

## Industrial 1-port RS422/485 *Modbus Gateway*

### IMG-110T



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# Presentation Outlines

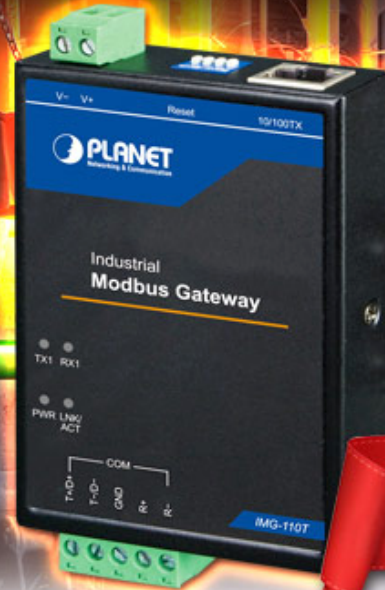
- ◆ Product Positioning
- ◆ Product Overview
- ◆ Product Benefits
- ◆ Product Features
- ◆ Applications
- ◆ Comparison
- ◆ Appendix

*Communication Bridge Between Modbus TCP/IP & Modbus RTU/ASCII Protocol*

10M  
100M

RS485  
RS422

Modbus **TCP/IP** Protocol



IP Code  
30

75°C  
-40°C

Modbus **RTU/ASCII** Protocol

**Industrial 4.0  
Infrastructure**

# Product Positioning



# Modes of Application Overview

Factory



Building



Transportation



# PLANET Serial Products Family

**Industrial**  
(-40-75 degrees C)

**Industrial 4.0**



**IMG-110T**  
 - RS422/485 over Fast Ethernet  
 - RJ45 Fast Ethernet Interface  
 - 9-48V DC Input

**Industrial**  
(-10-60 degrees C)



**ICS-210x Series (ICS-2100/ICS-2102/ICS-2102S15/ICS-2105A)**  
 - RS232/422/485 over Fast Ethernet  
 - RJ45/SC/SFP Fast Ethernet Interfaces  
 - 12-48V DC/24V AC Input

**Standard**  
(0-50 degrees C)



**ICS-10x Series (ICS-100/ICS-102/ICS-102S15/ICS-105A)**  
 - RS232/422/485 over Fast Ethernet  
 - RJ45/SC/SFP Fast Ethernet Interfaces  
 - 5V DC Input

**Serial over Ethernet Media Converter**

**Modbus Gateway**

# Product Overview



# Product Overview

## ◆ About Modbus

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol and is now a commonly available means of connecting industrial electronic devices.

**The main reasons for the use of Modbus in the industrial environment are:**

- 1: Developed with industrial applications in mind.**
- 2: Openly published and royalty-free.**
- 3: Easy to deploy and maintain.**
- 4: Moves raw bits or words without placing many restrictions on vendors.**

Modbus enables communication among many devices connected to the same network, for example, a system that measures temperature and humidity, and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.

The development and update of Modbus protocols has been managed by the Modbus Organization since April 2004 when Schneider Electric transferred rights to that organization.

The Modbus Organization is an association of users and suppliers of Modbus-compliant devices that seek to drive the adoption and evolution of Modbus.

# Product Overview

## ◆ About Modbus Protocol Versions

Versions of the Modbus protocol exist for serial port, and for Ethernet and other protocols that support the Internet protocol suite . There are many variants of Modbus protocols:

**Modbus RTU** — This is used in serial communication and makes use of a compact, binary representation of the data for protocol communication.

**Modbus ASCII** — This is used in serial communication and makes use of ASCII characters for protocol communication.

**Modbus TCP/IP or Modbus TCP** — This is a Modbus variant used for communications over TCP/IP networks, connecting over Port 502. It does not require a checksum calculation, as lower layers already provide checksum protection.

**Modbus over TCP/IP or Modbus over TCP or Modbus RTU/IP** — This is a Modbus variant that differs from Modbus TCP in that a checksum is included in the payload as with Modbus RTU.



# Product Overview

## ◆ About Modbus Protocol Versions

**Modbus over UDP** — Some have experimented with using Modbus over UDP on IP networks, which remove the overheads required for TCP.

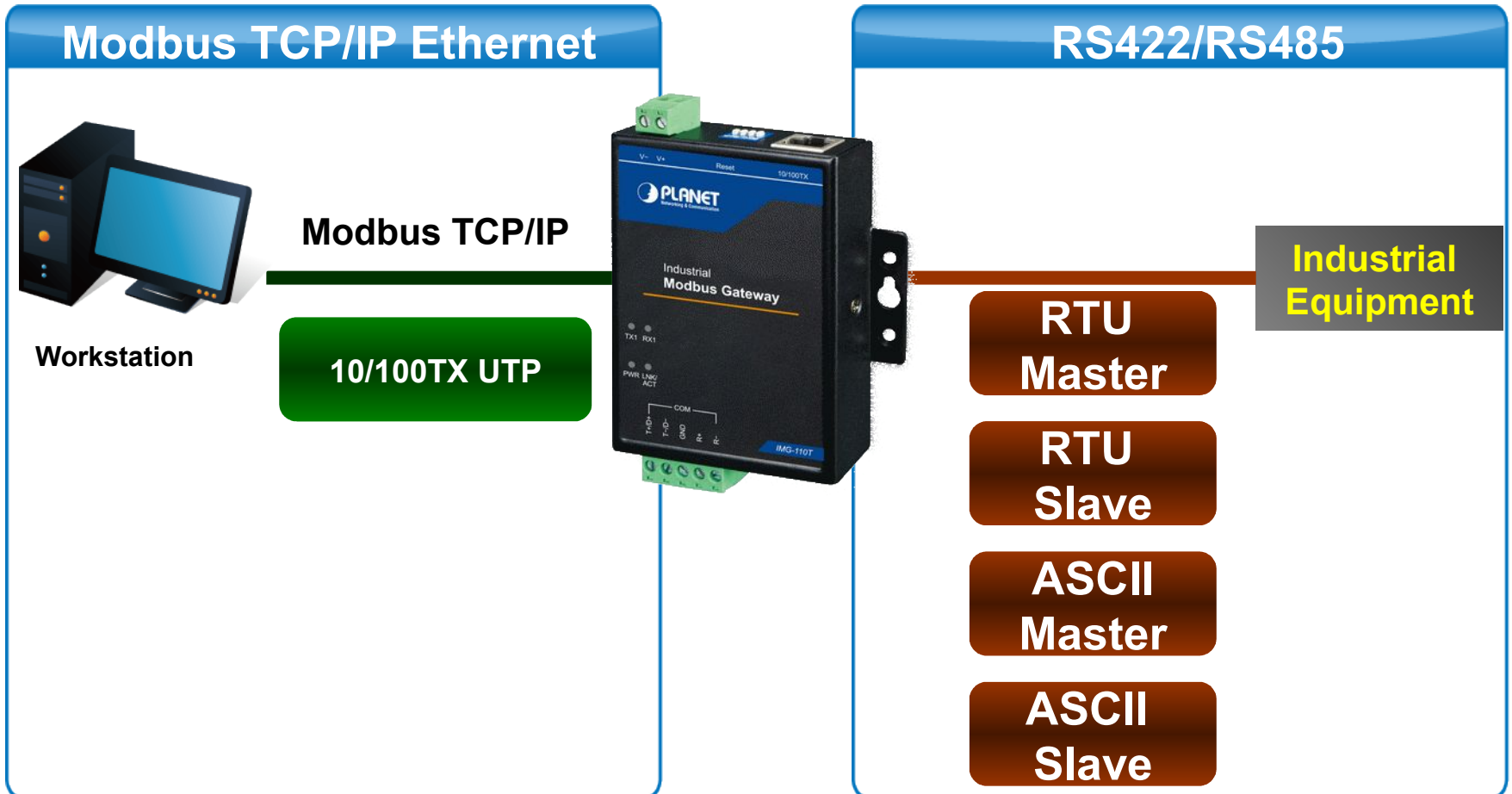
**Modbus Plus (Modbus+, MB+ or MBP)** — Modbus Plus is proprietary to Schneider Electric and unlike the other variants, it supports peer-to-peer communications between multiple masters.

**Pemex Modbus** — This is an extension of standard Modbus with support for historical and flow data. It was designed for the Pemex oil and gas company for use in process control and never gained widespread adoption.

**Enron Modbus** — This is another extension of standard Modbus developed by Enron Corporation with support for 32-bit integer and floating-point variables, and historical and flow data.

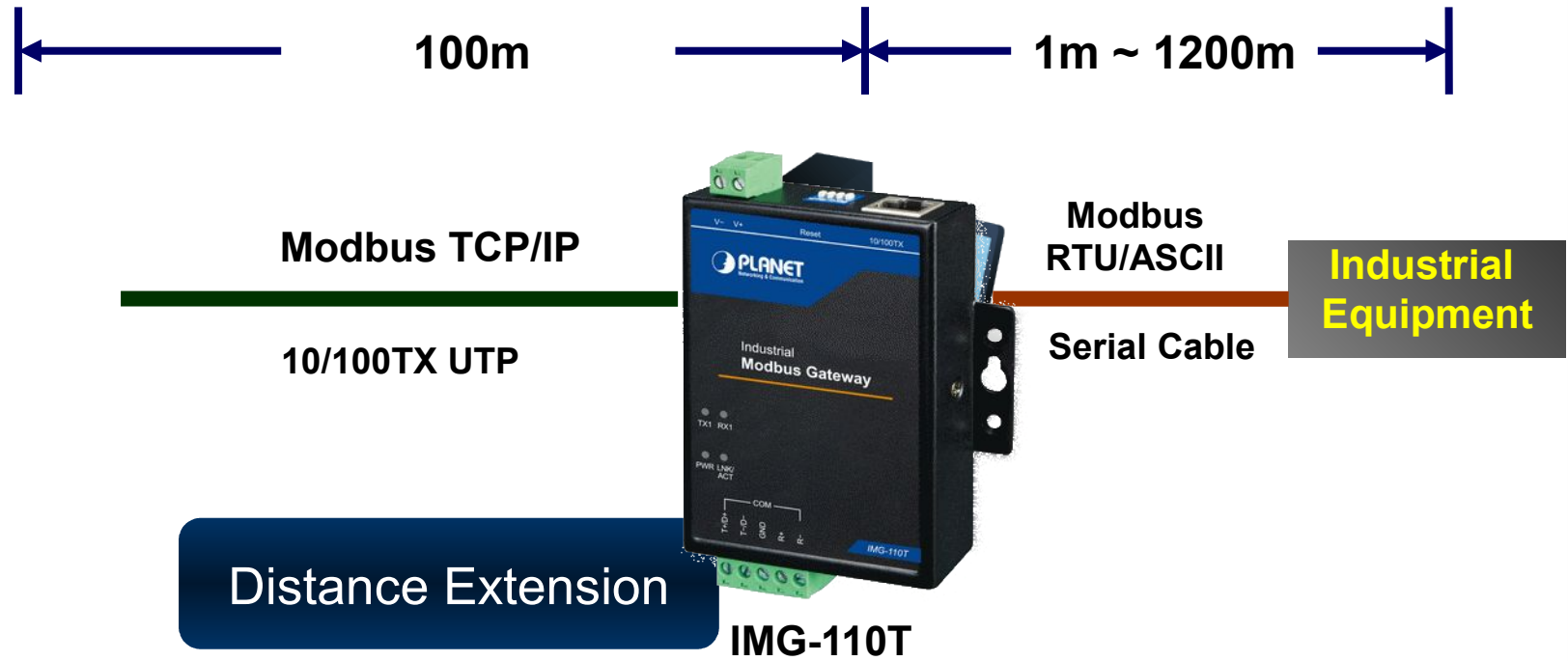
# Product Overview

## ◆ What is Industrial Modbus RTU/ASCII Network Integration?



# Product Overview

## ◆ What is Industrial Modbus RTU/ASCII Network Integration?



Distance Extension

Conversion Bridge between Modbus TCP/IP and Modbus RTU/ASCII Protocol

# Product Overview -- Range of Applications



**Programmable Logic Controller (PLC)**



**Modbus Electricity Meter**



**Power Meter**



**Modbus Touch Screen Room Controller**

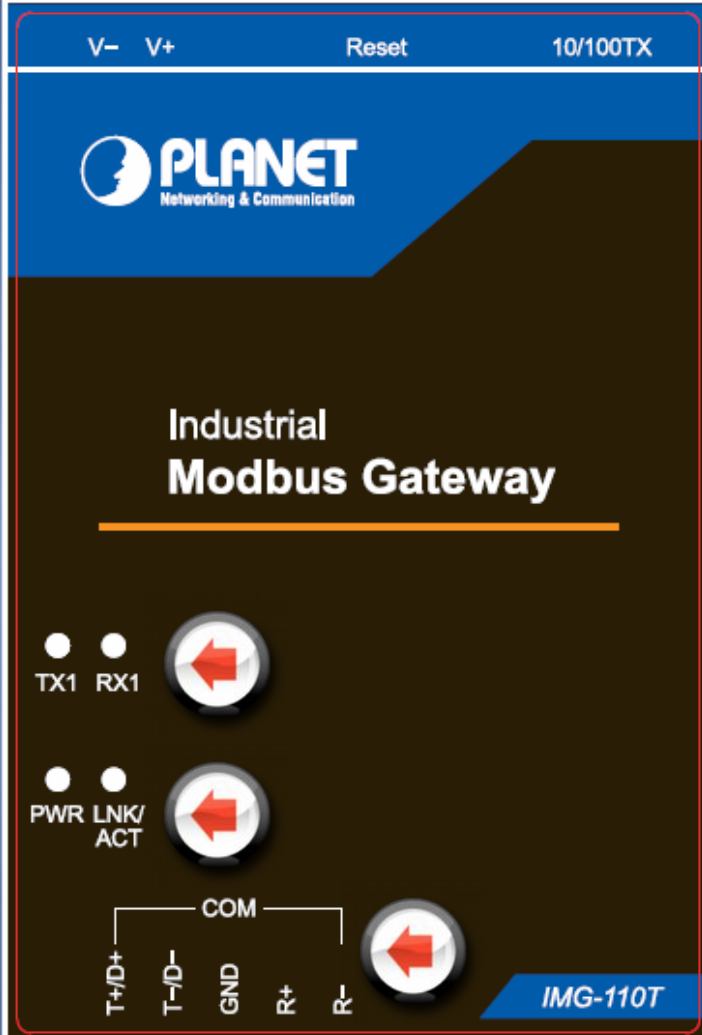


**Modbus SCADA**



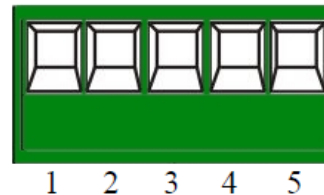
**Touch Panel HMI**

# Product Overview



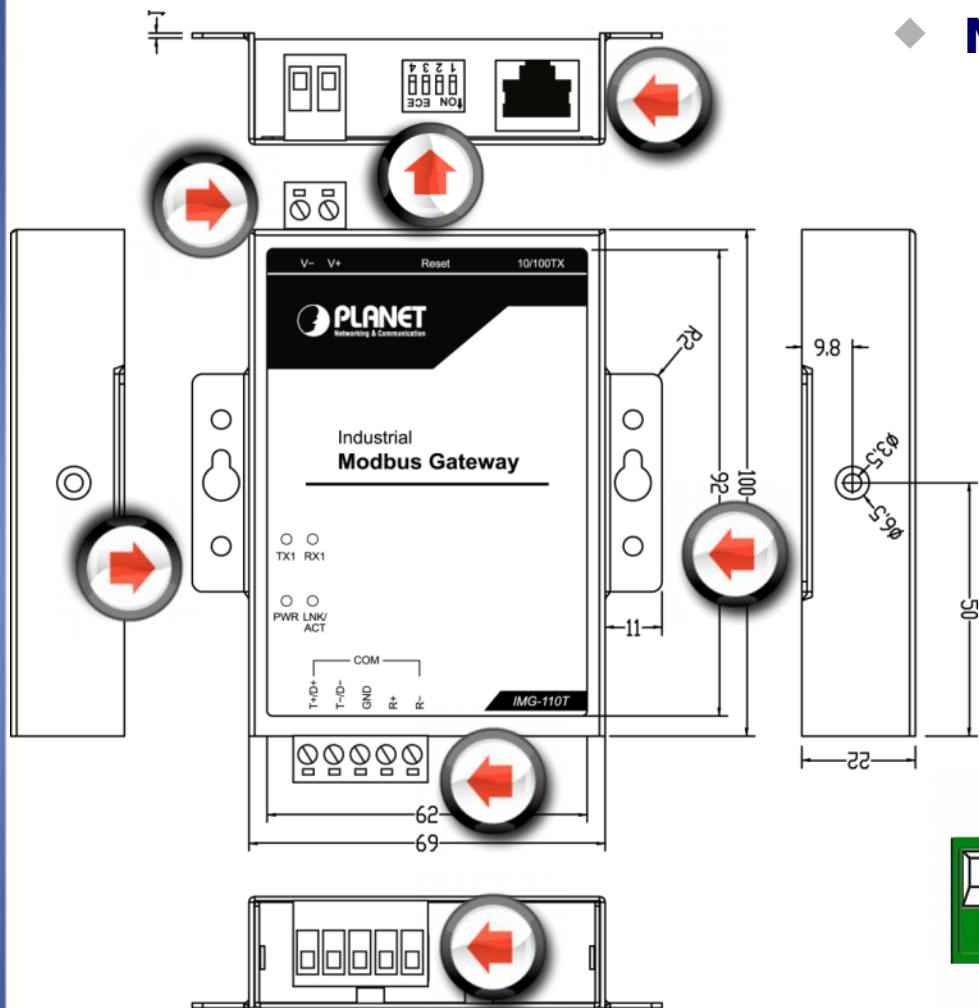
## ◆ Front Panel

- ✓ LED Indication for the **serial transmit data (TX1)**
- ✓ LED Indication for the **serial receive data (RX1)**
- ✓ LED Indication for **system power, Fast Ethernet Port LNK/ACT**
- ✓ PIN Definition for the **RS422/RS485 COM Interface**



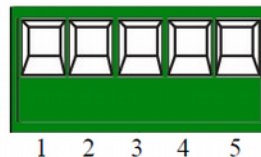
PIN	RS-485 PIN Define	RS-422 PIN Define
1	D+	T+
2	D-	T-
3	GND	GND
4	--	R+
5	--	R-

# Product Overview



## ◆ Mechanical Drawing

- ✓ 2-contact terminal block for the **DC 9-48V power input**
- ✓ DIP switch for **resetting to default**
- ✓ RJ45 port for **10/100BASE-TX**
- ✓ **Wall-mount kit**
- ✓ 5-contact terminal block for the **RS422/RS485 COM Interface**



PIN	RS-485 PIN Define	RS-422 PIN Define
1	D+	T+
2	D-	T-
3	GND	GND
4	--	R+
5	--	R-

# Product Benefits



## Product Benefits

### ◆ As required by customers

Economical  
**RS422/RS485 to  
10/100TX**  
Integration Solution



Conversion Bridge  
between  
**Modbus TCP/IP &  
Modbus RTU/ASCII**  
Protocols

Master Mode for **3**  
TCP Connections  
Slave Mode for **16** TCP  
Master Connections

**IMG-110T**

**Industrial 4.0**

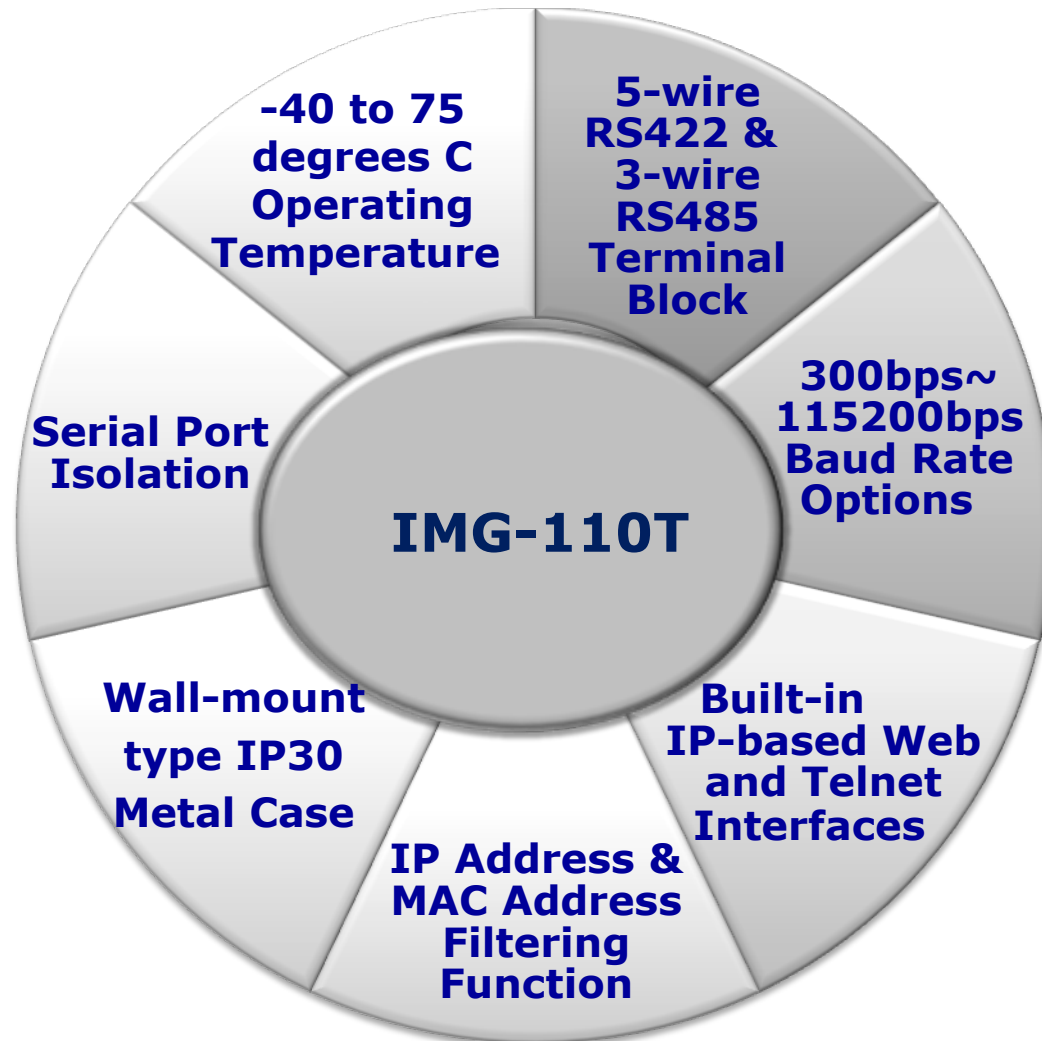
Higher Flexibility  
Cost Effectiveness



# Product Features



# Product Key Features



# Product Features

## ◆ Hardware

- ✓ **1** RS422/RS485 with **5-contact terminal block**
  - **3**-wire RS485.
  - **5**-wire RS422.
- ✓ **1** **10/100BASE-TX TP** RJ45 interface
- ✓ **DIP switch** for resetting to default
- ✓ **LED Indicators** for system, network and RS422/RS485 interface diagnostics
- ✓ **Wall-mount type IP30** metal case
- ✓ FCC Part 15 Class A, CE
- ✓ **IEEE 802.3/802.3u** Fast Ethernet standard
- ✓ Dimensions: 69 x 100 x 22 mm (W x D x H)
- ✓ Weight: 238g

# Product Features

## ◆ Hardware

- ✓ 1 RS422/RS485 with **5-contact terminal block**
  - **3-wire RS485**
  - **5-wire RS422**
- ✓ Serial Port **Isolation**
- ✓ **300bps~115200bps** Baud Rate (Data Rate)
- ✓ **7 & 8** Data Bits
- ✓ **Odd/Even/None/Space/Mark** Parity Type
- ✓ **1 & 2** Stop Bit
- ✓ **Hardware & None** Flow Control
- ✓ Signals:
  - **3-wire RS485: Data A (+), GND, Data B (-)**
  - **5-wire RS422: Tx+, Tx-, GND, Rx+, Rx-**
- ✓ Distance: RS422/RS485 for **1200m** transfer distance



# Product Features

## ◆ Industrial Conformance

- ✓ **9~48V DC** power input designed with **2-contact terminal block**
- ✓ **-40 to 75** degrees operating temperature
- ✓ **Wall-mount type IP30** metal case
- ✓ Stability tests include:
  - **IEC60068-2-32 (Free fall)**
  - **IEC60068-2-27 (Shock)**
  - **IEC60068-2-6 (Vibration)**



# Product Features

## ◆ Serial Operation Modes

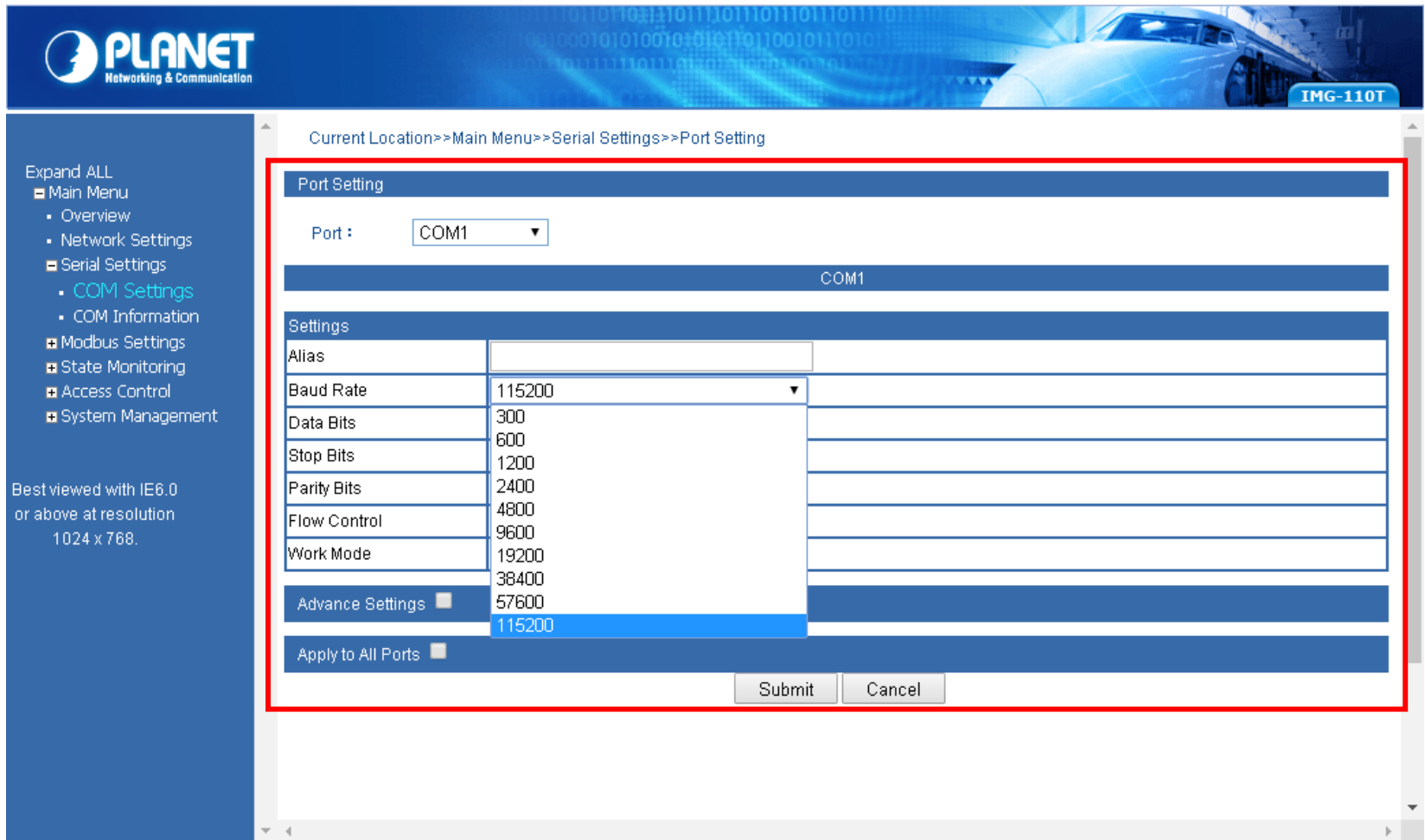
- ✓ **RTU Master** and **RTU Slave**
- ✓ **ASCII Master** and **ASCII Slave**
- ✓ Master mode supports **32 slave TCP connection** requests
- ✓ Slave mode supports **16 TCP master connections**

## ◆ Management Function

- ✓ Built-in IP-based **Web interface** and **telnet interface** for remote management
- ✓ **Modbus TCP, Modbus RTU, Modbus ASCII**, IP, ARP, DHCP and DNS
- ✓ **Firmware upgrade/configuration backup** and **restore** via HTTP Protocol

# Product Features

## ◆ User-friendly Web Management Interface -- COM Settings



The screenshot displays the PLANET web management interface for configuring COM settings. The breadcrumb trail is "Current Location>>Main Menu>>Serial Settings>>Port Setting". The "Port" dropdown is set to "COM1". The "Settings" table lists various parameters for the selected port.

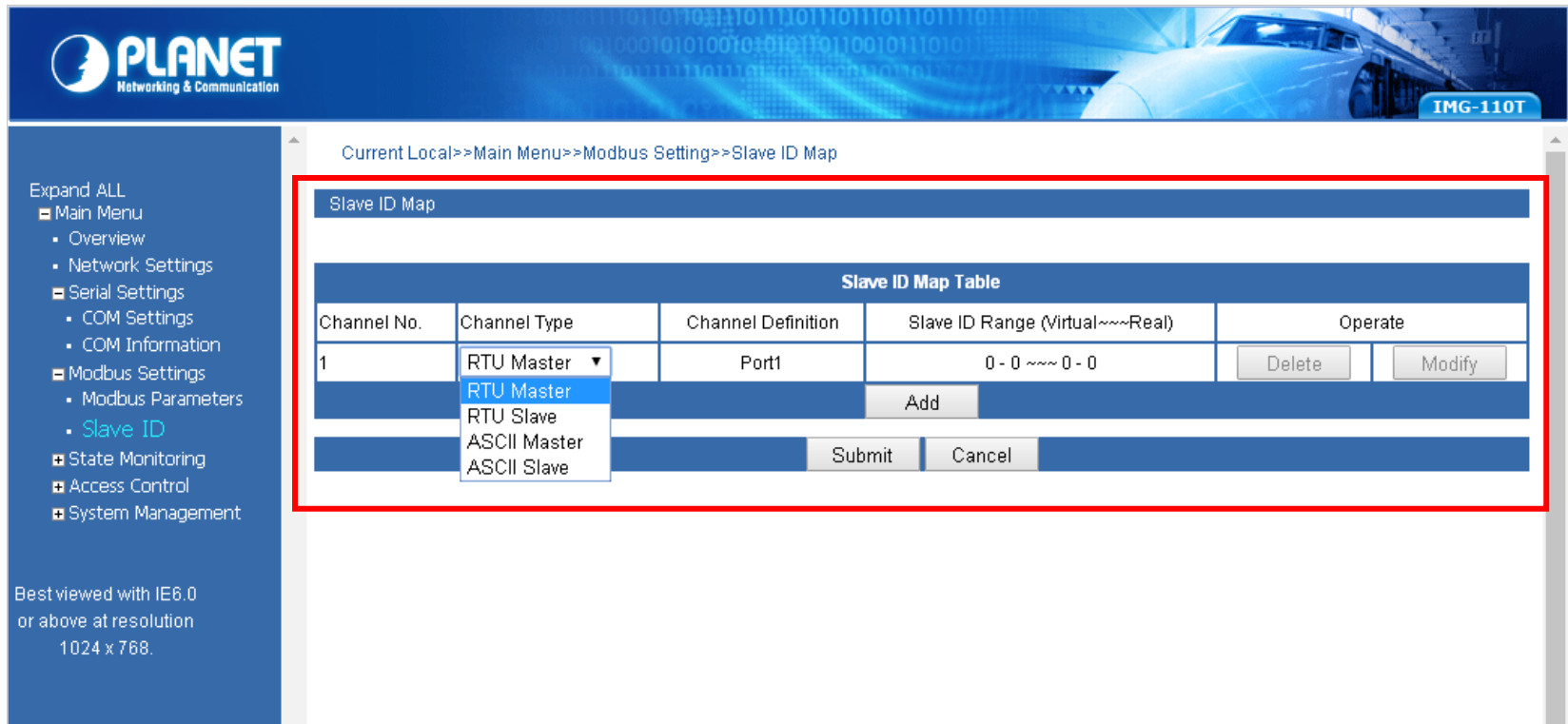
Settings	
Alias	
Baud Rate	115200
Data Bits	300
Stop Bits	600
Parity Bits	2400
Flow Control	4800
Work Mode	9600
	19200
	38400
Advance Settings <input type="checkbox"/>	57600
	115200

Additional options include "Apply to All Ports" (checkbox) and "Submit" / "Cancel" buttons.

Best viewed with IE6.0  
or above at resolution  
1024 x 768.

# Product Features

## ◆ User-friendly Web Management Interface -- **Slave ID**



Current Local>>Main Menu>>Modbus Setting>>Slave ID Map

Slave ID Map

Slave ID Map Table				
Channel No.	Channel Type	Channel Definition	Slave ID Range (Virtual~Real)	Operate
1	RTU Master	Port1	0 - 0 ~~~ 0 - 0	Delete Modify
	RTU Master		Add	
	RTU Slave			
	ASCII Master			
	ASCII Slave			Submit Cancel

Expand ALL

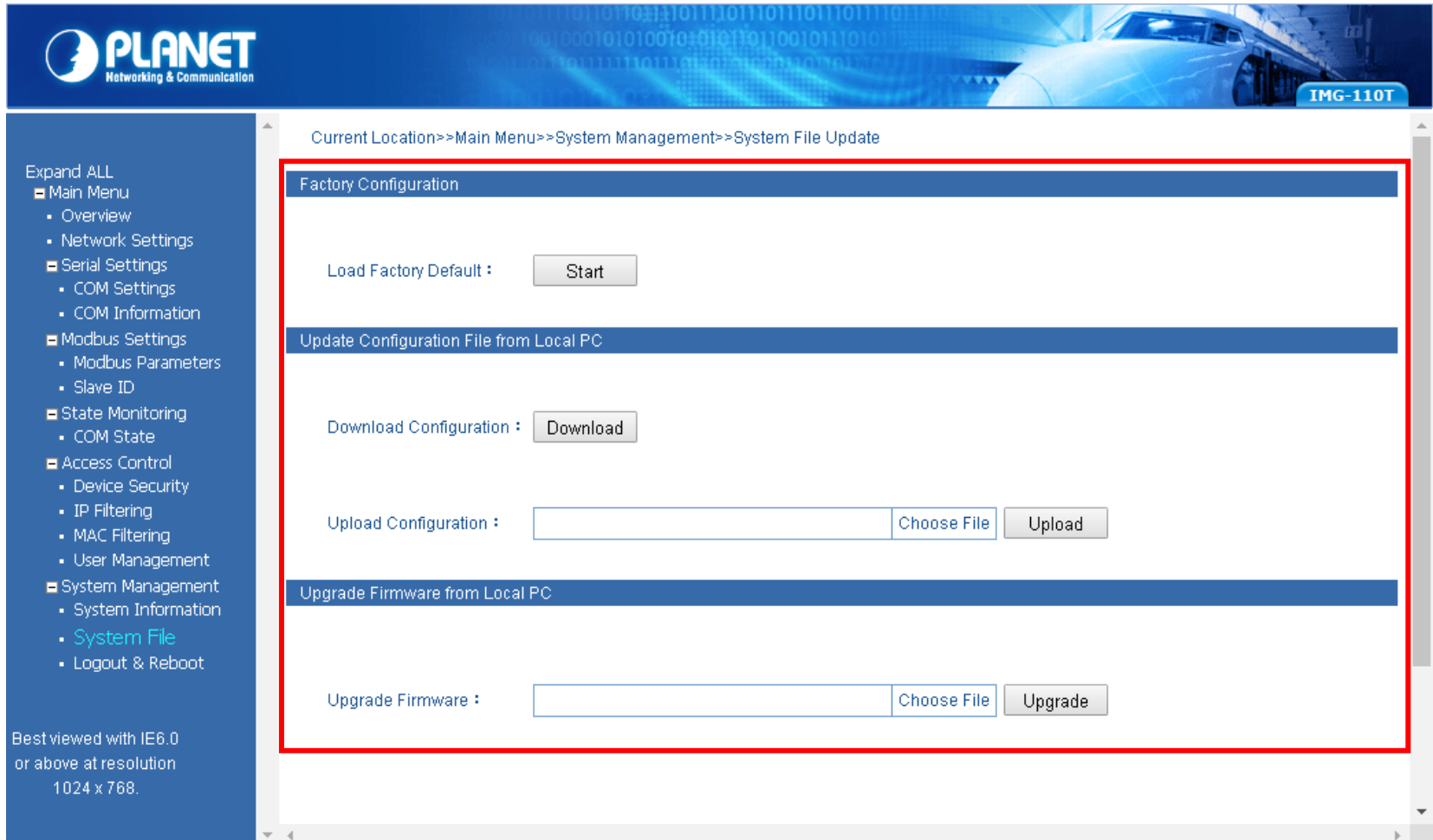
- Main Menu
  - Overview
  - Network Settings
- Serial Settings
  - COM Settings
  - COM Information
- Modbus Settings
  - Modbus Parameters
  - Slave ID
- State Monitoring
- Access Control
- System Management

Best viewed with IE6.0 or above at resolution 1024 x 768.



# Product Features

## ◆ User-friendly Web Management Interface -- System File



The screenshot displays the PLANET web management interface. The top navigation bar includes the PLANET logo and the text "Networking & Communication". The breadcrumb trail reads "Current Location>>Main Menu>>System Management>>System File Update". The main content area is divided into several sections:

- Factory Configuration:** Contains a "Load Factory Default" button labeled "Start".
- Update Configuration File from Local PC:** Contains a "Download Configuration" button labeled "Download".
- Upload Configuration:** Features a text input field, a "Choose File" button, and an "Upload" button.
- Upgrade Firmware from Local PC:** Features a text input field, a "Choose File" button, and an "Upgrade" button.

A red rectangular box highlights the "Update Configuration File from Local PC" and "Upgrade Firmware from Local PC" sections. On the left side, a navigation menu lists various system management options, with "System File" highlighted in blue. At the bottom left, a note states: "Best viewed with IE6.0 or above at resolution 1024 x 768."



# Product Features

## ◆ Access Control

- ✓ IP address and MAC address filtering function
- ✓ Users level management

## ◆ Management Utilities

- ✓ **PLANET Modbus Gateway utility** for finding client device on the network and related IP subnet address setting to reset to factory default function
- ✓ **PLANET Smart Discovery utility** automatically finds the client devices on the network

# Product Features

## ◆ PLANET Modbus Gateway Utility

PLANET Modbus Gateway Utility V1.0R

System(S) Tools(Y)

Auto Refresh Topology Refresh interval: 30 S

Total of devices:1

- IMG-110T
  - IP:192.168.0.100
  - MAC:00-30-4F-00-00-01

Device Topology

IMG-1

- Web Console
- Device Name
- Network Settings
- Restore Factory Settings

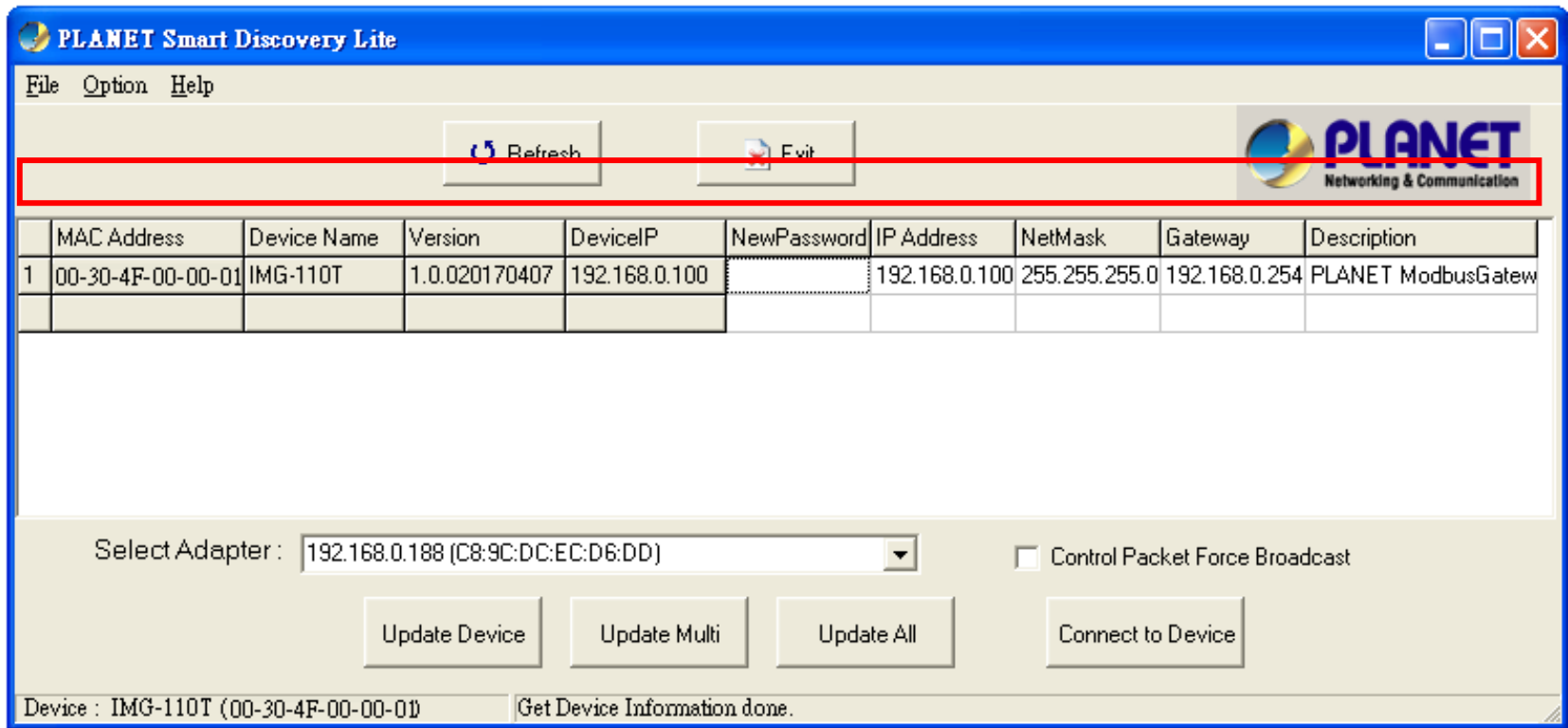
Recent Alarm

Message Type	Device	Description	Time Issued
--------------	--------	-------------	-------------

IP Address 192.168.0.100    MAC Address 00-30-4F-00-00-01    Description

# Product Features

## ◆ PLANET Smart Discovery Utility



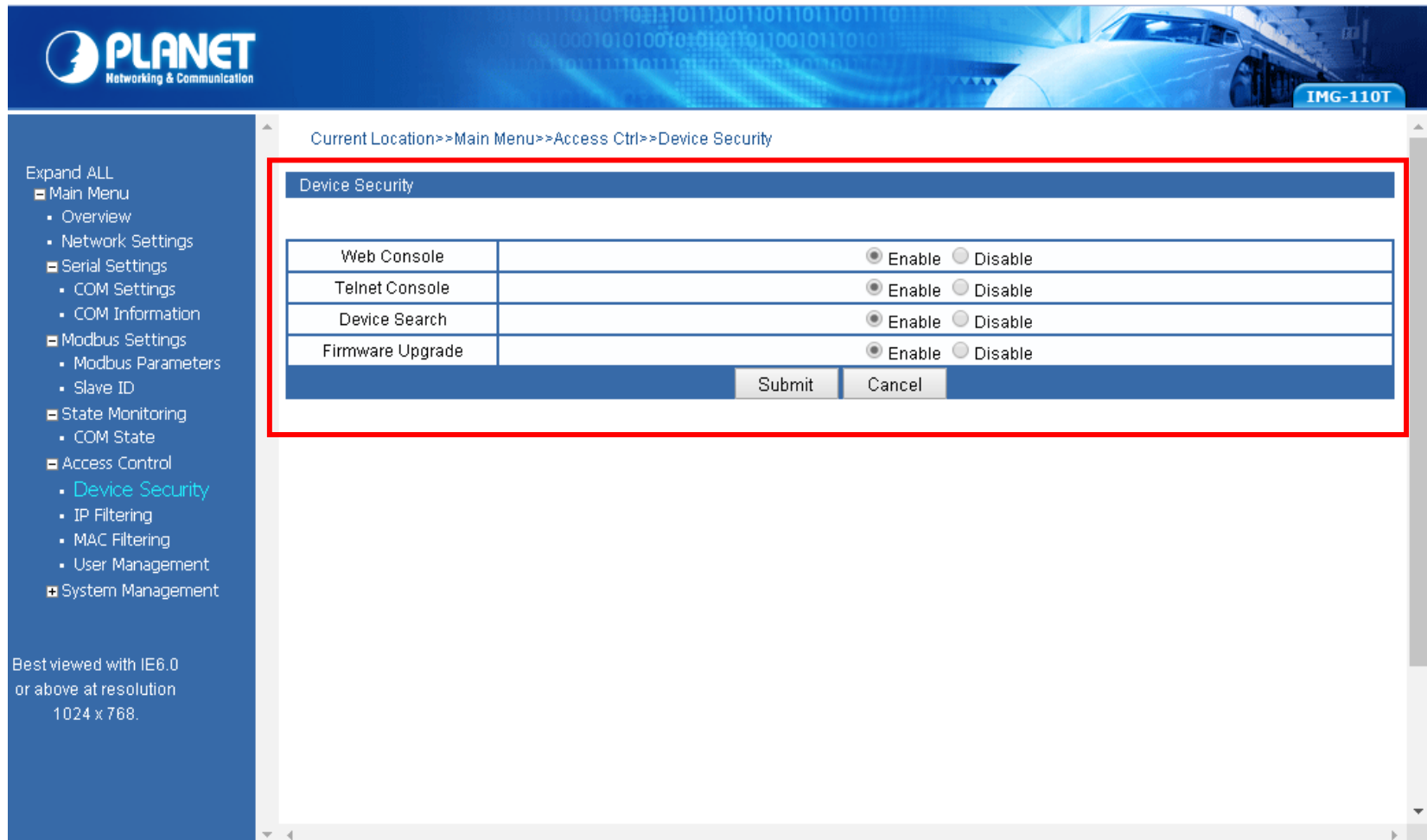
The screenshot shows the PLANET Smart Discovery Lite application window. The title bar reads "PLANET Smart Discovery Lite". The menu bar includes "File", "Option", and "Help". The interface features a "Refresh" button and an "Exit" button, both highlighted with a red rectangle. A table displays discovered devices with the following data:

	MAC Address	Device Name	Version	DeviceIP	NewPassword	IP Address	NetMask	Gateway	Description
1	00-30-4F-00-00-01	IMG-110T	1.0.020170407	192.168.0.100		192.168.0.100	255.255.255.0	192.168.0.254	PLANET ModbusGatew

Below the table, there is a "Select Adapter" dropdown menu showing "192.168.0.188 (C8:9C:DC:EC:D6:DD)". To its right is a checkbox labeled "Control Packet Force Broadcast" which is currently unchecked. At the bottom, there are four buttons: "Update Device", "Update Multi", "Update All", and "Connect to Device". The status bar at the bottom left shows "Device : IMG-110T (00-30-4F-00-00-01)" and the status bar at the bottom right shows "Get Device Information done."

# Product Features

## ◆ User-friendly Web Management Interface -- Device Security



Current Location>>Main Menu>>Access Ctrl>>Device Security

Device Security

Web Console	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Telnet Console	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Device Search	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Firmware Upgrade	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

Submit Cancel

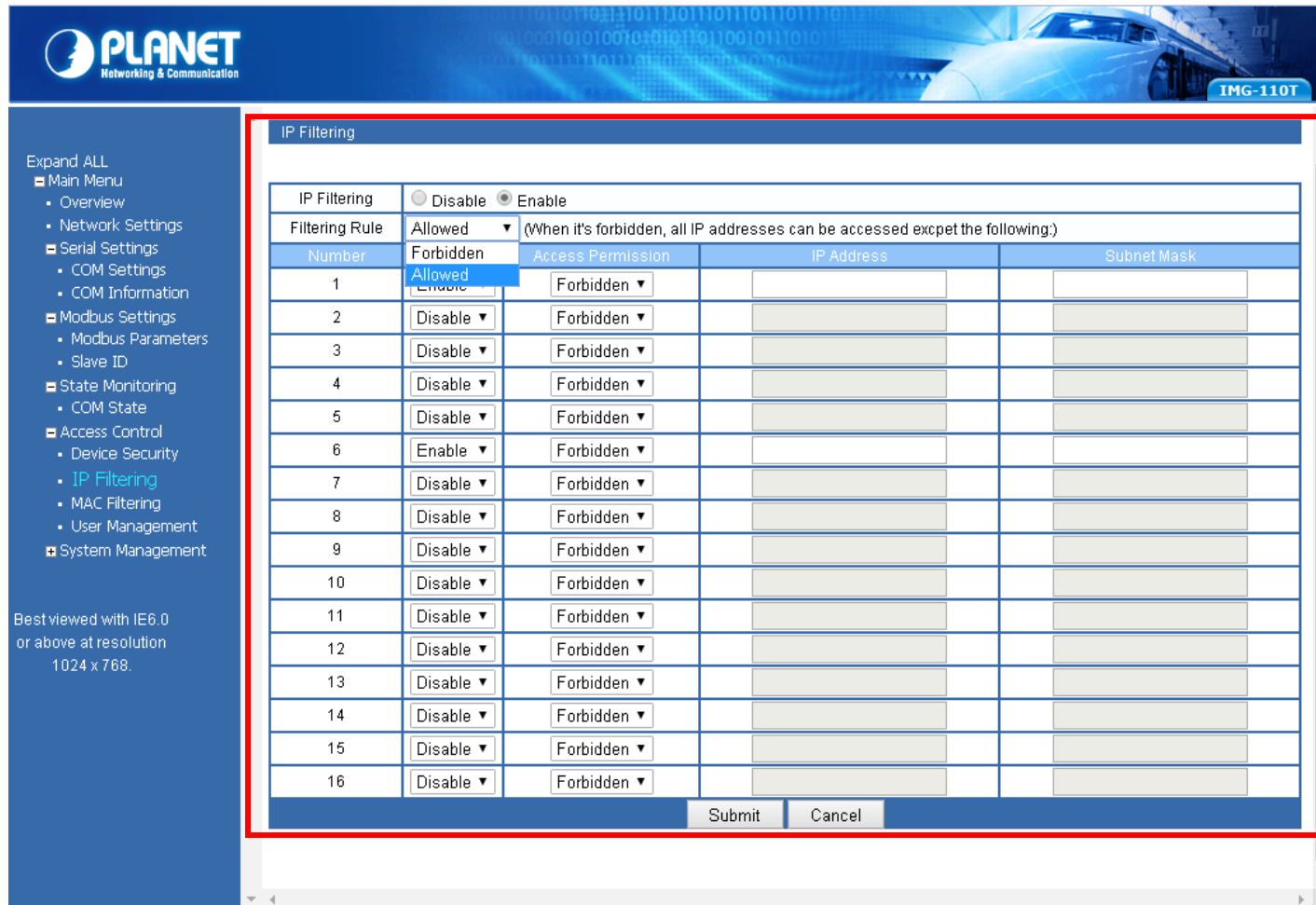
Expand ALL

- Main Menu
  - Overview
  - Network Settings
  - Serial Settings
    - COM Settings
    - COM Information
  - Modbus Settings
    - Modbus Parameters
    - Slave ID
  - State Monitoring
    - COM State
  - Access Control
    - Device Security
    - IP Filtering
    - MAC Filtering
    - User Management
  - System Management

Best viewed with IE6.0 or above at resolution 1024 x 768.

# Product Features

## ◆ User-friendly Web Management Interface -- IP Filtering



**PLANET**  
Networking & Communication

Expand ALL

- ▣ Main Menu
  - Overview
  - Network Settings
  - ▣ Serial Settings
    - COM Settings
    - COM Information
  - ▣ Modbus Settings
    - Modbus Parameters
    - Slave ID
  - ▣ State Monitoring
    - COM State
  - ▣ Access Control
    - Device Security
    - **IP Filtering**
    - MAC Filtering
    - User Management
  - ▣ System Management

Best viewed with IE6.0 or above at resolution 1024 x 768.

**IP Filtering**

IP Filtering  Disable  Enable

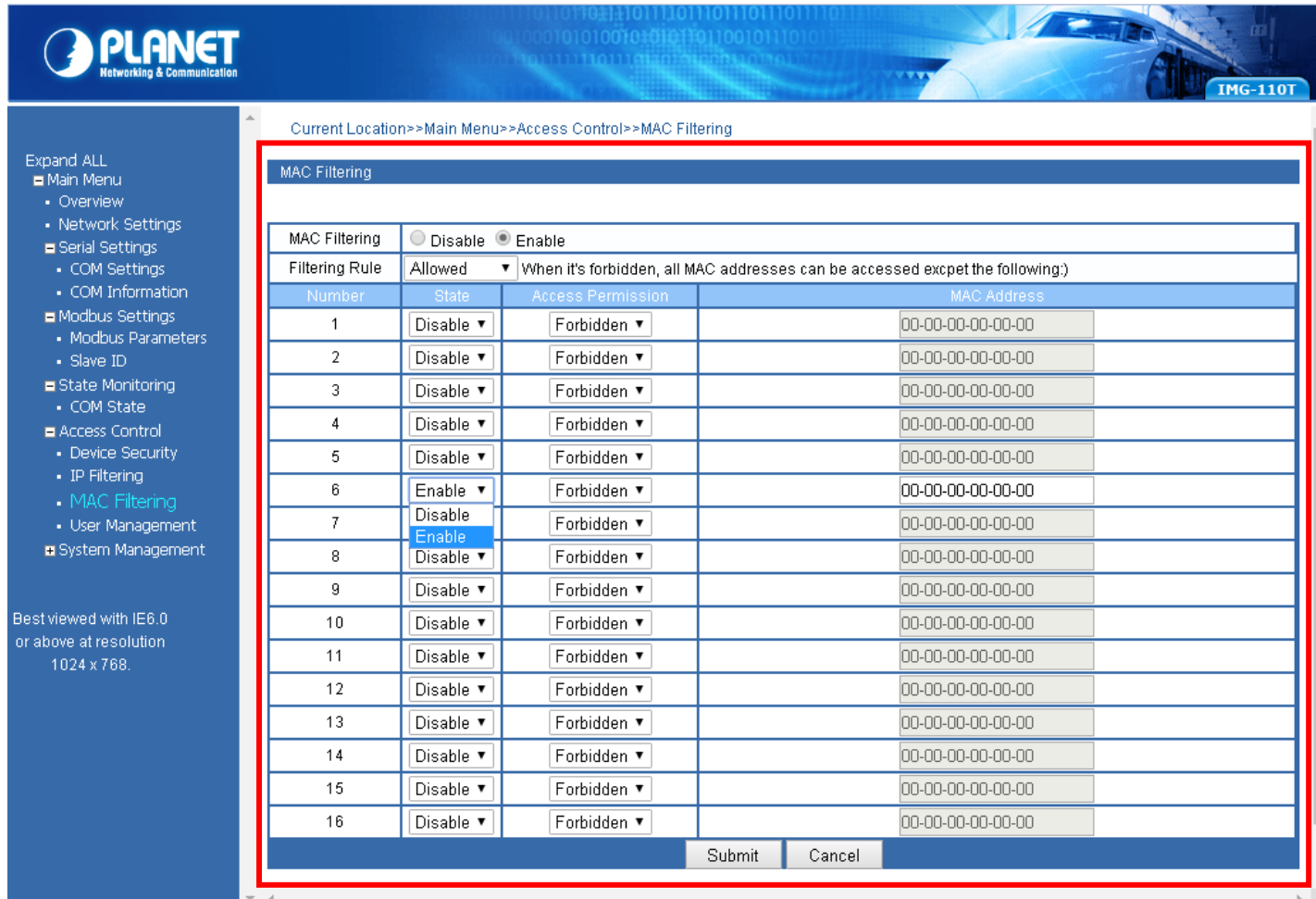
Filtering Rule: Allowed (When it's forbidden, all IP addresses can be accessed except the following.)

Number	Filtering Rule	Access Permission	IP Address	Subnet Mask
1	Allowed	Forbidden		
2	Disable	Forbidden		
3	Disable	Forbidden		
4	Disable	Forbidden		
5	Disable	Forbidden		
6	Enable	Forbidden		
7	Disable	Forbidden		
8	Disable	Forbidden		
9	Disable	Forbidden		
10	Disable	Forbidden		
11	Disable	Forbidden		
12	Disable	Forbidden		
13	Disable	Forbidden		
14	Disable	Forbidden		
15	Disable	Forbidden		
16	Disable	Forbidden		

Submit Cancel

# Product Features

## ◆ User-friendly Web Management Interface -- MAC Filtering



Current Location>>Main Menu>>Access Control>>MAC Filtering

MAC Filtering

MAC Filtering  Disable  Enable

Filtering Rule: Allowed (When it's forbidden, all MAC addresses can be accessed except the following)

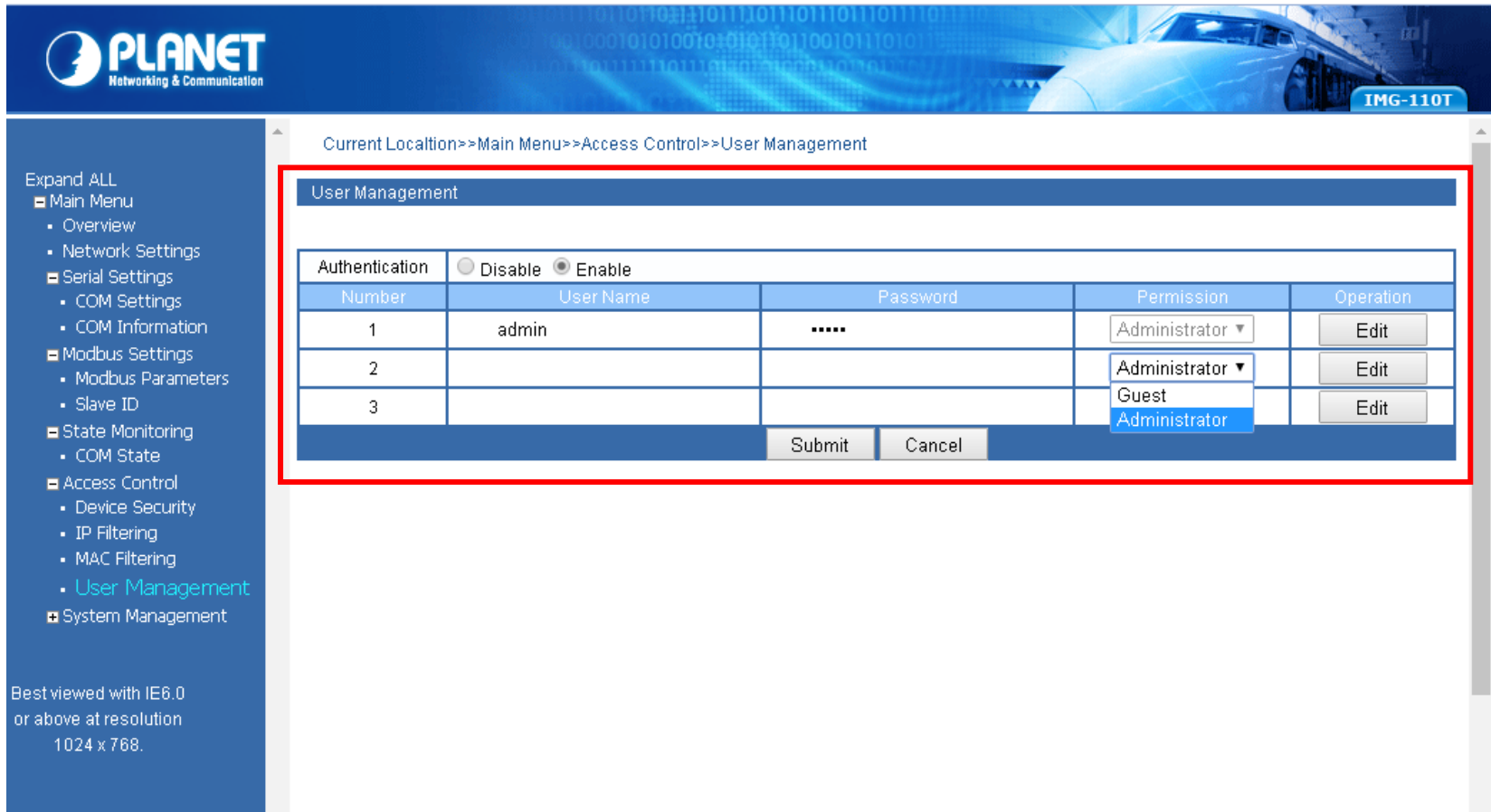
Number	State	Access Permission	MAC Address
1	Disable	Forbidden	00-00-00-00-00-00
2	Disable	Forbidden	00-00-00-00-00-00
3	Disable	Forbidden	00-00-00-00-00-00
4	Disable	Forbidden	00-00-00-00-00-00
5	Disable	Forbidden	00-00-00-00-00-00
6	Enable	Forbidden	00-00-00-00-00-00
7	Disable	Forbidden	00-00-00-00-00-00
8	Enable	Forbidden	00-00-00-00-00-00
9	Disable	Forbidden	00-00-00-00-00-00
10	Disable	Forbidden	00-00-00-00-00-00
11	Disable	Forbidden	00-00-00-00-00-00
12	Disable	Forbidden	00-00-00-00-00-00
13	Disable	Forbidden	00-00-00-00-00-00
14	Disable	Forbidden	00-00-00-00-00-00
15	Disable	Forbidden	00-00-00-00-00-00
16	Disable	Forbidden	00-00-00-00-00-00

Submit Cancel

Best viewed with IE6.0  
or above at resolution  
1024 x 768.

# Product Features

## ◆ User-friendly Web Management Interface – User Management



Current Location>>Main Menu>>Access Control>>User Management

User Management

Authentication  Disable  Enable

Number	User Name	Password	Permission	Operation
1	admin	*****	Administrator ▼	Edit
2			Administrator ▼	Edit
3			Guest Administrator	Edit

Submit Cancel

Expand ALL

- Main Menu
  - Overview
  - Network Settings
- Serial Settings
  - COM Settings
  - COM Information
- Modbus Settings
  - Modbus Parameters
  - Slave ID
- State Monitoring
  - COM State
- Access Control
  - Device Security
  - IP Filtering
  - MAC Filtering
  - User Management
- System Management

Best viewed with IE6.0 or above at resolution 1024 x 768.

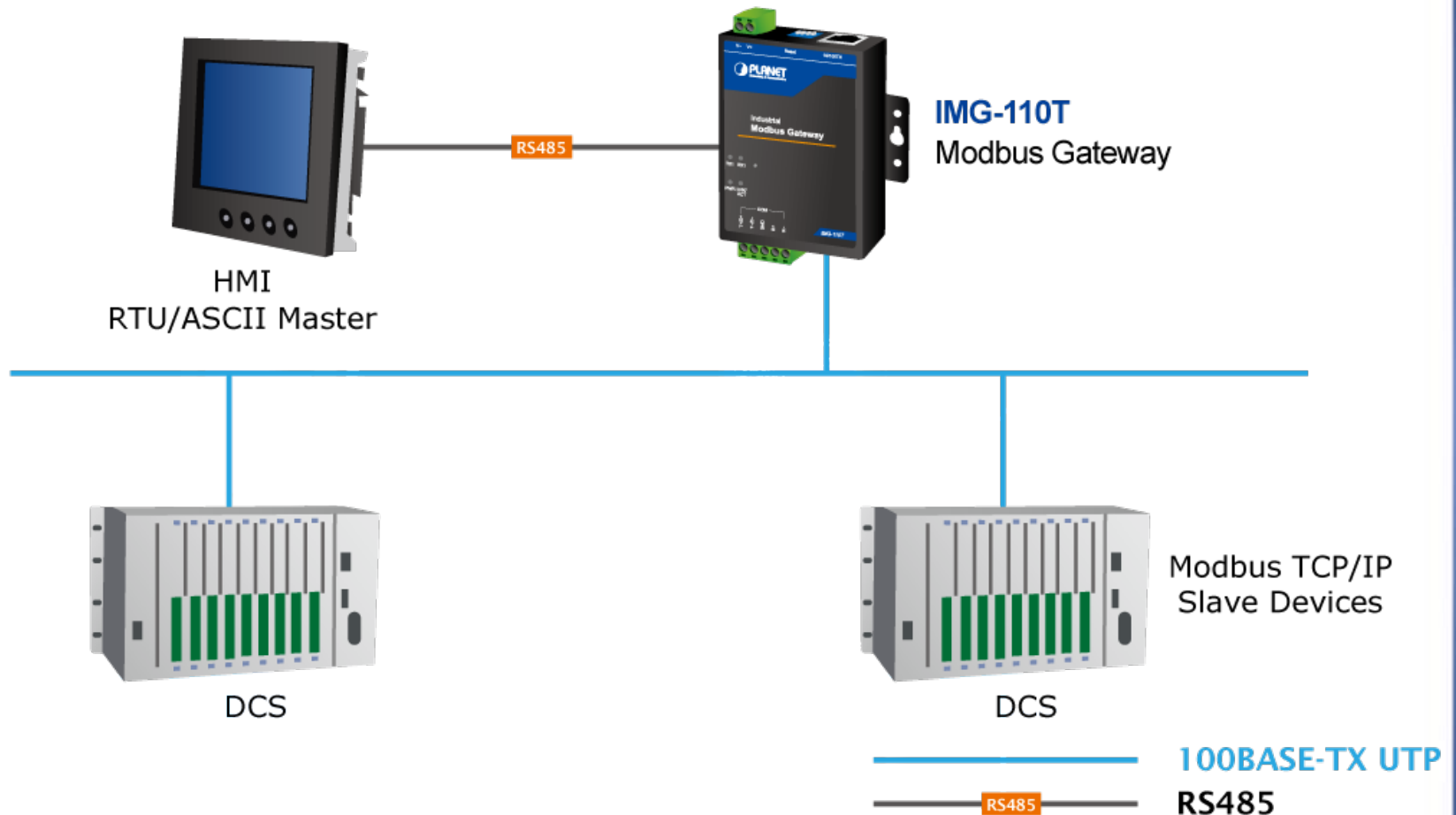


# Applications



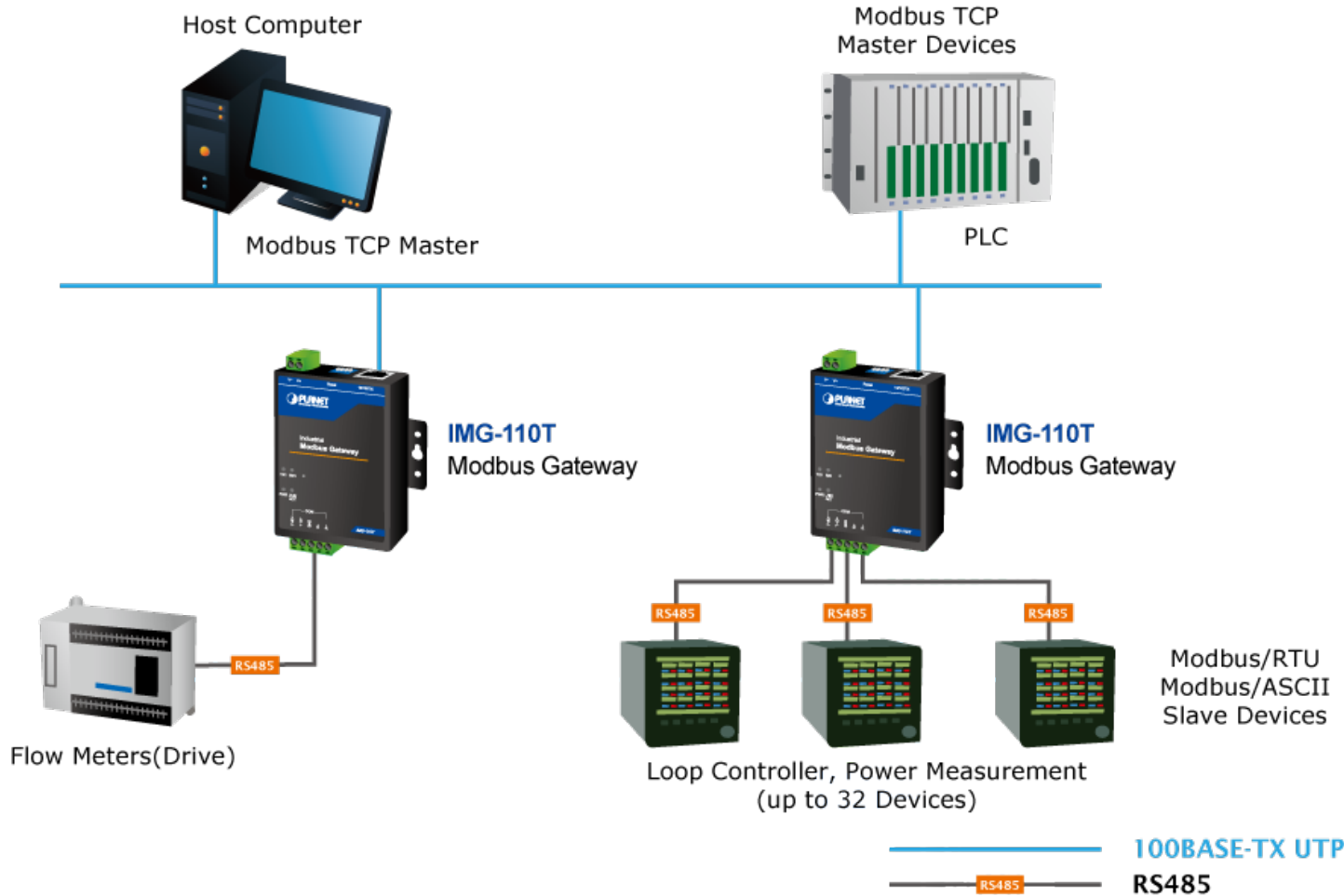
# Applications

## *RTU/ASCII Master to Multi Modbus TCP/IP Slaves*

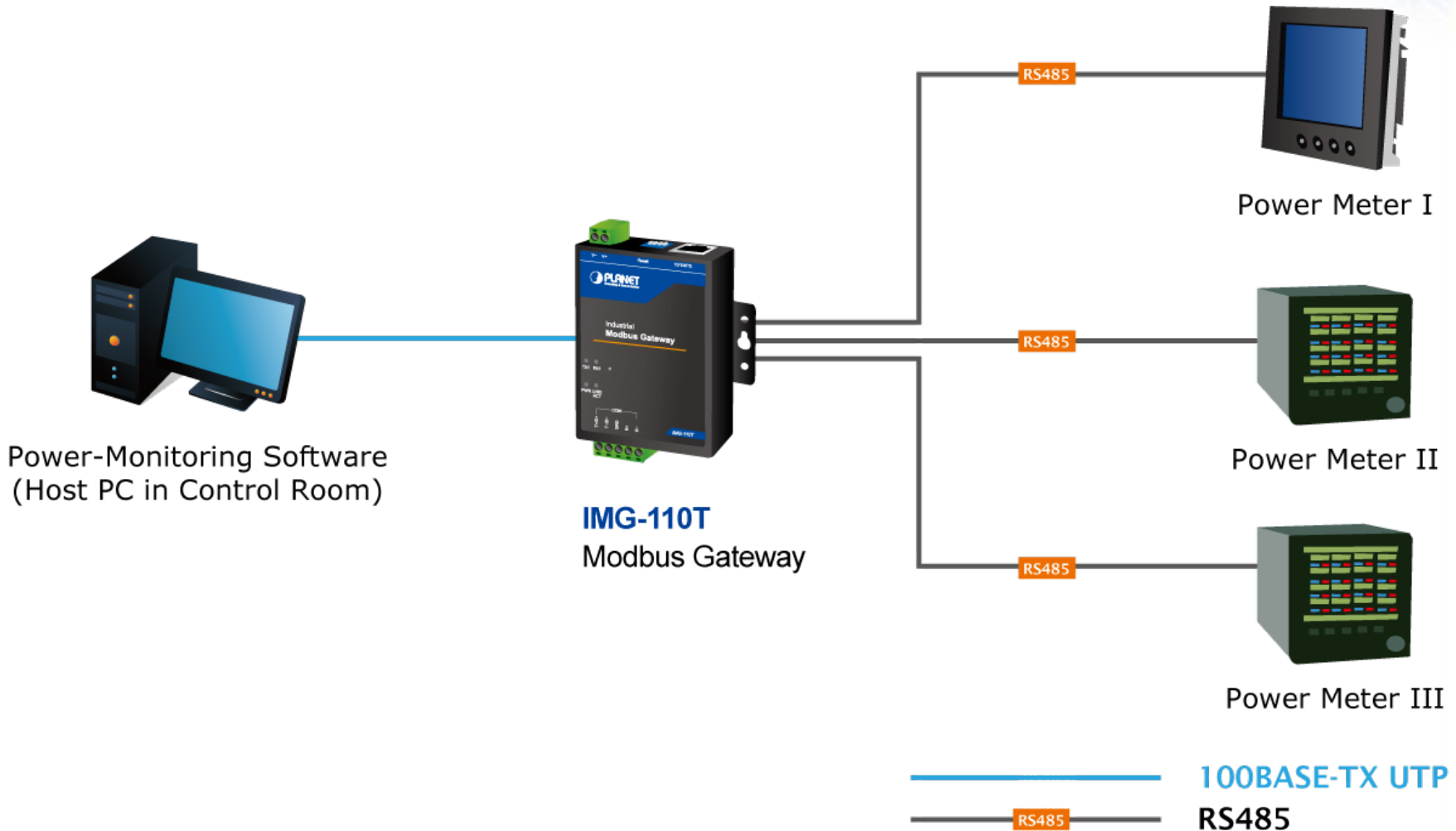


# Applications

## Multi Modbus TCP/IP Master to RTU/ASCII Slaves





# Applications



# Comparison



# Comparison

Brand & Model	 <b>PLANET IMG-110T</b>	 <b>MOXA MGate MB3180</b>
RJ45Port	One 10/100BASE-TX, auto MDI/MDIX	One 10/100BASE-TX, auto MDI/MDIX
Serial Port	5-contact terminal block RS422/RS485 x 1	DB9 male RS232/RS422/RS485 x 1
Baud Rate (Data Rate)	300bps to 115200bps	50bps to 921.6kpbs
Operation Mode	Modbus RTU/ASCII Master & Slave	Modbus RTU/ASCII Master & Slave
Management Interface	Remote IP-based Web/Telnet	Remote IP-based Web/Telnet
Utility	Modbus Gateway Utility/Discovery Utility	MGate Management Utility
Power Input Connector	2-contact terminal block (DC 9-48V)	DC jack for 12-48V DC
Enclosure & Operating Temperature	IP 30 metal case, -40~75 degrees C	IP 30 metal case, 0~60 degrees C
Price	\$	\$\$\$ (220)

# Appendix



# Appendix Sales Target

## ◆ Target Markets

- ✓ IE 4.0
- ✓ Factory
- ✓ Transportation
- ✓ Hospital
- ✓ Bank
- ✓ Service Provider
- ✓ System Integrator

## ◆ Recommended Solutions

If you already have PLANET Serial over Ethernet solution, you will just need:

- ✓ To integrate Modbus TCP/IP and Modbus RTU/ASCII protocols in one industrial automation environment to make the operating performance of the Modbus Gateway stable, especially in industrial environments.





# Appendix

## ◆ Available DIN-rail Power Supplies:

- ✓ **PWR-40-24**    **40W** 24V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 24~30 V)
- ✓ **PWR-60-24**    **60W** 24V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 24~30 V)
- ✓ **PWR-75-24**    **75W** 24V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 24~30 V)



# Appendix

## ◆ Available DIN-rail Power Supplies

- ✓ **PWR-75-48** 75W 48V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 48~56V)
- ✓ **PWR-120-48** 120W 48V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 48~56V)
- ✓ **PWR-240-48** 240W 48V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 48~56V)
- ✓ **PWR-480-48** 480W 48V DC Industrial DIN-rail Power Supply (Voltage Adj. Range: 48~56V)





# ACTIVATING IP POWER