, you should not tear up them, as we will depend on them to deal with the return product.

We haven't recruit agencies, sales and after service be took charged by GEMS.

Please pay attention.

Service phone:[86-755-29644311](tel:86-755-29644311) or email to: [sales@gemsnav.com](mailto:sales@gemsnav.com), We will response in 24 hours.

## 1 Functional Description

GNSSRK-M-RDV4 is a repeater operates by receiving GPS /GLONASS /Beidou2 /Galileo satellite signals with an antenna located outside the building and re-radiating the signals into the indoor area or covered space where satellite signal cannot reach.

GNSSRK-DV4 is a Multi-point GPS/GLONASS/Beidou2/Galileo repeater, transmitting GPS /GLONASS /Beidou2 /Galileo signal. This solution offer adjustable test signal to receiver.

If need extend the system, you can add assemblies and sending antennas, so as to cover satellite signal indoor large area and more rooms or buildings.

*Other documents, log in website: : [www.gemsnav.com](http://www.gemsnav.com) ,or  
contact:[sales@gemsnav.com](mailto:sales@gemsnav.com),or call the technical service: 86-755-29644311 。*

## 2 Typical Application

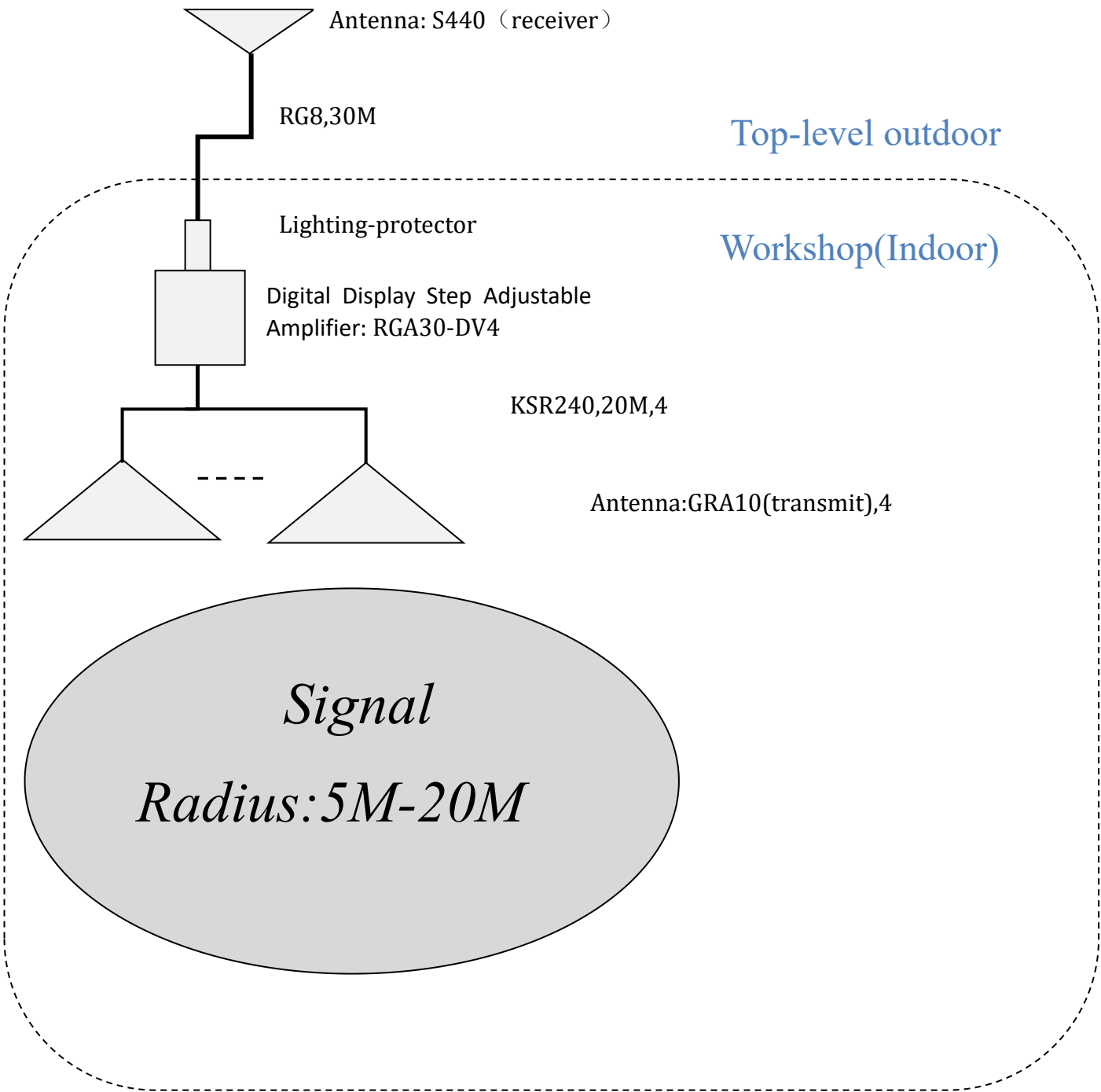
- ✧ For GPS/GLONASS/Beidou2/Galileo products testing  
For testing the cell- phone with GPS/GLONASS/Beidou2/Galileo , PND, car navigators, tracker, survey products, etc.
- ✧ For the purpose of GPS/GLONASS/Beidou2/Galileo signal covering  
Car parks, lab, aviation manufacturing hangar, trade shows, Emergency-, safety vehicles, public transportation etc.

## 3 Standard Configurations:

- ✧ Digital Display Step Adjustable Amplifier:RGA30-DV4 ,1 ea;
- ✧ Receiving Antenna: S440,1 ea;
- ✧ Cable Assembly:RG8,30M, 1ea;
- ✧ Cable Assembly:KSR240,20M,4 ea;
- ✧ Sending Antenna: GRA10, 4 ea.
- ✧ Ligting-protector:1 ea;

The cable assembly can be selected according to the customer's environment, and can communicate with our company's technicians.

#### 4. Topological (Under standard configuration)



## 5. Kits include

### 5.1 Digital Display Step Adjustable Amplifier RGA30-DV4

#### 5.1.1 Function:

Used to adjust system gain, 0-30 dB adjustable, you can control when needed. The input can be set to energize 5V DC or not energized.

With AC220/9V power adapter, supply power to system and itself.

① ② are RGA30-DV4 input and output. One way input, 4 way output.

③ For power control switch. System power-on when allocated to upward, opposite, system stops working.

④ For the gain adjustment button, you can adjust the gain size. You can adjust the controller gain increase or decrease. (Through the GAIN button to adjust . UP to the big , down to small.)

⑤ For the input power setting, IN for the input, PDC that power, BDC that is not power.

⑥ For the digital display, showing the current gain value of the amplifier, and the voltage of the input port.





### 5.1.2 Specification

#### Electrical Specifications, Operating Temperature -40 to 85° C

Parameter	Conditions	Min	Typ	Max	Units
Freq. Range	In- Output ports, 50Ω	1164		1616	GHz
In &Out Imped	In, all output ports		50		Ω
Gain 1207MHz 1227MHz 1561MHz 1575MHz 1609MHz	In- Output ports -45dBm Input Level		0~30		dB
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1	0~30	(0~30)+1	
		(0~30)-1.5	0~30	(0~30)+1.5	
Input SWR				2.5:1	-
Output SWR				2.5:1	-
Noise Figure				3	dB
Gain Flatness				3	dB
Phase Balance				1.0	deg
Group Delay Flatness				1	ns
Current	Pass DC, No Powered configuration, DC input on Out Port			250	mA
Max RF Input	Max RF input without damage			0	dBm

## 5.2 Antenna

### 5.2.1 Antenna (Receiving antenna) : S440



**Function: Receive satellite signal**

- GPS:L1,L2,L5;
- GLONASS:G1,G2;
- Beidou2:B1,B2,B3
- Galileo: E1,E2,E5a,E5b;

**Electrical parameter:**

Frequency [MHz]	1555~1623/1164~1288
Gain[dBi]	40±2(LNA included)
Polarization	right-hand circular polarized (RHCP)
Axial ratio [dB]	≤3
Elevation Coverage	360°
Input (VSWR)	≤2.0
Impedance	50Ω

**Low Noise Amplifier: Specifications:**

Gain(dB)	40±2
Flatness in bandwidth(dB)	±2 dB
Noise Figure(dB)	≤2
Output (VSWR)	≤2.0
Input (VSWR)	≤2.0
DC Voltage(V)	3.3-12V
DC Current(mA)	≤45

**Mechanical characteristic**

Size [mm]	Ø165×68.8
Connecting	TNC-C-K
Operation Temperature [°C]	-40~+85
Reposition Temperature [°C]	-55~+85
Humidity [%]	95% non-condensin

## 5.2.2 Transmitting antenna:GRA10



### Function: Transmit satellite signal

- ✧ GPS:L1,L2,L5;
- ✧ GLONASS:G1,G2;
- ✧ Beidou2:B1,B2,B3

### Mechanical characteristic:

Dimension	Ø165×68.8
Weight	185g
Circumstance	Indoor
Material	UV-Protected ABS
Connector	SMA/N Female
Operating temperature	-40°C~+60°C
Limit Temperature	-55°C~+70°C
Operating Humidity [%]	5~95

### Specifications:

Frequency [MHz]	1150~1800
Input impedance	50Ω
Polarization type	Vertical polarization
Horizontal coverage angle	360°
Input (VSWR)	≤1.45
Intermodulation	< -110dBm
Gain	3.0dBi

## 5.3 Cable Assembly



RG8,30M

We apply two cable assembly, RG8,30M and KSR240,20M.

Please log in [www.gemsnav.com](http://www.gemsnav.com), enter RG8 or KSR240, then you can see the two cable's technical specification.

### 5.3.1 RG8(KSR 400)

RG8,30M is usually used for connecting Receiver antenna S440 and lightning-protector. You can calculate the length according to your actual environment, also 60m or 90 be selected.

Connector N Male-N Male.

The attenuation value is 0.2 dB/m; Thus, you can assess the system, or contact with our sales to select proper configuration.

Tel:86-755-29644311

Fax:86-755-29644383-816

Email:[sales@gemsnav.com](mailto:sales@gemsnav.com)

### 5.3.2 KSR 240

KSR240,20M is usually used to connect RGA30-SV4 and GRA10.

The attenuation value 0.4dB/M.

Connector: N Male-SMA Male.

### 5.3.3 Select Connector

Connectors are industrial standard component, below are selectable:





SMA Connectors (Male - Female)



BNC Connectors (Male & Female)



N Connectors (Male - Female)



TNC Connectors (Male & Female)

## 5.4 Model Naming Rules

### GNSSRK-DV4 - DC

Part Number:

**Standard:**

S440, RGA30-DV4, with 230/5V Power adapter

Power Options:

**Blank(Standard) – With 230/5V Power adapter**

-Optional With -48V Power adapter

## 5.5 Frequency Reference Table

Global/Compass Navigation Satellite Systems(GNSS/CNSS)	5					2					6/3			6					1												
Frequency (MHz)	1164	1176	1188	1192	1207	1215	1219	1227	1239	1245	1252	1259	1266	1268	1278	1290	1535	1540	1545	1550	1558	1558	1561	1563	1575	1587	1592	1602	1609	1616	2491
GPS(USA) L1,L2,L2C,L5	L5+/-12					L2/L2C+/-12					L6+/-5					L1+/-12															
Glonass(Russia) G1,G2						G2+/-7										G1+/-7															
Galileo(European) L1,E1,E2,E5(E5a,E5b),E6	E5+/-15 E5a+/-12 E5b+/-12										E6+/-12			L6+/-5		E2		L1+/-17		E1											
Compass (Beidou 2,China)	B2+/-10										B3+/-10			B1+/-2																	
Beidou 1 (China,Tx(LHCP)/Rx(RHCP))																					L	S									
IRNSS (India)	L5+/-15															L1+/-12					S+/-15										
OmniStar											O+/-14--->																				

## 6. Typical faults and solutions

GNSS repeater GNSSRK-DV4 fault location and remove:

First: To determine whether the RGA30-DV4 power supply connected, through the RGA30-DV4 digital display can be observer to lose whether there is voltage output, such as digital shows a voltage of about 5V, indicating normal power supply, RGA30-DV4 work properly. Otherwise, check, the power outlet for good contact.

Second: If the digital stepper is adjustable, the input port of the amplifier has a voltage of 5V, you need to check whether the fixing is steady between GRA10 and the cable.

Third: If the below two step were ok, please check the outdoor antenna S440 .You can, check the voltage between axis of the cable connector and the outer shielding layer to make sure it's 5V.If no voltage, the circuit has fault, please contact our technical support. If 5V,the antenna S440 can be suspected.(In fact, this case hasn't appear in our engineering projects.)

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