

**BondaTherm**

# BondaTherm™



**Key Features of the BondaTherm Equalizer Kits:**

- Eliminates improper ratios and mixing errors
- Reduces material waste
- Eliminates employee contact with resins
- Eliminates messy hand mixing and transferring
- Increases productivity
- Resins are protected from moisture contamination

Wakefield Vette Part Number	Description	Packaging
BT-101-50M	Non-Sag 5 Minute BondaTherm Epoxy Adhesive	50ml Dual Cartridges
BT-102-50M	Toughened, Flexible Adhesive System	50ml Dual Cartridges
BT-301-50M	Fast Curing Thermally Conductive Adhesive	50ml Dual Cartridges
BT-301-200M	Fast Curing Thermally Conductive Adhesive	200ml Dual Cartridges
BT-01-50M	BondaTherm Equalizer Dispense Gun (50ml)	
BT-01-200M	BondaTherm Equalizer Dispense Gun (200ml)	
BT-02-50M	BondaTherm Equalizer Static Mixer (50ml)	
BT-02-200M	BondaTherm Equalizer Static Mixer (200ml)	
BT-101-50M-EQZ	Two Dual Cartridges (BT-101-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-102-50M-EQZ	Two Dual Cartridges (BT-102-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-301-50M-EQZ	Two Dual Cartridges (BT-301-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-301-200M-EQZ	Two Dual Cartridges (BT-301-200M), One Gun (BT-01-200M), Three Mixers (BT-02-200M)	Kit
BT-103-50M	5 Minute Clear Bondatherm Epoxy Adhesive	50ml Dual Cartridges
BT-302-50M	Fast Curing Aluminum Filled Bondatherm Epoxy Adhesive	50ml Dual Cartridges
BT-401-H	Silver Filled Bondatherm 2 gram Epoxy Hinge Packs	2 gram hinge pack
BT-402-H	Thermally Conductive Epoxy Potting UL Listed 100 gram Bondatherm Hinge Pack	100 gram hinge pack
BT-403-H	Aluminum Filled Bondatherm Epoxy Adhesive for Heat Sinks 100 gram Hinge Pack	100 gram hinge pack

## Bondatherm Cartridges



### BT-101-50M

This high bond strength adhesive is a clear 100% solids, two component, non-sag adhesive with a quick setting time of 5 minutes at room temperature. It is excellent for bonding plated metals, pewter, glass, wood, ceramic, felt, cement, gem stones, most plastics and rubbers, etc...

#### **DESCRIPTION:**

These high bond strength adhesives are clear 100% solids, two component, non-sag adhesives with a quick setting time of 5-46 minutes at room temperature. They are excellent for bonding plated metals, pewter, glass, wood, ceramic, felt, cement, gem stones, most plastics and rubbers, etc...

These adhesives were tested in our laboratory for flame retardancy properties. According to our test results they meet the requirements of UL94HB.

#### **APPLICATIONS:**

These unique adhesives are ideally suited for a wide range of electronic, electrical, industrial, structural, and jewelry applications. These adhesives are also an excellent choice for field repairs. They are offered in the popular BondaTherm Equalizer Kit dual barrel cartridge dispensing system and bulk packaging.

#### **FEATURES:**

- Non-sag consistency
- High bond strength
- Fast room temperature cure – three speeds to choose from
- Water & chemical resistance
- Outstanding thermal shock resistance
- 1:1 mix ratio
- Impact resistance

#### **SPECIFICATIONS:**

Color	Semi-transparent (available in black)
Mix ratio by volume	1:1
Mixed viscosity, 25°C cps*	Non-Sag
Solids content, %	100
Specific gravity, 25°C	1.15
Shore D hardness	
10-3005NS	86
10-3020NS	72
10-3046NS	65
Work Life, 25°C, minutes	
10-3005NS	3-5
10-3020NS	10-15
10-3046NS	25-30
Handling time, 25°C, minutes	
10-3005NS	15-20
10-3020NS	30-35
10-3046NS	55-60
Cure time, 25°C, hours	24-48

## Bondatherm Cartridges

### BT-101-50M (Cont.)



Coefficient of thermal expansion (in/in/°C)	60x10 <sup>-6</sup>
Operating temperature range, °C	-50 to +130
Dielectric strength, V/mil	420
Izod Impact ft-lb/in	2.7
Dielectric constant, 1KHz at 25°C	4.00
Dissipation factor, 1KHz at 25°C	.017
Volume resistivity, ohm-cm at 25°C	2.0 x 10 <sup>14</sup>
Shear strength, psi	
Aluminum (etched)	1,500
Cold rolled steel	1,000
Copper	960
Brass	725
Stainless Steel	750
Galvanized Steel	900
ABS	500
PVC	335
Polycarbonate	250
Compression strength, psi	8,500
Coverage, .005 in. thick bond line, sq. ft./gallon	320

#### **INSTRUCTIONS FOR USE:**

1. Thoroughly mix equal parts of resin to catalyst by weight or volume.
2. Apply evenly to both surface(s) to be bonded.
3. Application to the substrates should be made within five minutes. Larger quantities and/or higher temperatures will reduce the working time. Avoid mixing large quantities and/or at high temperature due to the possibility of creating a high exothermic temperature.
4. Join the coated surfaces. Allow to cure at 60°F (16°C) or higher until adhesive is set. Heat may be added up to 200°F (93°C) to accelerate the cure.
5. Avoid moving parts during cure. Pressure to the substrates is recommended. Maximum shear strength is obtained with a 3-5 mil bond line.

## Bondatherm Cartridges



### BT-102-50M

A two component system that forms strong structural bonds at room temperature. This unique adhesive system provides high peel and shear strengths. This is excellent for bonding many metals and woods, most plastics and rubbers and masonry products.

#### **DESCRIPTION:**

BT-102-50M is a toughened, flexible, and impact resistant epoxy adhesive. BT-102-50M is a two component system that forms strong structural bonds at room temperature. This unique adhesive system provides high peel and shear strengths. BT-102-50M is excellent for bonding many metals and woods, most plastics and rubbers and masonry products. This system is designed for electronic, aerospace and other demanding industrial applications.

This product is available in the popular BondaTherm Equalizer dual barrel cartridge system.

#### **FEATURES:**

- Impact resistant
- Excellent electrical insulator
- High peel and shear
- Outstanding structural bonds
- Convenient 1:1 Ratio
- Retention of strength after environmental aging

#### **Typical Specifications:**

Mixed viscosity, 25°C, cps	150,000
Specific gravity, 25°C,	
Resin	1.32
Catalyst	1.20
Gel time, 100 grams, 25°C	70 minutes
Tensile shear strength, psi	2,600
Durometer, shore D	70
Dielectric strength, V/mil	410
Dielectric constant, 60 Hz	4.4
Dissipation factor, 60 Hz	.02
Volume resistivity, ohm-cm	$1.1 \times 10^{15}$
Thermal conductivity, btu.in/hr.ft <sup>2</sup> .°F	.58 W/m-K
Coefficient of thermal expansion, per °C	$10 \times 10^{-5}$

Adhesive coverage: a .005-inch bond line will yield approximately 320sq. ft./gallon



## BT-102-50M (cont.)

## Bondatherm Cartridges

### **INSTRUCTIONS FOR USE:**

- 1) Surfaces must be clean and grease free. Use an oil free solvent such as acetone to wipe surfaces. Adhesion can be substantially increased by abrading the surfaces to be bonded with emery cloth, sand paper, carbide grinding tools, sand blasting, etc... A roughened, porous surface will produce the best results. Any oxidized metal films should be removed just prior to application of the epoxy adhesive mixture.
- 2) Thoroughly mix equal parts of resin and catalyst by volume.
- 3) Apply mixed product evenly to both surfaces.
- 4) Join the adhesive coated surfaces within 60 minutes of mixing resin and catalyst.
- 5) Cure according to one of the following schedules:

77°F	24-48 hours
150°F	2 hours
180°F	1 hour
200°F	30 minutes

### **STORAGE, HANDLING, AND AVAILABILITY:**

Store in a cool, dry place in original containers. Keep containers closed and stir well before using.



## BT-301-50M BT-301-200M

## Bondatherm Cartridges

BT-301-XXM has a simple 1:1 mix ratio and develops a 1,400 psi Lap Shear strength (aluminum to aluminum) in four hours at room temperature. After just twenty four hours the strength is over 2,200 psi. This is perfect for any thermally conductive applications.

### DESCRIPTION:

BT-301-XXM is a two component fast curing thermally conductive epoxy adhesive. This product was specifically formulated for use in the convenient BondaTherm Equalizer dual barrel cartridge system.

BT-301-XXM has a simple 1:1 mix ratio and develops a 1,400 psi Lap Shear strength (aluminum to aluminum) in four hours at room temperature. After just twenty four hours the strength is over 2,200 psi.

BT-301-XXM offers fast heat dissipation for a wide range of electronic applications. The black resin and white hardener provide an excellent visual indication of a complete mix.

### FEATURES:

- Fast room temperature cure
- Thermally conductive
- Forms strong bonds to a variety of substrates
- Electrically insulating
- Vibration and impact resistant
- 

### TYPICAL PROPERTIES:

Color	
Resin	Black
Hardener	White
Mixed	Dark Gray
Viscosity, @25°C, cps	
Resin	70,000
Hardener	70,000
Specific Gravity, @25°C	
Resin	1.5
Hardener	1.5
Gel Time, 25°C, 15 grams	15 minutes
Durometer, Shore D	
@25°C	80
@70°C	50
Lapshear Strength (Al to Al), psi	
After 4 hours	1,413
After 24 hours	2,231

## Bondatherm Cartridges



### BT-301-50M BT-301-200M (cont.)

Thermal Conductivity, W/m- K	1.04
Dielectric Strength, V/mil	440
Dielectric Constant, 25°C, 100Hz	5.3
Volume Resistivity, ohm-cm, 25°C	2.4 x 10 <sup>12</sup>
Coefficient of Thermal Expansion, ppm/°C	
Below Tg	45
Above Tg	175
Operating Temperature, °C	-40 to +120

#### NOTES:

- 1) At room temperature, BT-301-XXM will reach handle cure within 1-2 hours. The lap shear strength is 1,413 psi after 4 hours.
- 2) This product is an adhesive and is not designed for potting and encapsulating applications. BT-301-XXM is a fast reacting epoxy system and it will create a high exothermic temperature in large mass sizes (avoid mass sizes greater than 25 grams).

#### INSTRUCTIONS FOR USE:

- 1) Surfaces must be clean and grease free. Use an oil free solvent such as acetone to wipe surfaces. Adhesion can be substantially increased by abrading the surfaces to be bonded with emery cloth, sand paper, carbide grinding tools, sand blasting, etc... A roughened, porous surface will produce the best results. Any oxidized metal films should be removed just prior to application of the epoxy adhesive mixture.
- 2) Dispense material from BondaTherm Equalizer.  
Apply mixed product to substrate to be bonded.
- 3) Join substrates within 3-5 minutes.
- 4) Cure according to one of the following schedules:
- 5)

25°C	2-4 hours
65°C	< 10 minutes

#### STORAGE, HANDLING AND AVAILABILITY:

Store in a cool, dry place in original containers.

Please read and understand the Safety Data Sheet (SDS) before using this product.





## BT-103-50M

# Bondatherm Cartridges

These high bond strength adhesives are clear 100% solids, two component, low viscosity adhesives with a quick setting time of 5-46 minutes at room temperature. They are excellent for bonding plated metals, pewter, glass, wood, ceramic, felt, cement, gem stones, most plastics and rubbers, etc...

These adhesives were tested in our laboratory for flame retardancy properties. According to our test results they meet the requirements of UL94HB.

### **APPLICATIONS:**

These unique adhesives are ideally suited for a wide range of electronic, electrical, industrial, structural, and jewelry applications. These adhesives are also an excellent choice for field repairs. They are offered in the popular TriggerBond® dual barrel cartridge dispensing system and bulk packaging.

### **FEATURES:**

- High bond strength
- Outstanding thermal shock resistance
- Water and chemical resistance
- Impact resistance
- 1:1 mix ratio
- Fast room temperature cure – three speeds to choose from

### **TYPICAL SPECIFICATIONS (10-3005)**

Color	Clear (available in black)
Mix ratio by volume	1:1
Mixed viscosity, 25°C cps * Solids content, %	12,000 100
Specific gravity, 25°C Shore D hardness	1.15
10-3005	86
10-3020	72
10-3046	65
Work Life, 25°C, minutes	
10-3005	3-5
10-3020	10-15
10-3046	25-30
Handling time, 25°C, minutes	
10-3005	15-20
10-3020	30-35
10-3046	55-60
Cure time, 25°C, hours	24-48





## BT-103-50M (Cont.)

## Bondatherm Cartridges

Coefficient of thermal expansion (in/in/°C)	60x10 <sup>-6</sup>
Operating temperature range, °C	50 to *130
Dielectric strength, V/mil	420
Izod Impact, ft-lb/in.	2.7
Dielectric constant, 1KHz at 25°C	4.00
Dissipation factor, 1KHz at 25°C	.017
Volume resistivity, ohm-cm at 25°C	2.0 x 10 <sup>14</sup>
Shear strength, psi	
Aluminum (etched) Cold rolled	
steel Copper	
Brass	1,500
Stainless Steel	1,000
Galvanized Steel	960
ABS	725
PVC	750
Polycarbonate	900
Compression strength, psi	500
Coverage, .005 in. thick bond line, sq. ft./gallon	335
	250
	8,500
	320

### INSTRUCTIONS FOR USE:

1. Thoroughly mix equal parts of resin to catalyst by weight or volume.
2. Apply evenly to both surface(s) to be bonded.
3. Application to the substrates should be made within five minutes. Larger quantities and/or higher temperatures will reduce the working time.  
Avoid mixing large quantities and/or at high temperature due to the possibility of creating a high exothermic temperature.
4. Join the coated surfaces. Allow to cure at 60°F (16°C) or higher until adhesive is set. Heat may be added up to 200°F (93°C) to accelerate the cure.
5. Avoid moving parts during cure. Pressure to the substrates is recommended. Maximum shear strength is obtained with a 3-5 mil bond line.

## Bondatherm Hardware

Wakefield Vette Part Number	Description
BT-01-50M	BondaTherm Equalizer Dispense Gun (50ml)
BT-01-200M	BondaTherm Equalizer Dispense Gun (200ml)
BT-02-50M	BondaTherm Equalizer Static Mixer (50ml)
BT-02-200M	BondaTherm Equalizer Static Mixer (200ml)

### Bondatherm Equalizer Gun

BT-01-50M

For use w/ 50ml Cartridges



BT-01-200M

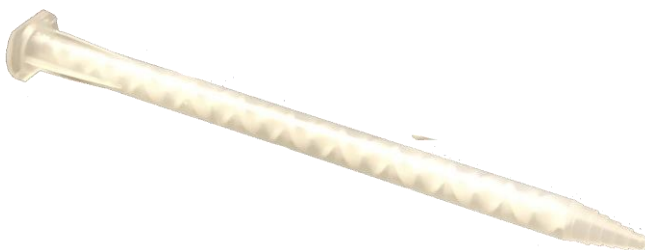
For use w/ 200ml Cartridges



### Bondatherm Equalizer Static Mixers

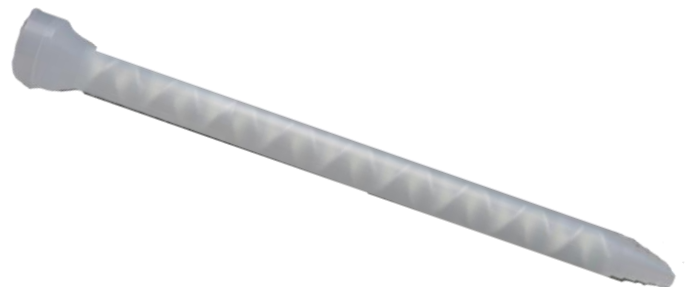
BT-02-50M

For use w/ 50ml Cartridges



BT-02-200M

For use w/ 200ml Cartridges



# BondaTherm Equalizer Kit

Wakefield Vette Part Number	Description	Packaging
BT-101-50M-EQZ	Two Dual Cartridges (BT-101-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-102-50M-EQZ	Two Dual Cartridges (BT-102-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-301-50M-EQZ	Two Dual Cartridges (BT-301-50M), One Gun (BT-01-50M), Three Mixers (BT-02-50M)	Kit
BT-301-200M-EQZ	Two Dual Cartridges (BT-301-200M), One Gun (BT-01-200M), Three Mixers (BT-02-200M)	Kit

(2) Dual Cartridges,  
(1) Dispense Gun, (3) Static Mixers





## Bondatherm Hinge Packs

### BT-401-H

#### DESCRIPTION:

BT-401-H is a two component epoxy adhesive filled with silver. This electrically conductive epoxy resin formulation offers continuity of conductivity with an electrical resistivity value of less than  $1 \times 10^{-4}$  ohm-cm. 40-3900 is also well known for its wide operating temperature range, -50 to + 170°C.

BT-401-H is specifically designed for adhesive bonding in microelectronic and optoelectronic applications. Due to its excellent continuity, it has also been used extensively in applications such as micro-wave EMI and RFI shielding, in the assembly or repair of printed circuit boards, wave guides, electronic modules, flat cable, high frequency shields, connectors, circuitry, and as a cold solder.

BT-401-H is formulated with pure silver (no alloys) and is designed in a convenient 1:1 mix ratio.

Both the resin and hardener have silver powder dispersed.

#### FEATURES:

- Electrically conductive
- Thermally conductive
- Room temperature cure
- Easy 1:1 mix ratio
- Good bond strength

#### TYPICAL SPECIFICATIONS:

Mix Ratio, by Weight	1:1
Color	Silver
Mixed Viscosity	Creamy Paste
Pot Life, 100 gram mass @ 25°C	1 Hour
Specific Gravity, 25°C	
Resin	2.98
Hardener	1.8
Hardness, Shore D	70
Thermal Conductivity, W/m- K	7.93
Tensile Lapshear, psi (Al to Al)	700
Flexural Strength, psi	10,200
Volume Resistivity, ohm-cm	.0001
Operating Temp. Range, °C	-50 to +170
Cure Schedule	a) 24 hours @ 25°C b) 1 hour @ 65°C c) 15 minutes @ 90°C

#### STORAGE AND HANDLING:

BT-401-H Resin and hardener should be stored at 25°C in original tightly sealed containers. Expected shelf life is twelve months in original unopened containers.

Filler settling is common with these products. Gently stir resin and hardener before using to make sure fillers are evenly dispersed.

# Bondatherm Hinge Packs



## BT-402-H

### DESCRIPTION:

BT-402-H has been formulated to meet the stringent non-burning requirements of UL94 V-0. BT-402-H Black Epoxy is used with Catalyst 190 and are listed with Underwriter's Laboratory for passing UL94 V-0. This system offers excellent heat transfer, low shrinkage, and outstanding insulation properties.

BT-402-H Black with Catalyst 190 **passes NASA's outgassing requirements** per ASTM E595-07. Other Catalyst's are available as well (30, 150.).

Typical applications for BT-402-H include encapsulating power supplies, transformers, coils, insulators, sensors, etc... This system is an excellent choice for applications requiring high thermal conductivity and flame retardancy.

### TYPICAL SPECIFICATIONS:

Viscosity @ 25°C cps, Resin	60,000
Mixed with Cat. 190	28,000
Mixed with Cat. 30	17,000
Mixed with Cat. 150	1,500
Specific Gravity, 25°C	1.6
Hardness, Shore D Color	90
Tensile Strength, psi	Black
Linear Shrinkage, in/in	9,850
Operating Temp. Range, °C	.002
Dielectric Strength, V/mil Dielectric	*60 to *200
Constant at 60 Hz	485
Volume Resistivity, ohm-cm, 25°C	5.6
Dissipation Factor, 60 Hz	1.5 x 10 <sup>15</sup>
Thermal Conductivity, W/m- K	.015
Compressive Strength, psi	2.16
	15,000
Coefficient of Expansion, in/in F	1.4 x 10 <sup>-5</sup>
Heat Distortion, °C Outgassing	155
(with Cat. 190)	
%TML	.50
%CVCM	.01

### INSTRUCTIONS FOR USE:

A. With Catalyst 190 listed with UL 94 V-0 (room temperature curing):

1. By weight, thoroughly mix 5 parts Catalyst 190 to 100 parts BT-402-H resin.
2. Degas and pour. Cure at room temperature for 12-24 hours at 25°C ambient.

B. With Catalyst 30 listed with UL 94 V-0 and RTI Rating of 130°C (Heat curing - Recommended for higher operating temperature and physical property applications):

1. By weight, thoroughly mix 10 parts Catalyst 30 to 100 parts BT-402-H resin.
2. Pour and cure according to one of the following recommended cure schedules:
  - a) 85°C (185°F) 3-4 hours
  - b) 100°C (212°F) 2-3 hours
 For optimum performance, an additional 2 hours @ 365°F (185°C) is recommended.

C. With Catalyst 150 (room temperature/heat curing):

1. By weight, thoroughly mix 17 parts Catalyst 150 to 100 parts BT-402-H resin.
2. Degas and pour. Cure at room temperature for 24 hours or for 2-3 hours at 35-40°C.

# Bondatherm Hinge Packs



## BT-403-H

### DESCRIPTION:

BT-403-H is a two component, aluminum filled epoxy system. This system is used for making heat resistant tools, parts, or bonds that require the highest thermal conductivity and heat resistance. We have developed this extremely conductive epoxy by formulating it with a unique combination of fillers, particle sizes and dispersion techniques.

BT-403-H has good heat dissipation making this a popular choice for a variety of heat sink applications. Its viscosity is particularly suited for Fin bonding.

BT-403-H passes NASA's outgassing requirements per ASTM E-595-07.

### FEATURES:

- Excellent Thermal Conductivity
- Superior Adhesion
- Low Viscosity allows quick self leveling

### TYPICAL SPECIFICATIONS:

Color	Grey
Viscosity, 25°C, Resin	130,000
Mixed	8,000
Specific Gravity, 25°C	1.81
Working time, 100 grams, 25°C	5 Hours
Durometer, Shore D 25°C	90
100°C	65
Tensile Strength, psi, 25°C Aluminum to Aluminum 1" overlap	9,000  2,500
Compressive Strength, PSI, 25°C Mix	18,500
Ratio, by weight	100:10
Operating temperature, °C	-55 to 155
Coefficient of Thermal Expansion, °C Thermal	28 x 10 <sup>-6</sup>
Conductivity, W/m- °K	4.5
Outgassing % TML	.91
% CVCM	.07

### MIXING INSTRUCTIONS:

- 1) By weight thoroughly mix 100 parts BT-403-H epoxy with 10 parts BT-403-H.
- 2) Cure according to one of the following schedules:

25°C	24 Hours
65°C	45 Minutes
125°C	15-20 Minutes

To reduce the viscosity of the resin and help with air release, warm the resin to moderate temperatures (80-100F) before adding the curing agent. Some settling is common during storage and transit. Premix resin thoroughly before adding curing agent.



Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А