

6605A

1PPS Distribution Amplifier

Operation Instructions

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Safety Requirements

Thank you for choosing our product. Please read this manual carefully before using the instrument for the first time. It will help you operate the instrument proficiently.

We continuously improve our products; therefore, the instrument you are using may differ slightly from this manual. If any changes are made, we will inform you by providing supplementary documentation. Should you have any questions, please contact our after-sales service department.

Warning: Input and output terminals may carry voltage. Electrical sparks may be generated when connecting or disconnecting test leads and power cords. Exercise caution to avoid electric shock. Always prioritize personal safety.

Prevent Fire or Personal Injury

- Use appropriate power cords. Only use power cords that are specific to this product and meet its specifications.
- Product grounding. This product must be grounded through the grounding wire of the power cord, and the grounding post on the product chassis must also be grounded. To prevent electric shock, the grounding conductor must be connected to earth ground. Before connecting to the input or output terminals of this product, ensure that the product is properly grounded.
- Observe all terminal ratings. To prevent fire or electric shock hazards, please pay attention to all ratings and markings of this product. Before connecting this product, please read this user manual for further information on the rated values.
- Do not operate when a malfunction is suspected. If you suspect that this product is damaged, please contact our maintenance personnel and do not continue to operate it.
- Do not operate in humid environments.
- Do not operate in explosive environments.
- Keep the product surface clean and dry.

Safety Precautions

The product manufacturer has ensured complete safety under correct usage conditions when designing this product.

- Please carefully follow the safety guidelines in this manual to avoid personal injury or damage to the instrument.

- Be sure to operate and use the instrument according to the instructions in this manual.
- This instrument does not contain hazardous substances.
- Instrument maintenance must be performed by qualified technicians only.

A. Specifications

- Pulse input: 1PPS (Input A and Input B).
- Pulse output: 1PPS, 12 channels.
- Isolation degree between output channels: ≤ 90 dBc.
- Output interface: BNC; supports TTL/LVTTL level switching.
- 1 x RJ45 network connection; 1 x DB9 serial port connection.
- 2 x pulse inputs available depending on option; 12 x pulse outputs available depending on option.

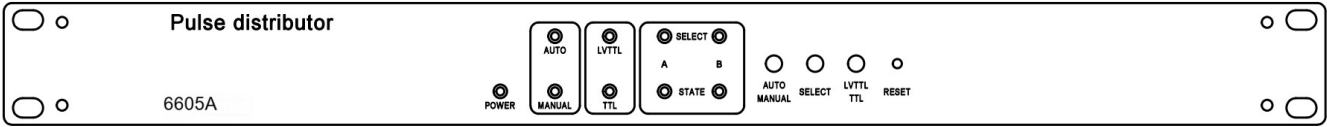
Parameter	Value
Phase Noise @ 1 Hz	≤ -110 dBc/Hz
Phase Noise @ 10 Hz	≤ -140 dBc/Hz
Phase Noise @ 100 Hz	≤ -150 dBc/Hz
Phase Noise @ 1 kHz	≤ -155 dBc/Hz
Phase Noise @ 10 kHz	≤ -160 dBc/Hz
Stability	$\leq 3 \times 10^{-13}$ (1s)
Power Consumption	≤ 20 W (@25C), AC: 85~264VAC, 50~60Hz
Operating Temperature	-10C ~ +60C
Storage Temperature	-30C ~ +70C
Weight	≤ 4 kg

Table 1: Key Technical Specifications

B. Panel Instructions

1. Front Panel

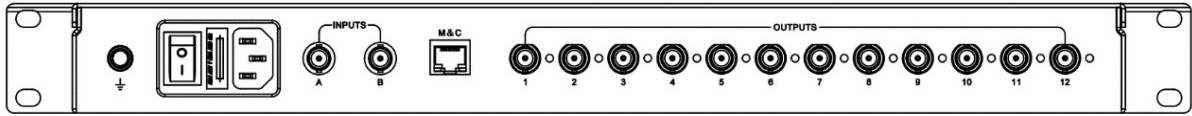
The front panel features nine LED indicators and four buttons. The LED indicators are: POWER, AUTO, MANUAL, LVTTTL, TTL, SELECT A, SELECT B, STATE A, and STATE B. The buttons are: AUTO/MANUAL, SELECT, LVTTTL/TTL, and RESET.



Item	Color	State Definition
POWER	Green	Steady: Device powered on; Off: Abnormal power supply
AUTO	Green	Steady: Automatic input selection mode
MANUAL	Green	Steady: Manual input selection mode
LVTTTL	Green	Steady: LVTTTL output level selected
TTL	Green	Steady: TTL output level selected
SELECT A	Green	Steady: Channel A input selected
SELECT B	Green	Steady: Channel B input selected
STATE A	Green	Steady: 1PPS signal detected on Input A; Off: No signal
STATE B	Green	Steady: 1PPS signal detected on Input B; Off: No signal
AUTO/MANUAL	Button	Toggle between automatic and manual input selection mode
SELECT	Button	Manually select Input A or Input B (in manual mode)
LVTTTL/TTL	Button	Toggle output level between LVTTTL and TTL
RESET	Button	Press and hold 5s to restore factory settings

2. Rear Panel

The rear panel of the device, from left to right, includes: Grounding Pillar, Power Interface, 1PPS Input A, 1PPS Input B, Network Port (M&C), 1PPS Output Interfaces 1-12, Output State LEDs 1-12.



- Grounding Pillar: Chassis grounding connection.
- Power Interface: AC power supply socket.
- 1PPS Input A/B: External 1PPS pulse signal inputs.
- Network Port: Device network monitoring interface (M&C).
- 1PPS Output Interfaces 1-12: Pulse signal output interfaces (BNC).
- Output State LEDs 1-12: Signal output state indicators (green = normal, off = abnormal).

C. Instructions

After powering on, connect a valid 1PPS input signal to the device. Once the device status indicator turns green and stays on, the device is ready for use.

1. Signal Input Selection

The device supports two methods for input signal selection:

- Manual selection: Use the SELECT button on the front panel to switch between Input A and Input B. Manual mode must be enabled first.
- Automatic selection: In AUTO mode, the device automatically selects the input channel based on signal availability and quality.

The automatic selection priority is as follows:

Priority	Input Selected	Condition
1	Input A	Input A is valid, Input B is invalid
2	Input B	Input A is invalid, Input B is valid
3	Input A	Both valid, amplitude of A > B by 1 dBm
4	Input B	Both valid, amplitude of B > A by 1 dBm

2. Control Mode

The device supports two control modes, selectable via the AUTO/MANUAL button on the front panel:

- **AUTO Mode:** The device automatically selects input switching according to the signal input status. Manual selection is disabled in this mode.
- **MANUAL Mode:** The device switches according to the input channel selected by the button or network command. Automatic selection is disabled in this mode.

3. Output Level Selection

The device supports two output level standards, selectable via the LVTTL/TTL button on the front panel or through the WEB/network interface:

- **LVTTL:** Low-Voltage TTL level output.
- **TTL:** Standard TTL level output.

4. Network Monitoring

The device supports real-time working status monitoring via the network using UDP protocol only. Network configuration can be set and changed through the upper computer network tool.

Default network configuration:

- **IP Address:** 192.168.1.201
- **Subnet Mask:** 255.255.255.0
- **Gateway:** 192.168.1.1
- **Net Dest IP:** 192.168.1.255
- **UDP Server Port:** 3000
- **UDP Client Port:** 3001

5. Restore Factory Settings

Press and hold the RESET button on the front panel for 5 seconds to restore the device network configuration to factory defaults. After resetting, the default network parameters described above will be applied.

6. WEB Operation

Through the network monitoring port, you can log in using a web browser to view and configure device status and settings.

6.1 Login

Connect the device monitoring network port to your computer. Open a web browser, enter the device IP address, and input the username "admin" and password "123456".

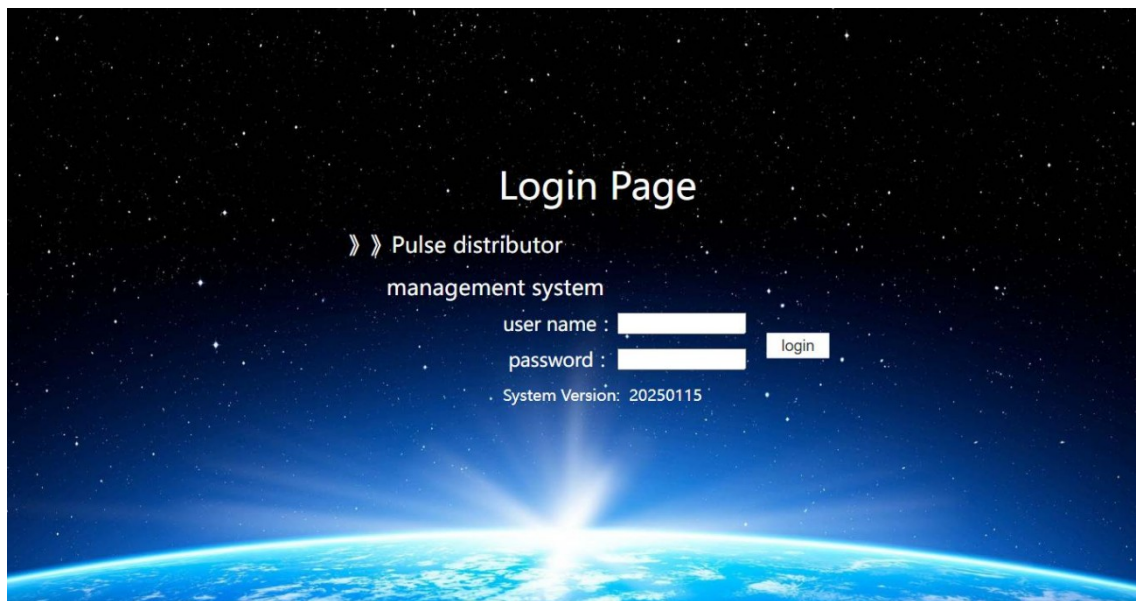


Figure 1: WEB Login Interface

6.2 Status Check

Click the "Device Monitor" tab at the top of the page to view the device's operational status, including input/output channel states, mode settings, and output level settings.

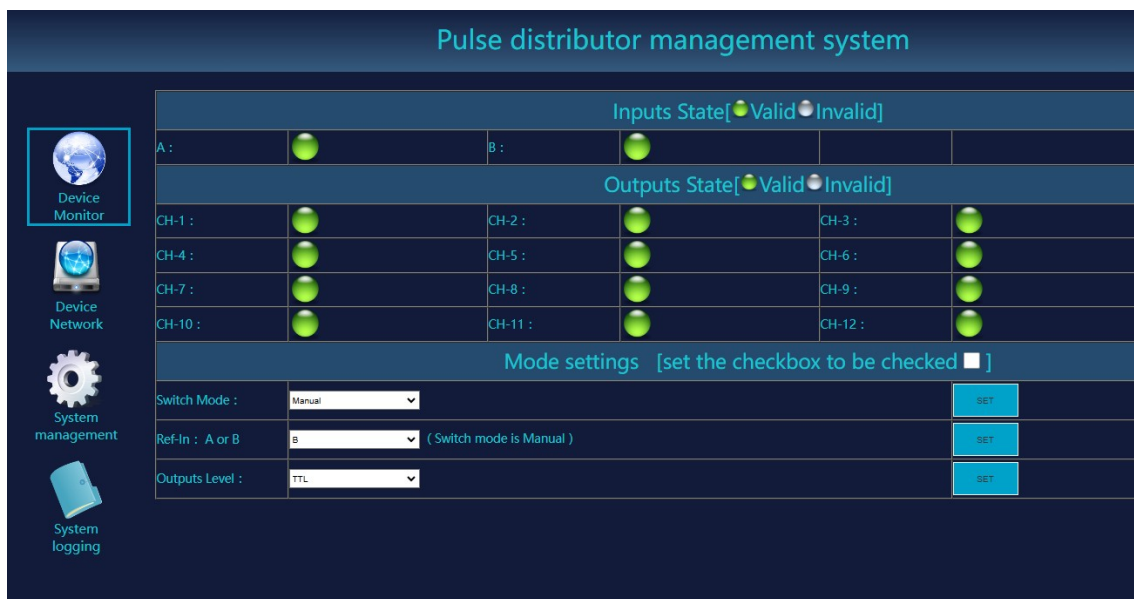


Figure 2: Device Monitor - Status Check

6.3 Parameter Settings

To modify device parameters:

- Select the "Device Monitor" or "Device Network" tab to view the parameters and status.
- Before setting, check the "set the checkbox to be checked" option at the top.
- Select a parameter to modify, then click the corresponding "SET" button.



Figure 3: Network Parameter Settings

6.4 System Management

Select the "System Management" tab to view device version information and perform firmware upgrades.

- View the current device model, hardware version, PL version, and PS version.
- Click "Choose File" to select the upgrade file, then click "Upload File". After upload completes, click "upgrade" to perform the upgrade.
- Click "Settings" in "Factory Settings" to restore the device to factory defaults. Note: The web connection may be disconnected after restoring.

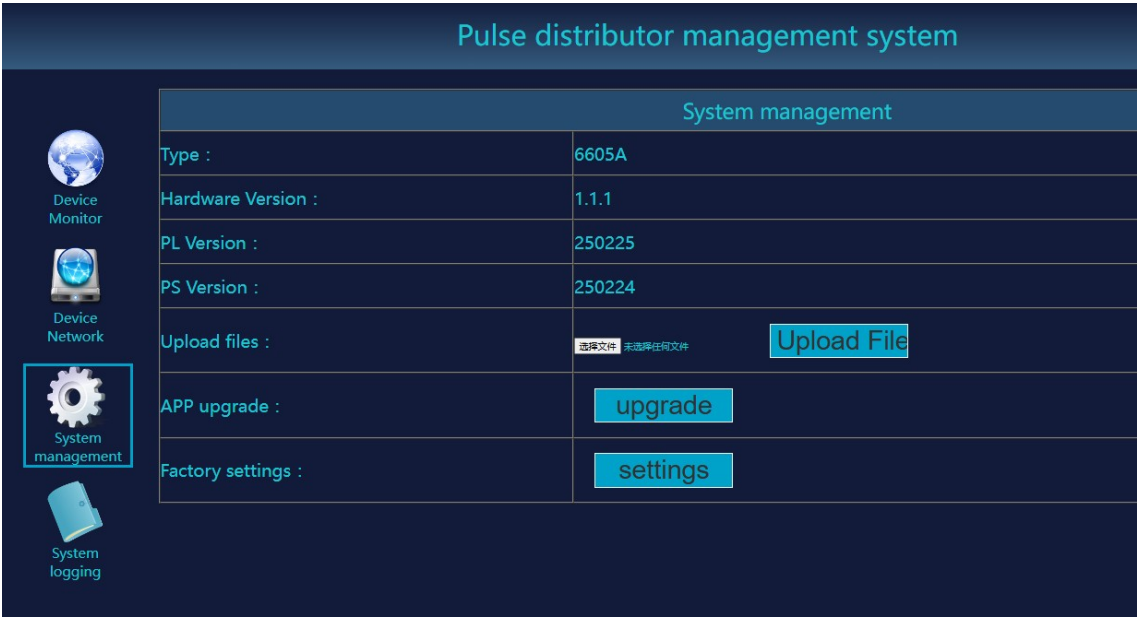


Figure 4: System Management Interface

6.5 Log Viewing

Select the "System logging" tab to view the records of device settings and operations.

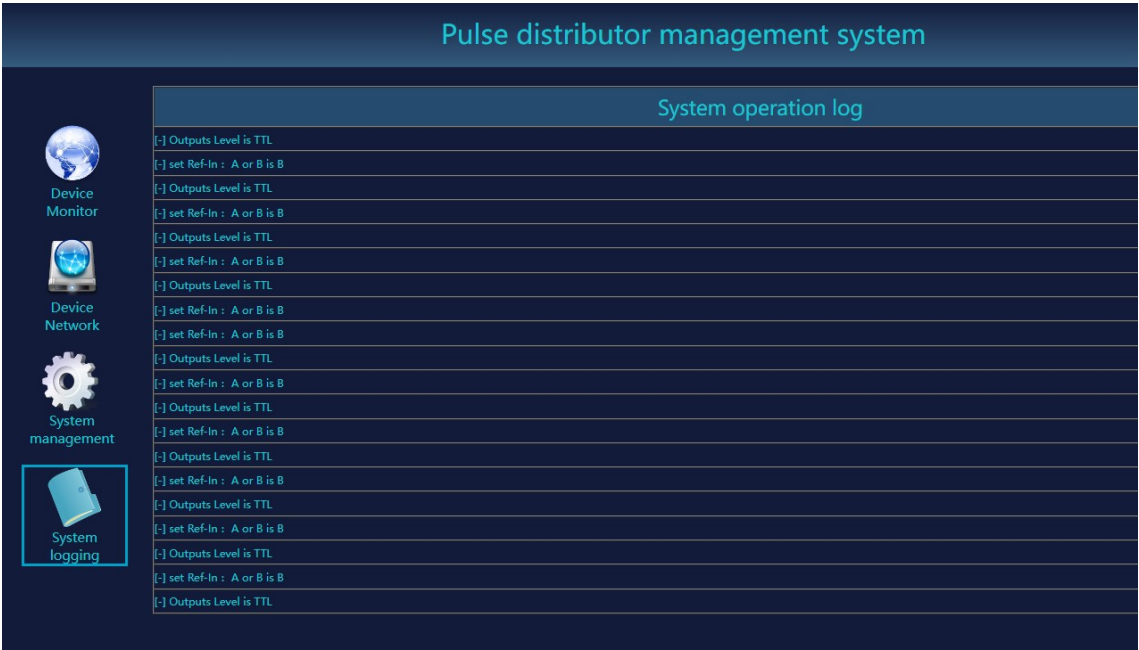


Figure 5: System Log Interface

D. Communication Protocol

This section describes the communication protocol for device monitoring and control via network (UDP) and serial port.

Communication parameters: 115200 baud, 8 data bits, 1 stop bit, no parity check.

Warning: Note: The device supports UDP protocol only. TCP protocol is not supported.

1. Network Status Protocol

1.1 Query Network Status (\$HTN)

Send the \$HTN command to query the device's current network configuration.

```
Format: $HTN
Example: Send: $HTN; Receive:
$HTN,ip=192.168.1.201,mask=255.255.255.0,gateway=192.168.1.1,destip=192.168.1.255,
serverport=3000,clientport=3001
```

Parameter	Description
ip	Device IP address

mask	Subnet mask
gateway	Default gateway
destip	Destination IP address
serverport	UDP server port
clientport	UDP client port

1.2 Set IP/Mask/Gateway (\$HTSETN cmd=1)

Send the \$HTSETN command with cmd=1 to set the device IP address, subnet mask, and gateway.

Format: \$HTSETN,cmd=1,ip=X.X.X.X,mask=X.X.X.X,gateway=X.X.X.X

Example: Send:

\$HTSETN,cmd=1,ip=192.168.1.201,mask=255.255.255.0,gateway=192.168.1.1; Receive:

\$HTSETN,cmd=1,result=ok

Parameter	Description
ip	New IP address (e.g., 192.168.1.201)
mask	New subnet mask (e.g., 255.255.255.0)
gateway	New gateway (e.g., 192.168.1.1)
result	ok = success, err = failure

1.3 Set Destination IP (\$HTSETN cmd=2)

Send the \$HTSETN command with cmd=2 to set the destination IP address.

Format: \$HTSETN,cmd=2,destip=X.X.X.X

Example: Send: \$HTSETN,cmd=2,destip=192.168.1.255; Receive:

\$HTSETN,cmd=2,result=ok

Parameter	Description
destip	Destination IP address (e.g., 192.168.1.255)
result	ok = success, err = failure

1.4 Set Server Port (\$HTSETN cmd=3)

Send the \$HTSETN command with cmd=3 to set the UDP server port.

Format: \$HTSETN,cmd=3,serverport=XXXX

Example: Send: \$HTSETN,cmd=3,serverport=3000; Receive: \$HTSETN,cmd=3,result=ok

Parameter	Description
serverport	UDP server port (1-65535)
result	ok = success, err = failure

1.5 Set Client Port (\$HTSETN cmd=4)

Send the \$HTSETN command with cmd=4 to set the UDP client port.

Format: \$HTSETN,cmd=4,clientport=XXXX

Example: Send: \$HTSETN,cmd=4,clientport=3001; Receive: \$HTSETN,cmd=4,result=ok

Parameter	Description
clientport	UDP client port (1-65535)
result	ok = success, err = failure

2. Working Status Protocol

2.1 Query Pulse Status (\$HTP)

Send the \$HTP command to query the device's pulse input/output status.

Format: \$HTP

Example: Send: \$HTP; Receive: \$HTP,in_ch=A,out_ch=1,out_state=0,out_level=0

Parameter	Description
in_ch	Input channel: A or B
out_ch	Output channel number (1-12)
out_state	0 = output disabled, 1 = output enabled
out_level	0 = LVTTTL, 1 = TTL

2.2 Query Distributor Mode (\$HTP mode)

Send the \$HTP command to query the pulse distributor mode status.

Format: \$HTP

Example: Send: \$HTP; Receive: \$HTP,mode=0,in_sel=A,auto_man=0

Parameter	Description
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mode	0 = normal mode
in_sel	Selected input: A or B
auto_man	0 = auto mode, 1 = manual mode

3. Control Protocol

3.1 Set Output Level (\$HTSETP cmd=5)

Send the \$HTSETP command with cmd=5 to set the output level (LVTTTL or TTL).

Format: \$HTSETP,cmd=5,val=X

Example: Send: \$HTSETP,cmd=5,val=0; Receive: \$HTSETP,cmd=5,result=ok

Parameter	Description
val	0 = LVTTTL, 1 = TTL
result	ok = success, err = failure

3.2 Set Auto/Manual Mode (\$HTSETP cmd=8)

Send the \$HTSETP command with cmd=8 to set the auto/manual input selection mode.

Format: \$HTSETP,cmd=8,val=X

Example: Send: \$HTSETP,cmd=8,val=0; Receive: \$HTSETP,cmd=8,result=ok

Parameter	Description
val	0 = auto mode, 1 = manual mode
result	ok = success, err = failure

3.3 Set Input Selection (\$HTSETP cmd=4)

Send the \$HTSETP command with cmd=4 to manually select the input channel (only valid in manual mode).

Format: \$HTSETP,cmd=4,val=X

Example: Send: \$HTSETP,cmd=4,val=0; Receive: \$HTSETP,cmd=4,result=ok

Parameter	Description
val	0 = Input A, 1 = Input B

result	ok = success, err = failure
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3.4 Restore Factory Settings (\$HTSETP cmd=5 val=1)

Send the \$HTSETP command with cmd=5 and val=1 to restore factory settings.

Format: \$HTSETP,cmd=5,val=1

Example: Send: \$HTSETP,cmd=5,val=1; Receive: \$HTSETP,cmd=5,result=ok

Parameter	Description
cmd	5 = restore factory settings command
val	1 = confirm restore
result	ok = success, err = failure

4. Version Information

4.1 Query Version (\$HTV)

Send the \$HTV command to query the device's firmware version information.

Format: \$HTV

Example: Send: \$HTV; Receive: \$HTV,model=HT6605A,hw=1.0,pl=1.0,ps=1.0

Parameter	Description
model	Device model number
hw	Hardware version
pl	PL (Programmable Logic) version
ps	PS (Processing System) version

5. Verification Calculation

The checksum in the communication protocol is calculated using the following method:

- Sum all bytes in the command string (excluding the leading '\$' and the checksum field itself).
- Take the low 8 bits of the sum.
- Convert to 2-digit hexadecimal (uppercase).

Example: For command \$HTN, the checksum is calculated as sum of ASCII values of 'H'+ 'T'+ 'N', then take low 8 bits.

E. Common Fault Handling

The following table lists common faults and their solutions. If the problem persists after troubleshooting, please contact our technical support.

Fault Phenomenon	Possible Cause	Solution
POWER LED off	Power cord not connected or power supply failure	Check power cord connection; verify AC outlet is working
STATEA/STATEB LED off	No 1PPS input signal or signal too weak	Check input cable connection; verify signal source is working
No output signal	Output disabled or wrong input selected	Check input selection; verify output is enabled
Cannot connect via WEB	Wrong IP address or network issue	Verify IP configuration; check network cable connection
Serial port no response	Wrong baud rate or cable issue	Verify 115200 baud rate; check serial cable connection
Output signal unstable	Input signal quality poor	Check input signal quality; use higher quality cable

Table 2: Common Faults and Solutions

Thank You

For Choosing Our Product

Technical Support: tech@go-satcom.com

China Go-Sat Microwave Co., Ltd.