IT Controller JRN-260K
(IRIDIUM Satellite Communication)
Product Introduction
Rel . 1.00

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Locator Products Group
Products Development Department

JRC Mobility

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1. Introduction

"IT Controller JRN-260K" used IRIDIUM Satellite is a vehicle small terminal to have the GPS measure -ment function and the IRIDIUM Satellite communication function, and to use it for management and positional information track / theft pursuit etc. of the vehicle.

As a communications protocol SMTP/e-mail protocol are mounted.

The terminal made by the QUAKE's Q4000 is installed.

The main specification is presented as follows.

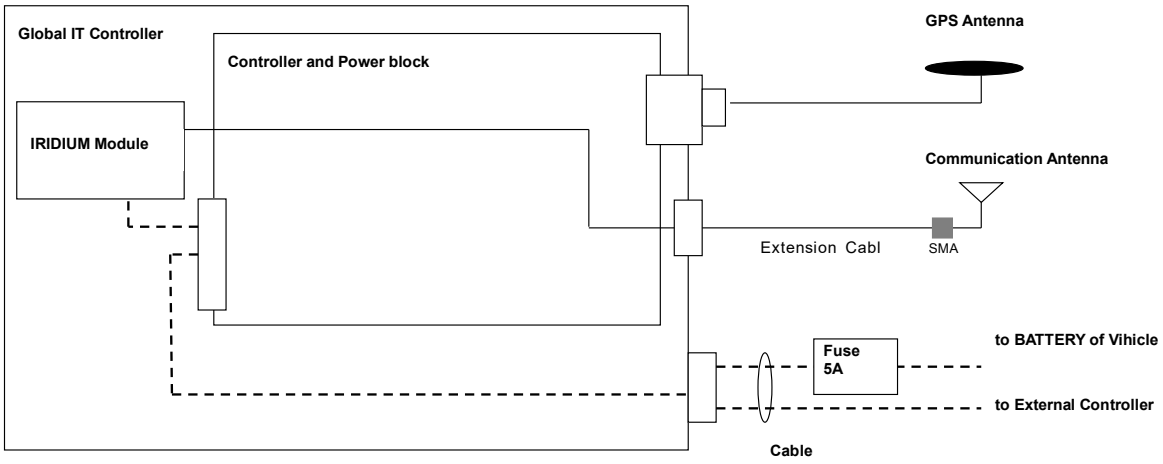
No.	Items	JRN-260K
1	Communication module	IRIDIUM Module（Q4000）is installed. PSK Modulation (Satellite Communication)
2	Data Rate	Uplink: 50kbps Downlink: 50kbps
4	Communication Antenna	Magnetic mount iridium antenna
5	Battery	The lithium ion rechargeable battery is installed.
6	Current and Voltage	23mA or less (Power saving mode) / 24V
7	Weight	1,500g or less

2. Composition

2.1. Items

No.	Equipment	Model	Quantity	Remarks
1	IT Controller	JRN-260K	1	
(1)	IRIDIUM Module	Q4000 (QUAKE GLOBAL) 1162-5000	1	
(2)	Battery Pack	NBB-2000 14.4V 1900mAh Rechargeable Battery	1	
2	GPS Antenna	NAY-3930G (YOKOWO)	1	
3	Communication Antenna	IAA.01.0151111 (Taoglas)	1	
4	Extension Cable	SMAJ-2.5DSQFB-BNCP-2150	1	

2.2. Overview



3. Function

(1) Operation in ACC OFF executes the following.
-1. Send data in daytime and nighttime.
-2. Response to calling from the server.
-3. Acquisition of information on the actual location by GPS,
and Generation of warning outside area.

(2) Storage of operation data
(3) Timer
Even if the main source of power is cut, the date and time are maintained.
(4) Backup
The rechargeable battery is installed. (14.4V / 1900mAh)
(5) Serial communication ports
4800bps (DTE), 115200bps (monitor)
(6) GPS function
Present location is acquired. (WGS84)
(7) IRIDIUM satellite communication
(8) Software rewriting function
A software rewriting is done by using the monitor port.
(9) Serial communications with the external equipment are done by the serial commands.
(10) Communication protocol
It transmits to the mail server by the e-mail.

4. Product specification

4.1. Common Specification

No.	Items	Specification performance
1	Power supply voltage	Voltage range DC+20 to +32V Range of voltage where IRIDIUM terminal (Q4000) can be transmitted: DC+20V to +32V
2	Battery pack	The lithium ion rechargeable battery 14.4V / 1900mAh
3	Current	Communication: Average current Less than 1.2A / 24V Idle: Less than 23mA/24V (Power-saving mode) ACC_OFF: 5mA or less /24V (ACC of linkage)
4	Circumference environment	Operation: -20 to +60 degree C Preservation: -40 to +85 degree C Humidity of operation: 0 to 90% (don't dew)
		At use in battery, Operation: -20 to +60 degree C Preservation: -20 to +65 degree C Humidity of operation: 0 to 90% (don't dew)
5	Environment (Charge)	0 to +40 degree C
6	Dimension	136.4(W)×220.0(D)×43.6(H) mm
7	Weight	1,500g or less
8	Case material	SPCC ISO 3574 : 1999 Cold-reduced carbon steel of commercial and drawing qualities (MOD)

4.2. Serial Interface Specification

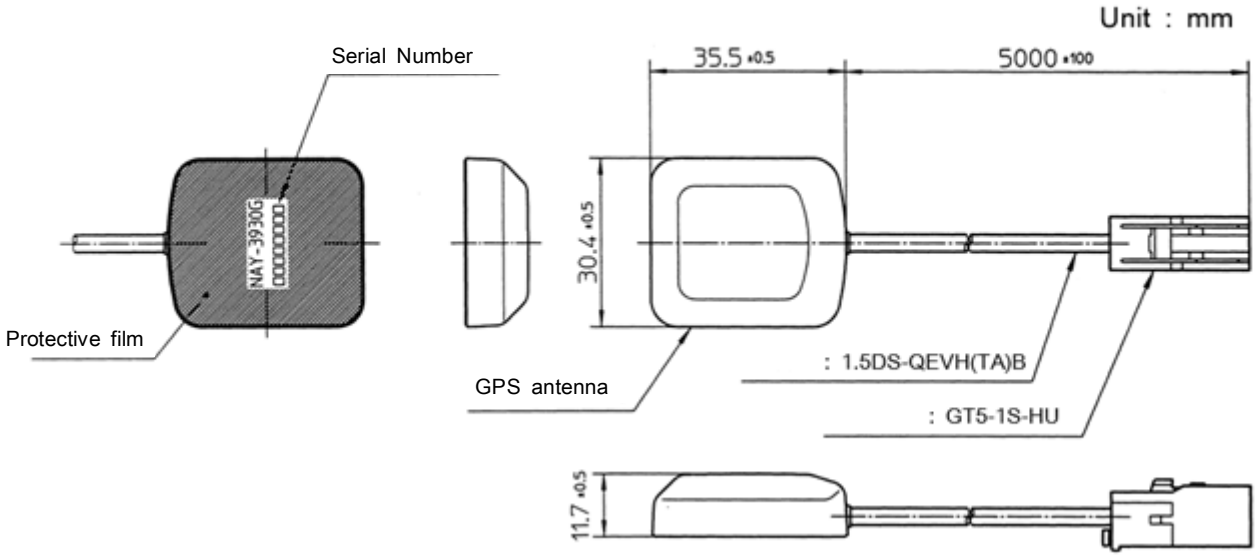
No.	Items	Specification performance
1	Data transmission	Half duplex start-stop synchronization
2	Signal level	RS-232C
3	Speed	4800bps
4	Frame length	Variable-length
5	Data Length	8 bit
6	Start bit	1 bit
7	Parity	None
8	Stop	1 bit

4.3. GPS Receiver Specification

No.	Items	Specification performance
1	Receiving Satellite	GPS
2	Receiving system	Max 23channel （high-speed search channel）
3	Received frequency	1575.42MHz(L1)、C/A code
4	Land survey system	WGS-84 （Default）
5	Time system	UTC
6	Positioning accuracy Position Speed Direction	 5.3m 2DRMS 0.04m/sec. RMS Less than 0.14° RMS (Speed60km/h)
7	Speed	1 sec typ
8	T.T.F.F (Without signal discontinuation) Open skies	Hot start: 3 sec typ. / 15sec max Warm start: 33 sec typ. / 55sec max Cold start: 40 sec typ. / 60sec max

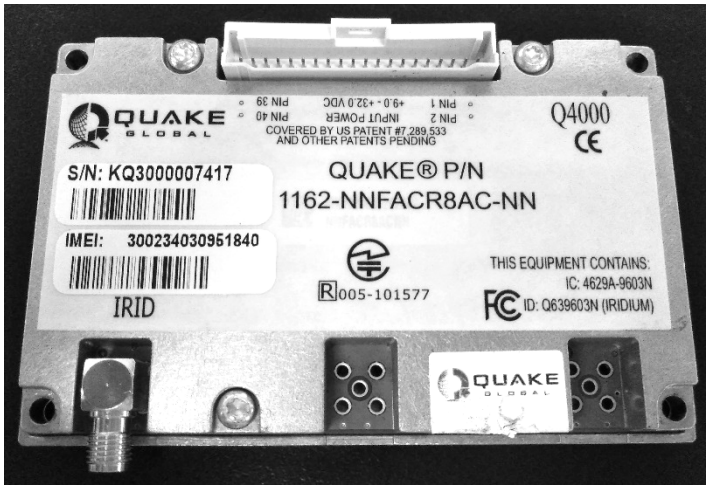
4.4. GPS Antenna

No.	Items	Specification performance
1	Model	NAY-3930G (YOKOWO)
2	Power supply voltage	2.7 to 3.3V
3	Consumption current	12 to 30mA
4	Cable	1. 5D Cable and 5M (Black)
5	Temperature range of operation	-30 to +70 degree C
6	Storage temperature range	-40 to +100 degree C
7	Humidity	20 to 95% (relativity, however thing without dew condensation)
8	Received frequency range	1575. 42±1.023MHz
9	Polarized wave	Right-handed circular polarization
10	Profit	25±6dBi (ascending vertical angle = 90 degrees)
11	Output impedance	50 ohms
12	OUTPUT VSWR	2.0, or less
13	Connector	GT5-1P-HU (HIROSE product)



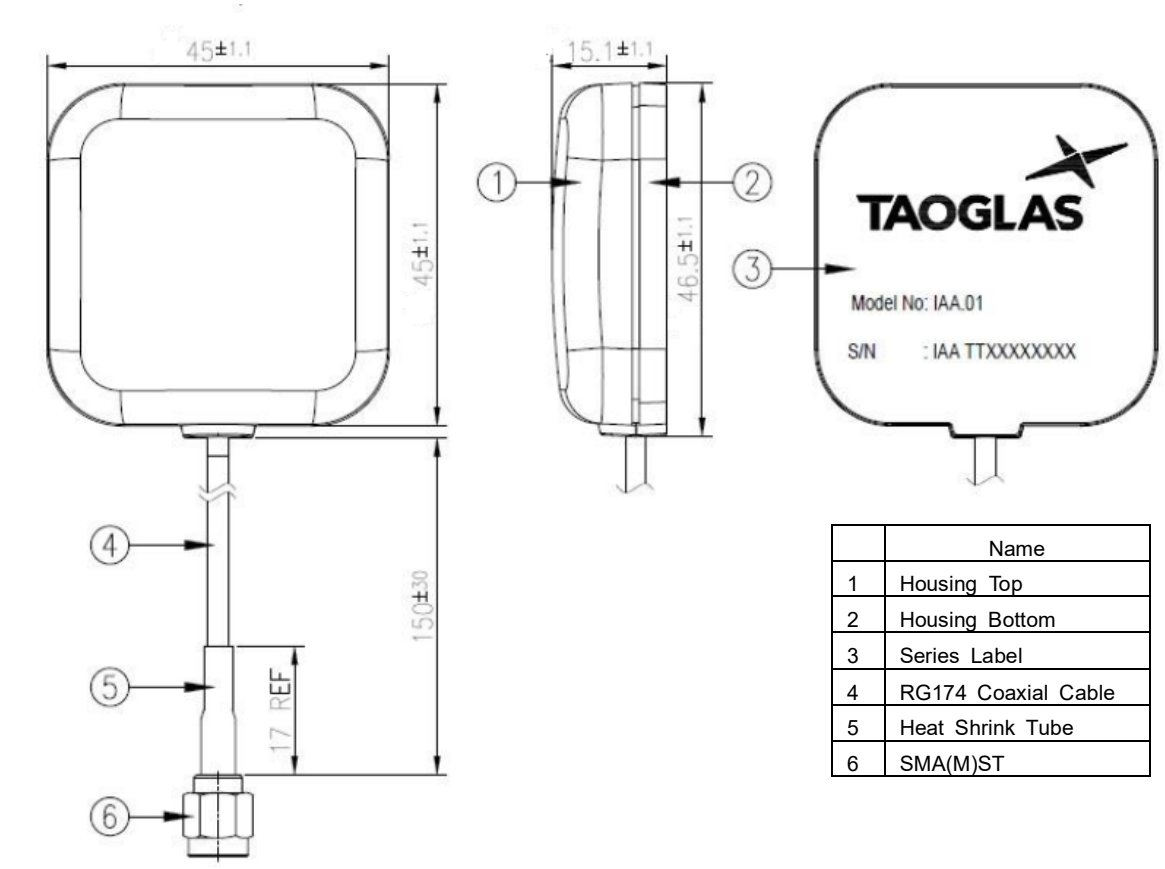
4.5. IRIDIUM Module (Q4000)

No.	Items	Specification performance
1	Model	Q4000（QUAKE GLOBAL）
2	Transmission	Packet
3	Communication	Satellite Communication
4	Frequency	1616~ 1626.5 MHZ
5	Modulation	PSK
6	Transmit Power	32dBm typical
7	RX Sensitivity	-116dBm BER $1x10^{-2}$ typ.
8	Access System	QCP（QUAKE Communication Protocol）
9	Data Rate	Uplink: 50kbps Downlink: 50kbps

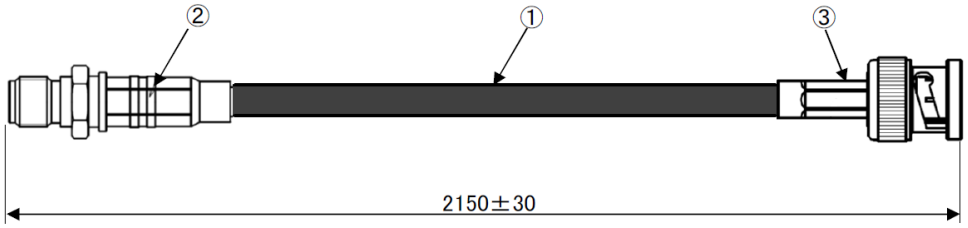


4.6. IRIDIUM Satellite Communication Antenna

No.	Items	Specification performance
1	Model	IAA.01.0151111（TAOGLAS）
2	Center frequency	1621MHz
3	VSWR	2 or less @ f0 (Center frequency)
4	Impedance	50Ω
5	Peak Gain	4.17dBi
6	Voltage-proof Input	2W
7	Input Connector	SMA(M)ST
8	MECHANICAL	Dimension: 45x45x46.5mm Weight: 34.6g Cable length: 0.15m of RG-174
9	Circumference Environment	Temperature range of Operation: -40 to +85 degree C Storage temperature Range: -40 to +85 degree C



	Name
1	Housing Top
2	Housing Bottom
3	Series Label
4	RG174 Coaxial Cable
5	Heat Shrink Tube
6	SMA(M)ST

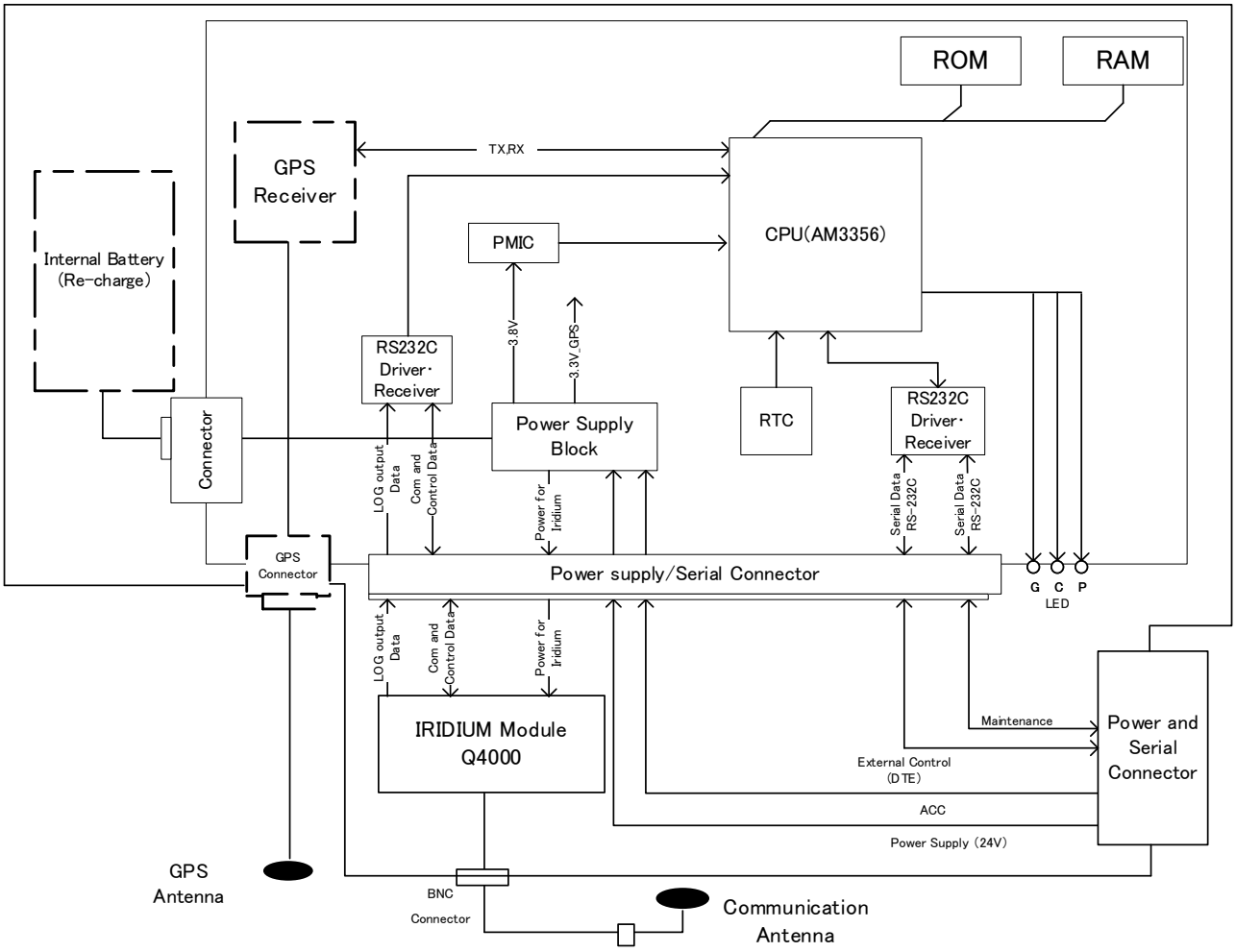


	Name
1	Coaxial Cable
2	SMAJ
3	BNCP

4.7. Internal Battery

NO.	Items	Specification performance
1	Model	NBB-2000
2	Description	The lithium ion rechargeable battery
3	Voltage	14.4V
4	Current Capacity	1900 mAh
5	Environment (discharge)	-20 to +60 degree C
6	Environment (Charge)	0 to +40 degree C
7	Discharging current (continuous)	205mA (RX)
8	Discharging current (pulse)	2000mA (TX, 1sec continuous)
9	Dimension	103mm × 41mm × 24mm
10	Connector	Cable (with connector)

5. Block Diagram

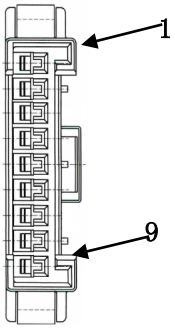


6. Interface

6.1. External Interface Specification

Pin Assign

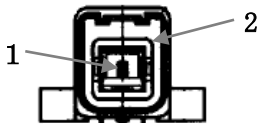
Number	Name	Remarks
1	GND	GND
2	Moni-Tx	ttys0 Monitor→ITcontroller
3	Moni-Rx	ttys0 ITcontroller→Monitor
4	GND	GND
5	DTE-Tx	ttys2 DTE→ITcontroller
6	DTE-Rx	ttys2 ITcontroller→DTE
7	GND	GND
8	ACC	ACC signal
9	BAT	Main battery



6.2. GPS Antenna Connector

Pin Assign

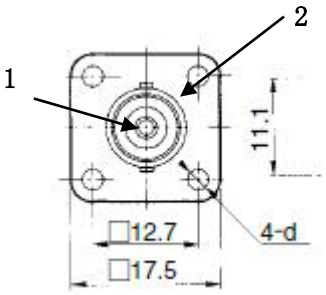
Number	Name	Remarks
1	RF	Received signal
2	GND	GND



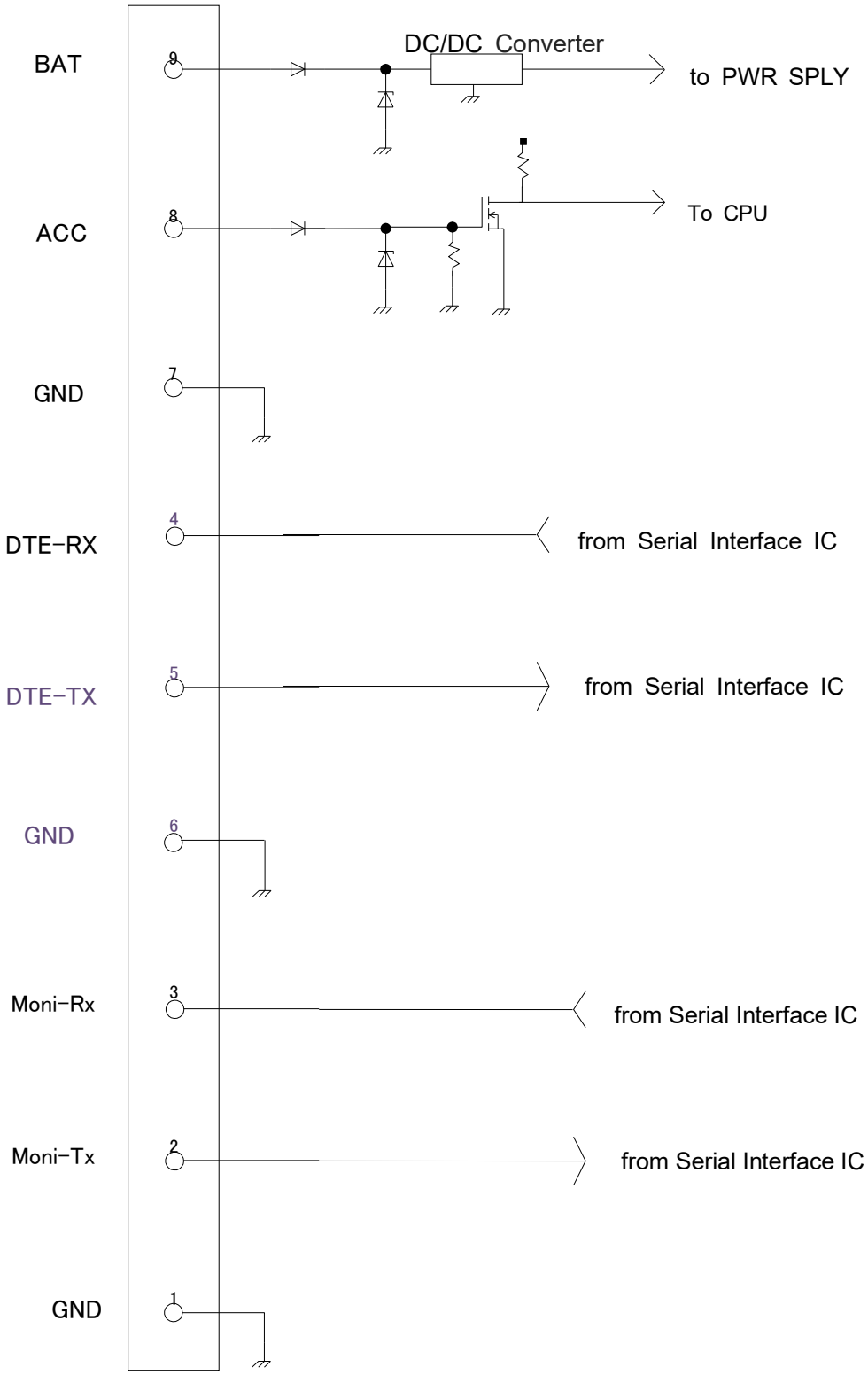
6.3. IRIDIUM Satellite Communication Antenna Connector

Pin Assign

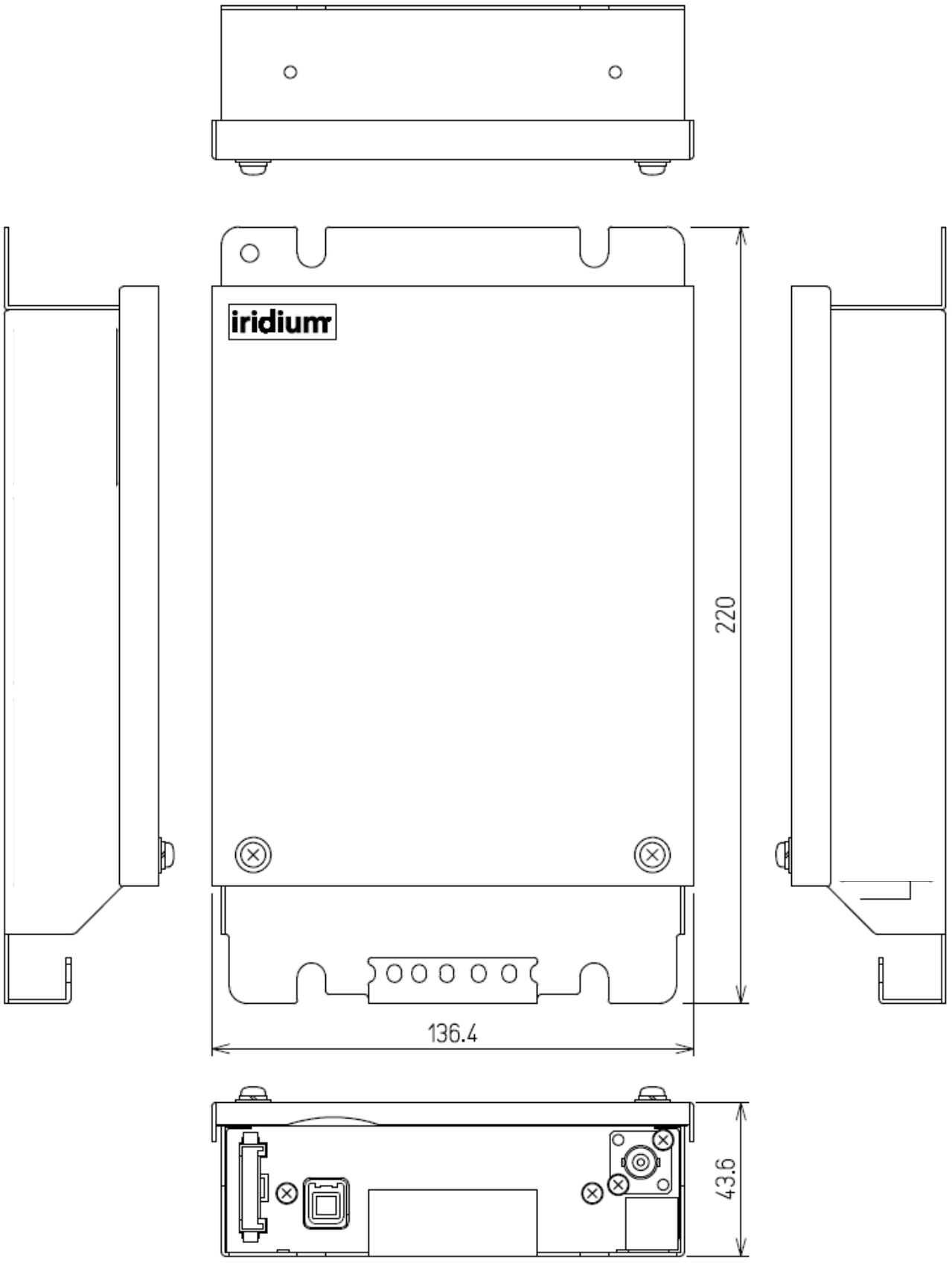
Number	Name	Remarks
1	RF	TX/RX
2	GND	GND



7. Equivalent circuit



8. Outline



9. Handling precautions

9.1. About specification value

Be sure to observe the specification value of this product. Using beyond the specification value may cause a malfunction.

	1 **Power supply voltage: Main unit (input voltage)** This is the maximum voltage that can be applied between the power supply terminal and the ground terminal (GND). If this voltage is exceeded, a failure may occur.
	2 **Operating temperature** This is the temperature range within which the operation can be performed with the specifications satisfied. If this temperature range is exceeded, the performance may not be satisfied. It may also cause a malfunction.
	3 **Storage temperature** This is the temperature range for storage without operation, and performance may not be satisfied if this temperature range is exceeded. It may also cause a malfunction.

9.2. Precautions for use

	1 This product is not suitable for use in locations where children are likely to be present.
	2 Do not remove or disassemble the screws of this product. Doing so may cause performance deterioration or failure.
	3 When performing maintenance with the screws removed, be sure to take measures against static electricity (battery replacement, reset switch operation, etc.). If not doing, it may cause performance degradation or malfunction.
	4 Dropping this product or leaving it outdoors for a long time may cause scratches, dirt, or malfunctions.
	5 This product is not designed for use in the following special environments. Do not use in the following special environment as it may cause performance deterioration and failure. ・ Water, oil, chemical liquid, organic liquid, etc. adhered or in liquid ・ Dust-filled environment ・ Locations with a lot of corrosive gases such as salt wind, chlorine, hydrogen sulfide, ammonia, sulfur oxide, hydrogen chloride, and subsulfide gas ・ Place where the entire this product gets wet (excluding GPS antenna) ・ Environment with strong static electricity and electromagnetic waves

	6	Do not use the product for medical equipment, Medical equipment that requires a high degree of safety that affects human life, Space / aviation equipment, Disaster prevention / crime prevention equipment and other equivalent equipment.
	7	Do not use the product near people wearing medical electrical equipment. There is a risk of medical equipment malfunction due to the influence of radio waves.
	8	Depending on the vehicle model, it may affect on-vehicle electronic devices. When installing or wiring, install and wire as far away from the on-vehicle electronic devices as possible. When installing a GPS antenna, install it as far away as possible from the car navigation system and other antennas. It may cause performance degradation.
	9	Do not immerse or wet this product. It may cause electric shock or malfunction. If there are water droplets, wipe with a dry cloth.
	10	Do not damage, break or process each cable. If a heavy object is put on, heated, pulled, or bent forcibly, the cable may be damaged, resulting in a fire or electric shock.
	11	Do not operate while driving a car or machine. It may cause an accident.
	12	If foreign matter such as water or metal gets inside, first turn off the power of this product, disconnect the power cable, and contact us. Using it as it is may cause fire, electric shock or malfunction.
	13	When cleaning, turn off the power and unplug the power cable for safety. It may cause fire or electric shock.
	14	When cleaning the surface, do not use organic solvents such as thinner or benzine. It may cause damage to the paint on the surface. To clean the surface, remove dust and dirt, and wipe with a clean cloth.

9.3. Notes on Equipment installation

	1	Install this product with the connectors facing down, fix the four upper and lower U-shaped notches with M6 bolts.
	2	Please do not put stress on the connector fitting part.
	3	When handling this product, pay sufficient attention to static electricity. It may break down due to static electricity. Be especially careful of static electricity on the interface connector.
	4	Be sure to turn off the power circuit before inserting the connector. Also, avoid twisting and insert in parallel.
	5	Be careful not to touch the interface connector terminals with bare or oily hands.
	6	The serial connector contact of this product is phosphor bronze and tin plated, so the socket contact on the inserted side should also be phosphor bronze and tin plated.
	7	Do not use or leave the product in places with high direct sunlight or high temperatures. It may cause overheating, deformation or failure of the equipment.
	8	Please install the main unit, antenna and cable so as not to interfere with operation and operation of equipment such as airbags.
	9	Please securely connect each cable to this product securely. It may cause the cable to come off or damage the connector.
	10	Do not install near devices that generate magnetic fields, such as high-voltage power transmission lines and transformers. The device may not work properly.
	11	The tightening torque when connecting the IRIDIUM Satellite Communication Antenna and the Extension Cable is as follows: Recommended：7 kgf･cm　　Upper limit：9kgf･cm
	12	Please properly waterproof treatment the joint between the IRIDIUM Satellite Communication Antenna and the Extension Cable.

9.4. Overcurrent protection

	1	This product does not have a built-in fuse for overcurrent protection. To prevent danger, use an overcurrent protection fuse on the power line.

9.5. Storage precautions

	1 Avoid locations that generate a lot of corrosive gas such as salt wind, chlorine, hydrogen sulfide, ammonia, sulfur oxide, hydrogen chloride, and subsulfide gas.
	2 Condensation will occur in places with rapid temperature and humidity changes. Avoid such an environment and store in a place with little temperature change.
	3 Do not place the product on an unstable place such as on a wobbling table or tilted. It may fall and cause malfunction or injury.
	4 Do not store in humid or dusty places. It may cause overheating, ignition or malfunction.

9.6. Carrying method

	1 Do not throw or drop. This product may be damaged.
	2 Do not get wet with water. Be careful not to get it wet during transportation during rainfall or snowfall.

9.7. Disposal

	1 This product will be collected and disposed of by us. Therefore, if it is necessary to dispose of the equipment due to aging or malfunction, please contact our sales department or your local branch / branch / sales office.
	2 Do not throw the batteries into fire. It may explode and cause fire or injury.

9.8. Other

	1 Please note that we are not liable for any malfunctions or abnormalities that may occur as a result of using this product in a manner that deviates from the contents described in this specification.
	2 With regard to the equipment described in this specification, parts may be changed to alternative parts within the range that does not impair the electrical, mechanical, and environmental resistance characteristics.
	3 If the chassis gets too hot to touch with your hands, do not touch the chassis directly, stop using it immediately, and contact our sales department or your local branch / branch / sales office.
	4 Never perform internal inspections or repairs by the customer. Inspection and repair by non-special maintenance personnel may cause a fire or electric shock. For internal inspection and repair, please ask our sales department or your nearest branch / branch / sales office or agency.

Explanation of symbol mark

	Caution	This symbol indicates general cautions, warnings, or dangers that are not specified.
	Instruction	This symbol tells the user what general actions are not specified.
	Instruction to turn off the power	This symbol indicates that the user should unplug the power plug from the outlet.
	Ban	This symbol indicates a general prohibition notice not specified.
	Disassembly ban	This symbol indicates a prohibition notice when disassembling this product may cause an electric shock or other trouble.
	No touch	This symbol indicates a prohibition notice when injury may occur by touching a specific part of this product under specific conditions.
	Water wet ban	This symbol indicates a prohibition notice when there is a possibility of electric shock or fire due to electric leakage when used in places subject to water, or when wetted, dipped, applied or spilled.

10. Compliance表記

10.1. Compliance with FCC/IC Rules and Regulations (USA and Canada)

・FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference, including interference that may cause undesired operation.

CAUTION:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

・IC

This Class [*] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [*] est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna type/Model name : pach antenna /7ABLE0010A
Maximum Antenna gain: 4.17dBi
Nominal impedance : 50Ω

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Type d'antenne /Nom du modèle	: antenne patch /7ABLE0010A
Le gain maximal de l'antenne:	4.17dBi
Impédance nominale	: 50Ω

・FCC/IC

RF exposure compliance
1) To comply with FCC/IC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Normes d'exposition RF
1) Afin de se conformer aux normes FCC / IC RF exigences de conformité de l'exposition, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de l'appareil et les personnes.
2) Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur.