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You can read the recommendations in the user guide, the technical guide or the installation guide for TRENDNET TEW-676APBO. You'll find the answers to all your questions on the TRENDNET TEW-676APBO in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual TRENDNET TEW-676APBO
User guide TRENDNET TEW-676APBO
Operating instructions TRENDNET TEW-676APBO
Instructions for use TRENDNET TEW-676APBO
Instruction manual TRENDNET TEW-676APBO



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· Housing - IP 66/67 housing · © Copyright 2012TRENDnet. All Rights Reserved. 6 TRENDnet User's Guide TEW-676APBO System Concept The TEW-676APBO is not only designed and used as a traditional outdoor AP, but also with rich features tailored for WISP applications. The two-level management capability and access control ease WISP and owners to maintain and manage wireless network in a more controllable fashion. Main applications are listed as follows with illustration: · · · · Wireless CPE for Multi Dwelling Unit/Multi-Tenant Unit(MDU/MTU) complexes including apartments, dormitories, and office complexes. Outdoor Access Point for school campuses, enterprise campuses, or manufacture plants. Indoor Access Point for hotels, factories, or warehouses where industrial grade devices are preferred. Public hotspot operation for café, parks, convention centers, shopping malls, or airports. Wireless coverage for indoor and outdoor grounds in private resorts, home yards, or golf course communities.

© Copyright 2012TRENDnet. All Rights Reserved. 7 TRENDnet User's Guide Product Benefit TEW-676APBO If you are still experiencing low or no signal consider repositioning the wireless devices or installing additional access points. The use of higher gain antennas may also provide the necessary coverage depending on the environment. The N300 Wireless 12dBi Outdoor 5GHz PoE Access Point is the point of connection to Wireless Outdoor Network for service provider deploying last mile services to business or residential broadband subscribers.

· Network administrators can create multiple subscriber service tier using per-subscriber rate limiting features, and manage centrally. TEW-676APBO outdoor bridge utilizes a 200mW output Tx Power to connect to the WiFi mesh or WDS infrastructure and provides the subscriber with an Ethernet connection for a local access. The N300 Wireless 12dBi Outdoor 5GHz PoE Access Point can be used for nine different purposes in six different modes, the Router AP mode, AP mode, the WDS mode, the CPE mode, Client Bridge + Universal Repeater mode and CPE + AP mode, Installation Considerations 1. 2. 3. There are a number of factors that can impact the range of wireless devices. Adjust your wireless devices so that the signal is traveling in a straight path, rather than at an angle. The more material the signal has to pass through the more signal you will lose. Keep the number of obstructions to a minimum.

Each obstruction can reduce the range of a wireless device. Position the wireless devices in a manner that will minimize the amount of obstructions between them. Building materials can have a large impact on your wireless signal. In an indoor environment, try to position the wireless devices so that the signal passes through less dense material such as dry wall. Dense materials like metal, solid wood, glass or even furniture may block or degrade the signal. Antenna orientation can also have a large impact on your wireless signal. Use the wireless adapter's site survey tool to determine the best antenna orientation for your wireless devices. Interference from devices that produce RF (radio frequency) noise can also impact your signal. Position your wireless devices away from anything that generates RF noise, such as microwaves, radios and baby monitors. 4.

5. © Copyright 2012TRENDnet. All Rights Reserved. 8 TRENDnet User's Guide Installation TEW-676APBO 1. 2. Unscrew the black cap covering the PoE port of the TEW-676APBO Install the waterproof kit and insert one end of an Ethernet cable through the kit. 3. Connect the Ethernet cable to the PoE port of the TEW-676APBO 7. 8. Connect the other end of the Ethernet cable to the LAN port of your network. Plug the power cord into the injector. Then connect the plug into a power outlet. Configuration 1. Open a web browser, type the IP address of the Access Point and then press Enter. The default IP address is 192.168.10.100. 4. 5.

Tighten and secure the seal nut of the waterproof kit. Connect the other end of the Ethernet cable to the P+DATA Out port on the PoE injector. 2. 3. Enter the Username and Password and click OK. By default the Username: root and Password: root. Click the Wizard button and follow the setup wizard instructions. Click Finish to complete installation. 6. Using another Ethernet cable, connect one end to the DATA IN port of the injector.

© Copyright 2012TRENDnet. All Rights Reserved. 9 TRENDnet User's Guide TEW-676APBO TEW-676APBO is multiple mode system which can be configured either as a wireless gateway or an access point as desired. It also can be used as a WDS link for Ethernet network expansion. This section depicts different applications on Router AP Mode, AP Mode, WDS Mode, CPE Mode, Client Bridge + Universal Repeater Mode and CPE + AP Mode.

Applications Remote Bass WDS : Example 2 : Router AP with WDS It can be deployed as a gateway with wireless Access Point and provides WDS link for network extension. Router AP Mode (Gateway + Access Point + WDS) Example 1 : Router AP without WDS AP Mode (including Access Point + WDS) It can be deployed as a gateway with wireless Access Point NAT An access point can be either a main, relay or remote base station. A main base station is typically connected to a wired network via the Ethernet port. A relay base station relays data between main base stations and relay stations or remote base stations with clients. A remote base station is the end point to accept connections from wireless clients and pass data upwards to a network wirelessly.

Example 1 : Access Point without WDS It can be deployed as a tradition fixed wireless Access Point © Copyright 2012TRENDnet. All Rights Reserved. 10 TRENDnet User's Guide Example 2 : Access Point with WDS It can be deployed as a tradition fixed wireless Access Point and provides TEW-676APBO WDS Mode (Pure WDS) WDS link to expand network Remote An access point can be either a main, relay or remote base station. A main base station is typically connected to a wired network via the Ethernet port. A relay base station relays data between main base stations and relay stations or remote base stations with clients. A remote base station is the end point to accept connections from wireless clients and pass data upwards to a network wirelessly. In this mode, it can support single or multiple WDS links and no wireless clients can associate with it. Example 1 : Point-to-Point WDS Main WDS Main Example 2 : Point-to-Multi-Point Remote WDS Main © Copyright 2012TRENDnet. All Rights Reserved. 11 TRENDnet User's Guide Example 3 : Multi-Point Repeating bridge TEW-676APBO Client Bridge + Universal Repeater Mode NA Inter Main Base Station It can be used as an Client Bridge + Universal Repeater to receive wireless signal over last mile applications, helping WISPs deliver wireless broadband Internet service to new residential and business customers.



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In this mode, TEW-676APBO is enabled with DHCP Server functions. The wired clients of TEW-676APBO are in the same subnet from Main Base Station and it accepts wireless connections from client devices. WIFI WAN LAN CPE + AP Mode (Router Client + Access Point) CPE Mode It can be used as an Outdoor Customer Premises Equipment (CPE) to receive wireless signal over last mile application, helping WISPs deliver wireless broadband Internet service to residents and business customers. In the CPE mode, TEW676APBO is a gateway enabled with NAT and DHCP Server functions. The wired clients connected to TEW-676APBO are in different subnet from those connected to Main Base Station, and, in CPE mode, it does not accept wireless association from wireless clients. NA T It can be used as an Outdoor Customer Premised Equipment(CPE) to receive wireless signal over the last mile, helping WISPs deliver wireless broadband Internet service to new residential and business customers. In this mode, theTEW-676APBO is a gateway with NAT and DHCP Server functions. The wireless and wired clients of TEW-676APBO are on the different subnet from Main Base Station and it accepts wireless connections from client devices. Main Base Station WIFI WAN © Copyright 2012TRENDnet. All Rights Reserved.

12 TRENDnet User's Guide TEW-676APBO entering the default IP Address, <http://192.168.10.254>, in the URL field, and then press Enter. TEW-676APBO supports web-based configuration.

Upon the completion of hardware installation, TEW-676APBO can be configured through a PC/NB by using its web browser such as Internet Explorer version 6.0. Web Management Interface Instructions System Login The system manager Login Page then appears. Enter "root" as User name and "root" as Password, and then click OK to login to the system; the root manager account is used as an example here. Default IP Address : 192.

168.10.100 Default IP Netmask : 255.255.255.0 Default User Name and Password : root/root The default user name and password for both root manager account and admin manager account are as follows: Router AP Root root Root root CPE Admin admin AP Root root WDS Root root UR + CB Root root CPE + AP Root Root Admin admin Login Success System Overview page will appear after successful login. AP Mode Configuration Mode Management Account User Name Password When AP mode is chosen, the system can be configured as an Access Point. This section provides detailed explanation for users to configure in the AP mode with help of illustrations. In the AP mode, functions listed in the table below are also available from the Web-based GUI interface. Option System Operating Mode Wireless General Setup Utilities Profiles Settings Firmware Upgrade Network Utility Reboot Status System Overview Clients default default admin default default default default admin Step LAN Functions Management Time Server SNMP Advanced Setup IP Segment Set-up for Administrator's PC/NB Set the IP segment of the administrator's computer to be in the same range as TEW-676APBO for accessing the system.

Do not duplicate the IP Address used here with IP Address of TEW-676APBO or any other device within the network Example of Segment : The valid range is 1 ~ 254 and 192.168.10.254 shall be avoided because it is already assigned to TEW-676APBO . 192.168.10.10 is used in the example below. IP Address : 192.168.

10.10 IP Netmask : 255.255.255.0 Virtual AP WDS Setup AP Mode Functions WDS Status Extra Info Event Log Launch Web Browser Launch web browser to access the web management interface of system by © Copyright 2012TRENDnet.

All Rights Reserved. 13 TRENDnet User's Guide External Network Connection Network Requirement TEW-676APBO IP Gateway : The default gateway of the LAN port; default Gateway is 192.168.2.1 Dynamic IP : This configuration type is applicable when the TEW-676APBO is connected to a network with the presence of a DHCP server; all related IP information will be provided by the DHCP server automatically.

Normally, TEW-676APBO connects to a wired LAN and provides a wireless connection point to associate with wireless client as shown in Figure 3-1. Then, Wireless clients could access to LAN or Internet by associating themselves with TEW-676APBO set in AP mode. Hostname : The Hostname of the LAN port DNS : Check either "No Default DNS Server" or "Specify DNS Server IP" button as desired to set up the system DNS. Primary : The IP address of the primary DNS server. Secondary: The IP address of the secondary DNS server. Configure LAN IP Here are the instructions to setup the local IP Address and Netmask.

Please click on System -> LAN and follow the below setting. 802.1d Spanning Tree The spanning tree network protocol provides a loop free topology for a bridged LAN between LAN interface and 4 WDS interfaces from wds0 to wds3. The Spanning Tree Protocol, which is also referred to as STP, is defined in the IEEE Standard 802.

1d. The Spanning tree always enabled on TEW-676APBO. Below Figures depict a loop for a bridged LAN between LAN and WDS link Click Save button to save your changes. Click Reboot button to activate your changes Mode : Check either "Static IP" or "Dynamic IP" button as desired to set up the system IP of LAN port . Static IP : The administrator can manually setup the LAN IP address when static IP is available/ preferred. IP Address : The IP address of the LAN port; default IP address is 192.168.2.254 IP Netmask : The Subnet mask of the LAN port; default Netmask is 255.255.

255.0 © Copyright 2012TRENDnet. All Rights Reserved. 14 TRENDnet User's Guide TEW-676APBO WDS Remote Base Station LOOP WDS WDS Blocked by Spanning Tree Protocol Remote Base Station WDS Remote Base Station LOOP WDS Blocked by Spanning Tree Protocol Base Station WDS Remote Base Station © Copyright 2012TRENDnet. All Rights Reserved.

15 TRENDnet User's Guide Wireless LAN Network TEW-676APBO unit is %) for your environment. If you are not sure which setting to choose, then keep the default setting, 100%. When Band Mode select in 802.11a only mode, the HT(High Throughput) settings should be hidden immediately. HT TxStream/RxStream : By default, it's 2.

Operating Mode : By default, it's Mixed Mode. Mixed Mode : In this mode packets are transmitted with a preamble compatible with the legacy 802.11a/g, the rest of the packet has a new format. In this mode the receiver shall be able to decode both the Mixed Mode packets and legacy packets. Green Field : In this mode high throughput packets are transmitted without a legacy compatible part. Channel Bandwidth : The "20/40" MHz option is usually best. The other option is available for special circumstances. Guard Interval : Using "Auto" option can increase throughput. However, it can also increase error rate in some installations, due to increased sensitivity to radiofrequency reflections.



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Select the option that works best for your installation.

MCS : This parameter represents transmission rate. By default (Auto) the fastest possible transmission rate will be selected. You have the option of selecting the speed if necessary. (Refer to Appendix C. MCS Data Rate) **Reverse Direction Grant(RDG)** : Disable or enable reserve direction grant. Default is enabled. **A-MSDU** : Aggregated Mac Service Data Unit. Select Enable to allow aggregation for multiple MSDUs in one MPDU Default is disabled. **Auto Block ACK** : Disable or enable auto block ACK. Default is enabled.

Decline BA Request : Disable or enable decline BA request. Default is disabled. Change these settings as described here and click Save button to save your changes. Click Reboot button to activate your changes. The items in this page are for AP's RF general settings and will be applied to all VAPs and WDS Links.

The network manager can configure related wireless settings, General Settings, Advanced Settings, Virtual AP(VAP) Setting, Security Settings and MAC Filter Settings. **Wireless General Setup** The administrator can change the data transmission, channel and output power settings for the system. Please click on Wireless -> General Setup and follow the below setting. **MAC Address** : The MAC address of the Wireless interface is displayed here. **Band Mode** : Select an appropriate wireless band; bands available are 801.

11a or 802.11a/n mixed mode . **AP Isolation** : Select Enable, all clients will be isolated from each VAP, that means different VAP's clients can not reach to each other. **Transmit Rate Control** : Select the desired rate from the drop-down list; the options are auto or ranging from 6 to 54Mbps only for 802.11a mode. **Tx Power** : You can adjust the output power of the system to get the appropriate coverage for your wireless network. Specify digit numbers between 1 to 100 (the Wireless Advanced Setup To achieve optimal wireless performance, it is necessary to tweak advance setting per requirements properly, not necessary higher the better or lower. The administrator can change the RTS threshold and fragmentation threshold settings for the system. Please click on Wireless -> Advanced Setup and follow the below setting. © Copyright 2012TRENDnet.

All Rights Reserved. 16 TRENDnet User's Guide TEW-676APBO receiving radio. The transmitter will resend the original packet if correspondent ACK failed to arrive within specific time interval, also refer to as "ACK Timeout". ACK Timeout is adjustable due to the fact that distance between two radio links may vary in different deployment. ACK Timeout makes significant influence in performance of long distance radio link. If ACK Timeout is set too short, transmitter will start to "Resend" packet before ACK is received, and throughputs become low due to excessively high re-transmission. ACK Timeout is best determined by distance between the radios, data rate of average environment. The Timeout value is calculated based on round-trip time of packet with a little tolerance, So, if experiencing re-transmissions or poor performance the ACK Timeout could be made longer to accommodate. **Beacon Interval** : Beacon Interval is in the range of 20~1024 and set in unit of millisecond. The default value is 100 msec.

Access Point (AP) in IEEE 802.11 will send out a special approximated 50-byte frame, called "Beacon". Beacon is broadcast to all the stations, provides the basic information of AP such as SSID, channel, encryption keys, signal strength, time stamp, support data rate. All the radio stations received beacon recognizes the existence of such AP, and may proceed next actions if the information from AP matches the requirement. Beacon is sent on a periodic basis, the time interval can be adjusted.

By increasing the beacon interval, you can reduce the number of beacons and associated overhead, but that will likely delay the association and roaming process because stations scanning for available access points may miss the beacons. You can decrease the beacon interval, which increases the rate of beacons. This will make the association and roaming process very responsive; however, the network will incur additional overhead and throughput will go down. **Short Slot** : By default, it's "Enable" for reducing the slot time from the standard 20 microseconds to the 9 microsecond short slot time Slot time is the amount of time a device waits after a collision before retransmitting a packet. Reducing the slot time decreases the overall back-off, which increases throughput.

Back-off, which is a multiple of the slot time, is the random length of time a station waits before sending a packet on the LAN. For a sender and receiver own right of the channel the shorter slot time help manage shorter wait time to retransmit from collision because of hidden wireless clients or other causes. When collision sources can be removed sooner and other senders attempting to send are listening the channel(CSMA/CA) the owner of the channel should continue ownership and finish their transmission and release the channel. Then, following ownership of the channel will be sooner for the new pair due to shorter slot time. However, when long duration of existing collision sources and shorter slot time exist the owners might experience subsequent collisions. @@The default is 1. **DTIM** is defined as Delivery Traffic Indication Message. @@DTIM is necessary and critical in wireless environment as a mechanism to fulfill power-saving synchronization. A DTIM interval is a count of the number of beacon frames that must occur before the access point sends the buffered multicast frames. @@The higher DTIM interval will help power saving and possibly decrease wireless throughput in multicast applications.

Extra Slot Time : Slot time is in the range of 1~255 and set in unit of microsecond. The default value is 9 microsecond. **ACK Timeout** : ACK timeout is in the range of 1~255 and set in unit of microsecond. The default value is 32 microsecond. All data transmission in 802.11b/g request an "Acknowledgement" (ACK) send by © Copyright 2012TRENDnet. All Rights Reserved. 17 TRENDnet User's Guide TEW-676APBO **Fragment Threshold** : The Fragment Threshold is in the range of 256~2346 byte. The default is 2346 byte. @@@@The pros is obvious, the cons is the overhead for transmission.

@@@@Only when the frame size is over the Threshold, fragmentation will take place automatically. **RTS Threshold** : TRTS Threshold is in the range of 1~2347 byte. The default is 2347 byte. The main purpose of enabling RTS by changing RTS threshold is to reduce possible collisions due to hidden wireless clients. RTS in AP will be enabled automatically if the packet size is larger than the Threshold value.

By default, RTS is disabled in a normal environment supports non-jumbo frames. **WMM Parameters of Access Point** : This affects traffic flowing from the access point to the client station Data Transmitted AP to Clients Background.



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Best Effort Video Voice Priority Description High throughput. @@Medium throughput and delay. Most traditional IP data is sent to this queue Minimum delay.

Time-sensitive video data is automatically sent to this queue Time-sensitive data like VoIP and streaming media are automatically sent to this queue Short Preamble : By default, it's "Enable". To Disable is to use Long 128-bit Preamble Synchronization field. @@The short preamble provides 72-bit Synchronization field to improve WLAN transmission efficiency with less overhead. Queue AC_BK AC_BE AC_VI AC_VO Low Medium High High Tx Burst : By default, it's "Enable". To Disable is to deactivate Tx Burst. @@@@In this way, 802.11n networks can send multiple data packets with the fixed overhead cost of just a single frame. WMM : By default, it's "Disable". To Enable is to use WMM and the WMM parameters should appears. Configuring QoS options consists of setting parameters on existing queues for different types of wireless traffic.

You can configure different minimum and maximum wait times for the transmission of packets in each queue based on the requirements of the media being sent. Queues automatically provide minimum transmission delay for Voice, Video, multimedia, and mission critical © Copyright 2012TRENDnet. All Rights Reserved. 18 TRENDnet User's Guide applications, and rely on best-effort parameters for traditional IP data. As an Example, time-sensitive Voice & Video, and multimedia are given effectively higher priority for transmission (lower wait times for channel access), while other applications and traditional IP data which are less timesensitive but often more data-intensive are expected to tolerate longer wait times. TEW-676APBO used, a sender does not retransmit packets that have not been received by the recipient. When the Normal ACK policy is used, the recipient acknowledges each received unicast packet. Aifsn : The Arbitration Inter-Frame Spacing Number specifies a wait time (in milliseconds) for data frames CWmin : Minimum Contention Window. This parameter is input to the algorithm that determines the initial random back-off wait time ("window") for retry of a transmission. The value specified here in the Minimum Contention Window is the upper limit (in milliseconds) of a range from which the initial random back-off wait time is determined. CWmax : Maximum Contention Window. The value specified here in the Maximum Contention Window is the upper limit (in milliseconds) for the doubling of the random back-off value. This doubling continues until either the data frame is sent or the Maximum Contention Window size is reached. Once the Maximum Contention Window size is reached, retries will continue until a maximum number of retries allowed is reached. Valid values for the "cwmax" are 1, 3, 7, 15, 31, 63, 127, 255, 511, or 1024.

The value for "cwmax" must be higher than the value for "cwmin". Txop : Transmission Opportunity is an interval of time when a WME AP has the right to initiate transmissions onto the wireless medium (WM). This value specifies (in milliseconds) the Transmission Opportunity (TXOP) for AP; that is, the interval of time when the WMM AP has the right to initiate transmissions on the wireless network. ACM : Admission Control Mandatory, ACM only takes effect on AC_VI and AC_VO. When you do not click Checkbox, it means that the ACM is controlled by the connecting AP.

If you click Checkbox, it means that the Client is in charge. AckPolicy : Acknowledgment Policy, WMM defines two ACK policies: Normal ACK and No ACK. Click "Checkbox" indicates "No ACK" When the no acknowledgment (No ACK) policy is used, the recipient does not acknowledge received packets during wireless packet exchange. This policy is suitable in the environment where communication quality is fine and interference is weak. While the No ACK policy helps improve transmission efficiency, it can cause increased packet loss when communication quality deteriorates. This is because when this policy is WMM Parameters of Station : This affects traffic flowing from the client station to the access point. Aifsn : The Arbitration Inter-Frame Spacing Number specifies a wait time (in milliseconds) for data frames CWmin : Minimum Contention Window. This parameter is input to the algorithm that determines the initial random backoff wait time ("window") for retry of a transmission. The value specified here in the Minimum Contention Window is the upper limit (in milliseconds) of a range from which the initial random backoff wait time is determined. CWmax : Maximum Contention Window.

The value specified here in the Maximum Contention Window is the upper limit (in milliseconds) for the doubling of the random backoff value. This doubling continues until either the data frame is sent or the Maximum Contention Window size is reached. Once the Maximum Contention Window size is reached, retries will continue until a maximum number of retries allowed is reached. Valid values for the "cwmax" are 1, 3, 7, 15, 31, 63, 127, 255, 511, or 1024. The value for "cwmax" must be higher than the value for "cwmin". Txop : Transmission Opportunity is an interval of time when a WME AP has the right to initiate transmissions onto the wireless medium (WM). This value specifies (in milliseconds) the Transmission Opportunity (Txop) for AP; that is, the interval of time when the WMM AP has the right to initiate transmissions on the wireless network. ACM : Admission Control Mandatory, ACM only takes effect on AC_VI and AC_VO. When you do not click Checkbox, it means that the ACM is controlled by the connecting AP. If you click Checkbox, it means that the Client is in charge.

© Copyright 2012TRENDnet. All Rights Reserved. 19 TRENDnet User's Guide Data Transmitted Clients to AP Background. Best Effort Video Voice TEW-676APBO Create Virtual AP (VAP) The TEW-676APBO support broadcasting multiple SSIDs, allowing the creation of Virtual Access Points, partitioning a single physical access point into 7 logical access points, each of which can have a different set of security, VLAN Tag(ID) and network settings.

Figure 3-2 shows multiple SSIDs with different security type and VLAN settings.

Sales Network Queue Priority Description High throughput. @@Medium throughput and delay. Most traditional IP data is sent to this queue Minimum delay. Time-sensitive video data is automatically sent to this queue AC_BK AC_BE AC_VI AC_VO Low Medium High High SSID 1 VLA N #1 W E WPAPSK/TKIP WPAPSK/AES Time-sensitive data like VoIP and streaming media are automatically sent to this queue Click Save button to save your changes. Click Reboot button to activate your changes.

The items in this page are for AP's RF advanced settings and will be applied to all VAPs and WDS Links.



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Engineer Network SSID 2 VLA N #2 Market Network SSID 3 VLA N #3 Guest Network WPA2PSK/TKIP WPA2PSK/AES VLA N #4 Accounting Network SSID 4 VLA N #5 SSID 5 Multiple SSIDs with different Security Type and VLAN Tag © Copyright 2012TRENDnet. All Rights Reserved. 20 TRENDnet User's Guide Virtual AP Overview The administrator can view all of the Virtual AP's settings via this page. Please click on Wireless -> Virtual AP Setup and the Virtual AP Overview Page appears. TEW-676APBO Enable AP : By default, it's "Disable" for VAP1 ~ VAP6. The Primary AP always enabled. Select "Enable" to activate VAP or click "Disable" to deactivate this function ESSID : Extended Service Set ID, When clients are browsing for available wireless networks, this is the SSID that will appear in the list. ESSID will determine the service type available to AP's clients associated with the specified VAP. Client Isolation : Select Enable, all clients will be isolated from each other, that means all clients cannot reach to other clients.

Below Figures depict Client Isolation and AP Isolation Client Isolation VAP0 VAP : Indicate the system's Virtual AP. ESSID : Indicate the ESSID of the respective Virtual AP MAC Address : The MAC address of the VAP Interface is displayed here. When you enable AP and reboot system, the MAC address will display here. Status : Indicate the Status of the respective Virtual AP. The Primary AP always on. Security Type : Indicate an used security type of the respective Virtual AP. MAC Filter : Indicate an used MAC filter of the respective Virtual AP. Edit : Click Edit button to configure Virtual AP's settings, including security type and MAC Filter. VAP1 VAP2 AP Isolation Hidden SSID : By default, it's "Disable". Enable this option to stop the SSID broadcast in your network.

When disabled, people could easily obtain the SSID information with the site survey software and get access to the network if security is not turned on. When enabled, network security is enhanced. It's suggested to enable it after AP security settings are archived and setting of AP clients could make to associate to it.

Virtual AP Setup For each Virtual AP, administrators can configure SSID, VLAN tag(ID), SSID broadcasting, Maximum number of client associations, security type settings. Click Edit button on the Edit column, and then a Virtual AP setup page appears. Maximum Clients : The default value is 32. You can enter the number of wireless clients that can associate to a particular SSID. When the number of client is set to 5, only 5 clients at most are allowed to connect to this VAP. VLAN Tag(ID) : By default, it's selected "Disable". This system supports tagged Virtual LAN(VLAN).

A valid number of 1 to 4094 can be entered after it's enabled. If your network utilize VLANs you could tie a VLAN Tag to a specific SSID, and packets from/to wireless clients belonging to that SSID will be tagged with that VLAN Tag. This enables security of wireless applications by applying VLAN Tag. © Copyright 2012TRENDnet. All Rights Reserved. 21 TRENDnet User's Guide TEW-676APBO Cipher Suite : By default, it is AES. Select either AES or TKIP cipher suites Pre-shared Key : Enter the pre-shared key; the format shall go with the selected key type. Security Type : Select the desired security type from the drop-down list; the options are Disable, WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise, WPA2-Enterprise and WEP 802.1X. Disable : Data are unencrypted during transmission when this option is selected.

WEP : Wired Equivalent Privacy(WEP) is a data encryption mechanism based on a 64-bit or 128-bit shared key. Group Key Update Period : By default, it is 3600 seconds. This time interval for rekeying GTK, broadcast/multicast encryption keys, in seconds. Entering the time-length is required. WPA-Enterprise (or WPA2-Enterprise): The RADIUS authentication and encryption will be both enabled if this is selected. Authentication Method : Enable the desire option among OPEN, SHARED or WEPAUTO. Key Index : Key index is used to designate the WEP key during data transmission. 4 different WEP keys can be entered at the same time, but only one is chosen. WEP Key # : Enter HEX or ASCII format WEP key value; the system supports up to 4 sets of WEP keys. Key Length Hex 10 characters 26 characters 5 characters 13 characters ASCII 64-bit 128-bit WPA-PSK (or WPA2-PSK) : WPA (or WPA2) Algorithms, allows the system accessing the network by using the WPA-PSK protected access.

rekeying GTK, broadcast/multicast encryption keys, in seconds. Entering the time-length is required. · PMK Cache Period : By default, it's 10 minutes. Set WPA2 PMKID cache timeout period, after time out, the cached key will be deleted. · Pre-Authentication : By default, it's "Disable".

To Enable is use to speed up roaming before pre-authenticating IEEE 802.1X/EAP part of the full RSN authentication and key handshake before actually associating with a new AP. Radius Server Settings : · IP Address : Enter the IP address of the Authentication RADIUS server. · Port : By default, it's 1812. The port number used to communicate with RADIUS server.

· Shared secret : A secret key used between system and RADIUS server. Supports 8 to 64 characters. WPA General Settings : · Cipher Suite : By default, it is AES. Select either AES or TKIP cipher suites · Group Key Update Period : By default, it's 3600 seconds. This time interval for © Copyright 2012TRENDnet.

All Rights Reserved. 22 TRENDnet User's Guide Session Timeout : The Session timeout is in the range of 0~60 seconds. The default is 0 to disable re-authenticate service. · Amount of time before a client will be required to re-authenticate. WEP 802.

1X : When WEP 802.1x Authentication is enabled, please refer to the following Dynamic WEP and RADIUS settings to complete configuration. · TEW-676APBO Wireless MAC Filter Setup Continue Virtual AP Setup section. For each Virtual AP setting, the administrator can allow or reject clients to access each Virtual AP. Radius Server Settings : IP Address : Enter the IP address of the Authentication RADIUS server. Port : By default, it's 1812. The port number used to communicate with RADIUS server. · Shared secret : A secret key used between system and RADIUS server. Supports 8 to 64 characters. · Session Timeout : The Session timeout is in the range of 0~60 seconds.

The default is 0 to disable re-authenticate service. · Amount of time before a client will be required to re-authenticate. Click Save button to save your changes. Click Reboot button to activate your changes · · MAC Filter Setup : By default, it's "Disable". Options are Disable, Only Deny List MAC or Only Allow List MAC.



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Two ways to set MAC filter rules : Only Allow List MAC. The wireless clients in the "Enable" list will be allowed to access the Access Point; All others or clients in the "Disable" list will be denied. Only Deny List MAC. The wireless clients in the "Enable" list will be denied to access the Access Point; All others or clients in the "Disable" list will be allowed. Add a station MAC : Enter MAC address (e.g. aa:bb:cc:00:00:0a) and click "Add" button, then the MAC address should display in the "Enable" List. There are a maximum of 20 clients allowed in this "Enable" List. The MAC addresses of the wireless clients can be added and removed to the list using the Add and Remove buttons. Click Reboot button to activate your changes © Copyright 2012TRENDnet. All Rights Reserved. 23 TRENDnet User's Guide Wireless Network Expansion The administrator could create WDS Links to expand wireless network. When WDS is enabled, access point functions as a wireless bridge and is able to communicate with other access points via WDS links. A WDS link is bidirectional and both side must support WDS. Access points know each other by MAC Address.

In other words, each access point needs to include MAC address of its peer. Ensure all access points are configured with the same channel and own same security type settings. Remote Base Station TEW-676APBO Security Type : Option is "Disable", "WEP", "TKIP" or "AES" from drop-down list. Needs the same type to build WDS links. Security type takes effect when WDS is enabled. WEP Key : Enter 5 / 13 ASCII or 10 / 26 HEX format WEP key. TKIP Key : Enter 8 to 63 ASCII or 64 HEX format TKIP key. AES Key : Enter 8 to 63 ASCII or 64 HEX format AES key. WDS MAC List Enable : Click Enable to create WDS link. WDS Peer's MAC Address : Enter the MAC address of WDS peer.

Description : Description of WDS link. WDS SSID: Click Save button to save your changes. Click Reboot button to activate your changes System Status This section breaks down into subsections of System Overview, Associated Clients Status, WDS Link Status, Extra Information and Event Log. System Overview Please click on Wireless -> WDS Setup and follow the below setting. Display detailed information of System, Network, LAN and Wireless in the System Overview page.

System : Display the information of the system. System Name : The name of the system. Operating Mode : The mode currently in service. Location : Deployed geographical location. © Copyright 2012TRENDnet.

All Rights Reserved. 24 TRENDnet User's Guide Description : A description of the system. Firmware Version : The current installed firmware version. Firmware Date : The build time of installed firmware. Device Time : The current time of the system. System Up Time : The time period that system has been in service since last reboot. Network Information : Supports Static or Dynamic modes on the LAN interface. TEW-676APBO Wireless Information : Display total received and transmitted statistics on available Virtual AP. IP Address : The management IP of system. By default, it's 192.

168.2.254. IP Netmask : The network mask. By default, it's 255.255.255.0. IP Gateway : The gateway IP address and by default, it's 192.168.

2.1. Primary DNS : The primary DNS server in service. Secondary DNS : The secondary DNS server in service. LAN Information : Display total received and transmitted statistics on the LAN interface.

MAC Address : The MAC address of the Wireless port. Channel : The current channel on the Wireless port. Rate : The current Bit Rate on the Wireless port. Receive bytes : The total received packets in bytes on the Wireless port. Receive packets : The total received packets on the Wireless port.

Transmit bytes : The total transmitted packets in bytes on the Wireless port. Transmit packets : The total transmitted packets on the Wireless port. Associated Clients Status It displays ESSID, on/off Status, Security Type, total number of wireless clients associated with all Virtual AP. MAC Address : The MAC address of the LAN port. Receive bytes : The total received packets in bytes on the LAN port. Receive packets : The total received packets of the LAN port.

Transmit bytes : The total transmitted packets in bytes of the LAN port. Transmit packets : The total transmitted packets of the LAN port. © Copyright 2012TRENDnet. All Rights Reserved.

25 TRENDnet User's Guide TEW-676APBO VAP Information : Highlights key VAP information. VAP : Available VAP from Primary AP to VAP6. ESSID : Display name of ESSID for each VAP. MAC Address : Display MAC address for each VAP. Status : On/Off Security Type : Display chosen security type; WEP, WPA/WPA2-PSK, WPA/WPA2-Enterprise. Clients : Display total number of wireless connections for each VAP. VAP Clients : Display all associated clients on each Virtual AP. MAC Address : MAC address of associated clients Signal Strength ANT0/ANT1 : Signal Strength of from associated clients. Bandwidth : Channel bandwidth of from associated clients Idle Time : Last inactive time period in seconds for a wireless connection. Connect Time : Total connection time period in seconds for a wireless connection.

Disconnect : Click "Delete" button to manually disconnect a wireless client in a Virtual AP. MAC Address : Display MAC address of WDS peer. Signal Strength ANT0/ANT1 : Indicate the signal strength of the respective WDS links. Phy Mode : Indicate the phy mode of the respective WDS linked. BandWidth : Indicate the channel bandwidth of the respective WDS linked.

MCS : Indicate the MCS of the respective WDS linked. SGI : Indicate the SGI (Short Guard Interval) of the respective WDS linked. "1" indicate the Short Guard Interval, "0" indicate the Long Guard Interval. Extra Information Users could pull out information such as Route table, ARP table, MAC table, Bridge table or STP available in the drop-down list from system. The "Refresh" button is used to retrieve latest table information.

Show WDS Link Status Peers MAC Address, antenna 0/1 received signal strength, phy mode and channel bandwidth for each WDS are available. Route table information : Select "Route table information" on the drop-down list to display route table. © Copyright 2012TRENDnet. All Rights Reserved. 26 TRENDnet User's Guide TEW-676APBO could be used as a L2 or L3 device. It doesn't support dynamic routing protocols such as RIP or OSPF. Static routes to specific hosts, networks or default gateway are set up automatically according to the IP configuration of system's interfaces. When used as a L2 device, it could switch packets and, as L3 device, it's capable of being a gateway to route packets inward and outward. TEW-676APBO This table displays local MAC addresses associated with wired or wireless interfaces, but also remember non-local MAC addresses learned from wired or wireless interfaces.



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ARP table Information : Select "ARP Table Information" on the drop-down list to display ARP table.

ARP associates each IP address to a unique hardware address (MAC) of a device. It is important to have a unique IP address as final destination to switch packets to. Ageing timers will be reset when existing MAC addresses in table are learned again or added when new MAC addresses are seen from wired or wireless interfaces as well. When time runs out for a particular entry, it will be pruned from the table. In that situation, switching packet to that particular MAC address will be dropped. Bridge STP Information : Select "Bridge STP Information" on the drop-down list to display a list of bridge STP information. Bridge table information : Select "Bridge Table information" on the drop-down list to display bridge table. Bridge table will show Bridge ID and STP's Status on the each Ethernet bridge and its attached interfaces, the Bridge Port should be attached to some interfaces (e.g. eth2, ra0~ra6 and wds0~wds3).

Bridge MAC information : Select "Bridge MACs Information" on the drop-down list to display MAC table. © Copyright 2012TRENDnet. All Rights Reserved. 27 TRENDnet User's Guide Event Log TEW-676APBO The Event log displays system events when system is up and running. Also, it becomes very useful as a troubleshooting tool when issues are experienced in system.

Time : The date and time when the event occurred. Facility : It helps users to identify source of events such "System" or "User" Severity : Severity level that a specific event is associated such as "info", "error", "warning", etc. Message : Description of the event. Click Refresh button to renew the log, or click Clear button to clear all the record. © Copyright 2012TRENDnet.

All Rights Reserved. 28 TRENDnet User's Guide TEW-676APBO Configure LAN IP Here are the instructions for how to setup the local IP Address and Netmask. Please click on System -> LAN and follow the below setting. WDS Mode Configuration Please refer to illustrations of the section 1.3 for possible applications in the WDS mode. This section provides detailed explanation for users to configure in the WDS mode with help of illustrations. In the WDS mode, functions listed in the table below are also available from the Web-based GUI interface. Option System Operating LAN Functions Management Time Server SNMP WDS Mode Functions Wireless General Setup Advanced Setup WDS Setup Utilities Profiles Settings Firmware Network Utility Reboot Status System WDS Status Extra Info Event Log External Network Connection Network Requirement You could expand your Ethernet network via WDS link. In this mode, the TEW-676APBO connects directly to a wired LAN, and wirelessly bridges to a remote access point via a WDS link as shown in Figure 4-1. In the mode, it can't associate with any wireless clients.

WDS Mode : Check either "Static IP" or "Dynamic IP" button as desired to set up the system IP of LAN port . Static IP : The administrator can manually setup the LAN IP address when static IP is available/ preferred. IP Address : The IP address of the LAN port; default IP address is 192.168.2.254 IP Netmask : The Subnet mask of the LAN port; default Netmask is 255.255.255.0 IP Gateway : The default gateway of the LAN port; default Gateway is 192.168.

2.1 Dynamic IP : This configuration type is applicable when the TEW-676APBO is connected to a network with the presence of a DHCP server; all related IP information will be provided by the DHCP server automatically. Hostname : The Hostname of the LAN port DNS : Check either "No Default DNS Server" or "Specify DNS Server IP" button as desired to set up the system DNS. Primary : The IP address of the primary DNS server. Secondary : The IP address of the secondary DNS server.

Point to Point network Configuration Click Save button to save your changes. Click Reboot button to activate your changes © Copyright 2012TRENDnet. All Rights Reserved. 29 TRENDnet User's Guide Wireless Network Expansion TEW-676APBO The network manager can configure related wireless settings, General Settings, Advanced Settings and WDS Settings. General Setup The administrator can change the data transmission, channel and output power settings for the system.

Please click on Wireless -> General Setup and follow the below setting. MAC Address : The MAC address of the Wireless interface is displayed here. Band Mode : Select an appropriate wireless band; bands available are 801.11a or 802.11a/n mixed mode. Transmit Rate Control : Select the desired rate from the drop-down list; the options are auto or ranging from 6 to 54Mbps only for 802.11a mode. Tx Power : You can adjust the output power of the system to get the appropriate coverage for your wireless network. Specify digit number between 1 to 100 (the unit is %) for your environment. If you are not sure which setting to choose, then keep the default setting, 100%.

When Band Mode select in 802.11a only mode, the HT(High Throughput) settings should be hidden immediately. HT TxStream/RxStream : By default, it's 2. Operating Mode : By default, it's Mixed mode Mixed Mode : In this mode packets are transmitted with a preamble compatible with the legacy 802.11a/g, the rest of the packet has a new format. In this mode the receiver shall be able to decode both the Mixed Mode packets and legacy packets. Green Field : In this mode high throughput packets are transmitted without a legacy compatible part. Channel Bandwidth : The "20/40" MHz option is usually best. The other option is available for special circumstances. Guard Interval : Using "Auto" option can increase throughput.

However, it can also increase error rate in some installations, due to increased sensitivity to radiofrequency reflections. Select the option that works best for your installation. MCS : This parameter represents transmission rate. By default (Auto) the fastest possible transmission rate will be selected. You have the option of selecting the speed if necessary.

(Refer to Appendix C. MCS Data Rate) Reverse Direction Grant(RDG) : Disable or enable reserve direction grant. Default is enabled. A-MSDU : Aggregated Mac Service Data Unit . Select Enable to allow aggregation for multiple MSDUs in one MPDU Default is disabled.

Auto Block ACK : Disable or enable auto block ACK. Default is enabled. Decline BA Request : Disable or enable decline BA request. Default is disabled. Change these settings as described here and click Save button to save your changes. Click Reboot button to activate your changes. The items in this page are for AP's RF general settings and will be applied to all WDS Links. © Copyright 2012TRENDnet. All Rights Reserved. 30 TRENDnet User's Guide Wireless Advanced Setup To achieve optimal wireless performance, it is necessary to tweak advance setting per requirements properly, not necessary higher the better or lower.



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The administrator can change the RTS threshold and fragmentation threshold settings for the system. Please click on Wireless -> Advanced Setup and follow the below setting. TEW-676APBO improve performance. Extra Slot Time : Slot time is in the range of 1~255 and set in unit of microsecond. The default value is 9 microsecond. ACK Timeout : ACK timeout is in the range of 1~255 and set in unit of microsecond. The default value is 32 microsecond. All data transmission in 802.11b/g request an "Acknowledgement" (ACK) send by receiving radio. The transmitter will resend the original packet if correspondent ACK failed to arrive within specific time interval, also refer to as "ACK Timeout".

ACK Timeout is adjustable due to the fact that distance between two radio links may vary in different deployment. ACK Timeout makes significant influence in performance of long distance radio link. If ACK Timeout is set too short, transmitter will start to "Resend" packet before ACK is received, and throughputs become low due to excessively high re-transmission. ACK Timeout is best determined by distance between the radios, data rate of average environment. The Timeout value is calculated based on round-trip time of packet with a little tolerance, So, if experiencing re-transmissions or poor performance the ACK Timeout could be made longer to accommodate.

Beacon Interval : Beacon Interval is in the range of 20~1024 and set in unit of millisecond. The default value is 100 msec. Access Point (AP) in IEEE 802.11 will send out a special approximated 50-byte frame, called "Beacon". Beacon is broadcast to all the stations, provides the basic information of AP such as SSID, channel, encryption keys, signal strength, time stamp, support data rate.

All the radio stations received beacon recognizes the existence of such AP, and may proceed next actions if the information from AP matches the requirement. Beacon is sent on a periodic basis, the time interval can be adjusted. By increasing the beacon interval, you can reduce the number of beacons and associated overhead, but that will likely delay the association and roaming process because stations scanning for available access points may miss the beacons. You can decrease the beacon interval, which increases the rate of beacons. This will make the association and roaming process very responsive; however, the network will incur additional overhead and throughput will go down. Short Slot : By default, it's "Enable" for reducing the slot time from the standard 20 microseconds to the 9 microsecond short slot time Slot time is the amount of time a device waits after a collision before retransmitting a packet. Reducing the slot time decreases the overall back-off, which increases throughput. Back-off, which is a multiple of the slot time, is the random length of time a station waits before sending a packet on the LAN. For a sender and receiver own right of the channel the shorter slot time help manage shorter wait time to retransmit from collision because of hidden wireless clients or other causes. When collision sources can be removed sooner and other senders attempting to send are listening the channel (CSMA/CA) the owner of the channel should continue ownership and finish their transmission and release the channel.

Then, following ownership of the channel will be sooner for the new pair due to shorter slot time. However, when long duration of existing collision sources and shorter slot time exist the owners might experience subsequent collisions. When adjustment to longer slot time can't improve performance then RTS/CTS could supplement and help DTIM Interval : The DTIM interval is in the range of 1~255. The default is 1. DTIM is defined as Delivery Traffic Indication Message. @DTIM is necessary and critical in wireless environment as a © Copyright 2012TRENDnet. All Rights Reserved. 31 TRENDnet User's Guide mechanism to fulfill power-saving synchronization. A DTIM interval is a count of the number of beacon frames that must occur before the access point sends the buffered multicast frames. @The higher DTIM interval will help power saving and possibly decrease wireless throughput in multicast applications. TEW-676APBO with the fixed overhead cost of just a single frame. WMM : By default, it's "Disable". To Enable is to use WMM and the WMM parameters should appears. Fragment Threshold : The Fragment Threshold is in the range of 256~2346 byte. The default is 2346 byte.

@@@The pros is obvious, the cons is the overhead for transmission. @@@Only when the frame size is over the Threshold, fragmentation will take place automatically. RTS Threshold : TRTS Threshold is in the range of 1~2347 byte. The default is 2347 byte. The main purpose of enabling RTS by changing RTS threshold is to reduce possible collisions due to hidden wireless clients.

RTS in AP will be enabled automatically if the packet size is larger than the Threshold value. By default, RTS is disabled in a normal environment supports non-jumbo frames. Queue WMM Parameters of Access Point : This affects traffic flowing from the access point to the client station Data Transmitted Priority AP to Clients Background. Best Effort Video Voice Low Med High High Description High throughput. @Medium throughput and delay. Most traditional IP data is sent to this queue Minimum delay. Time-sensitive video data is automatically sent to this queue Time-sensitive data like VoIP and streaming media are automatically sent to this queue Short Preamble : By default, it's "Enable". To Disable is to use Long 128-bit Preamble Synchronization field. @The short preamble provides 72-bit Synchronization field to improve WLAN transmission efficiency with less overhead. AC_BK AC_BE AC_VI AC_VO Tx Burst : By default, it's "Enable".

To Disable is to deactivate Tx Burst. @@@@In this way, 802.11n networks can send multiple data packets Configuring QoS options consists of setting parameters on existing queues for different types of wireless traffic. You can configure different minimum and maximum wait times for the transmission of packets in each queue based on the requirements of the media being sent. Queues automatically provide © Copyright 2012TRENDnet. All Rights Reserved. 32 TRENDnet User's Guide minimum transmission delay for Voice, Video, multimedia, and mission critical applications, and rely on best-effort parameters for traditional IP data. As an Example, time-sensitive Voice & Video, and multimedia are given effectively higher priority for transmission (lower wait times for channel access), while other applications and traditional IP data which are less timesensitive but often more data-intensive are expected to tolerate longer wait times. TEW-676APBO communication quality deteriorates. This is because when this policy is used, a sender does not retransmit packets that have not been received by the recipient.



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