ZigBee
Static-Network-Topology
using
NetRecover

ZigBee / IEEE 802.15.4

ZM101, ZM101PA, ZM102, ZM201
EZport, SZport, ZIOport

PNI Passport Networks

In Static Network Topology situations, where self-healing mesh networks aren't needed, it is advised to setup persistent network with NetRecover. In this case, NetRecover will reduce network traffic and instability.

NetRecover stores self-neighbour table information on its memory, when network is temporarily disrupted, the nodes that are involved instead of constantly seeking to rejoin/re-establish networks, will restore its previous neighbour table and the original network will be remembered. This saves the time for network re-establishment.

ATpoll is a command that is preset within all ZM Routers and End Devices, which performs regular timed interval check on network connections (sync). When ATpoll check is passed the node will remain content. It is when ATpoll check fails, it will trigger the End Devices and Routers to actively search for the Coordinators to join.
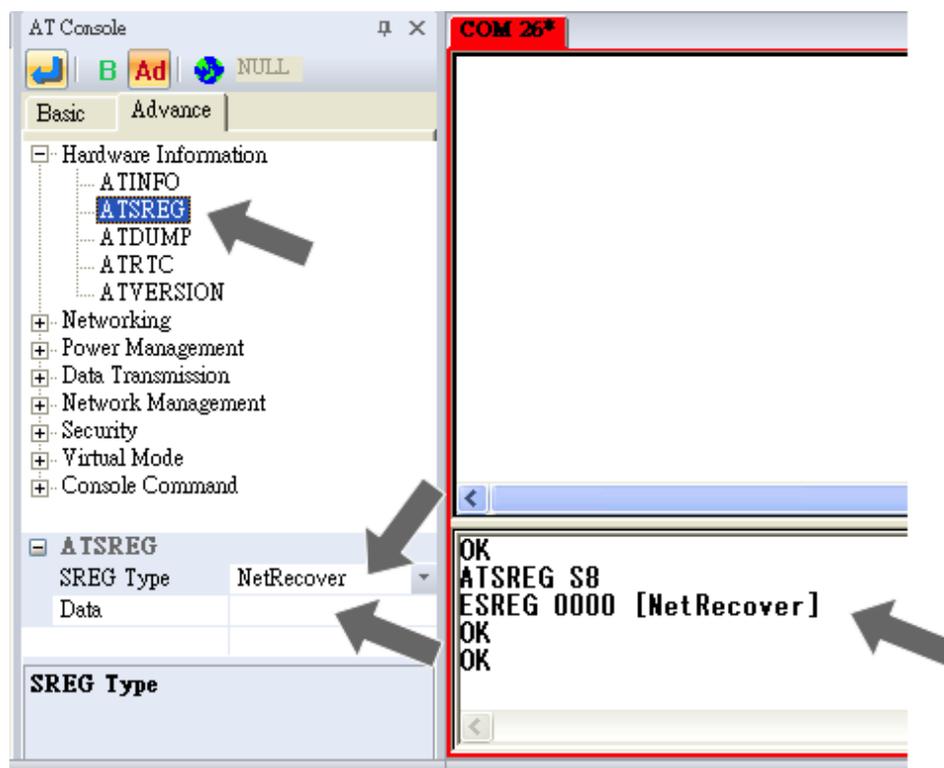
NetRecover
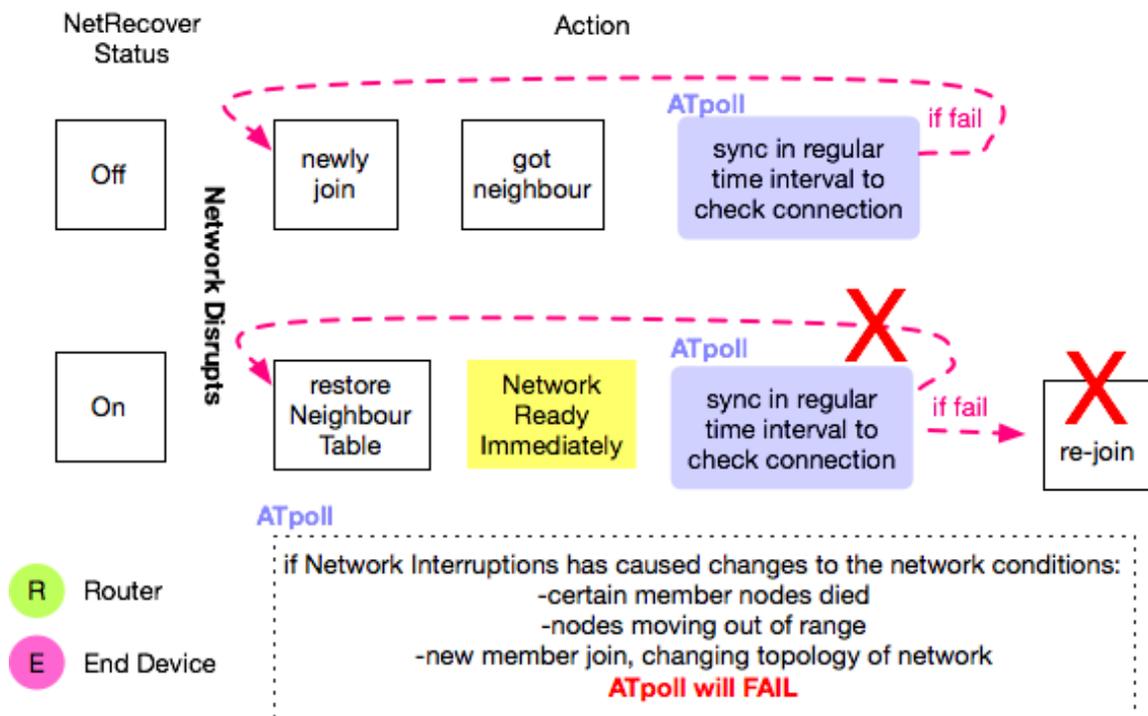
In most cases, to set up persistent network, it is advised to turn NetRecover status on all ZDO to on.

In case 1, figure above, a self-healing mesh network setting, where when network disrupt happens, the End Device or Routers will actively search for the Coordinators to join and therefore rebuild new neighbour tables. After the network is establish, ATpoll will regularly check for network connection health.

In case 2, figure above, persistent network setting, where when network disrupt happens, the End Device or Routers will automatically restore its previous saved Neighbor Table and the original network will be remembered. If original network have changed, for example one of the parent member dies, the ATpoll check that is performed afterwards will fail. ATpoll will trigger Rejoin to search for the coordinators. However, NetRecover will prevent ATpoll's Rejoin from changing the neighbour table. In this situation the network is stuck and all ZDO nodes' NetRecover setting must be turned off in order to establish a new network. Warning! Do not set up Persistent Network if in Dynamic Environment.

Turn on/off NetRecover using VisualManager

- In AT Console select advanced tab
- Under Hardware Information select ATSREG
- Within the ATSREG pull down menu select NetRecover
- Under Data: input 1 to turn on NetRecover; input 0 to turn off NetRecover; leave empty to view the current NetRecover setting.
- After pressing enter in the top left corner, the results will be shown in the output window.

Turn on/off NetRecover using Command Line

In Windows, Open Hyper Terminal

Turn on NetRecover

in command-line input | atsreg s8 1 | press enter
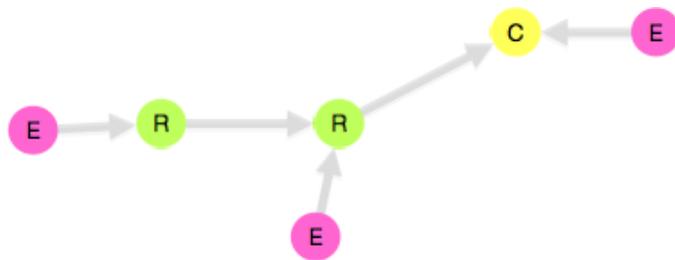in command-line input | atsave 1 | press enter

Turn off NetRecover

in command-line input | atsreg s8 0 | press enter
in command-line input | atsave 1 | press enter

(the default setting of NetRecover is off)

Network Connection Behaviors

• End Device is attracted to Coordinator, either directly or through an intermediate Router (follow the direction of arrow).

• Router is also attracted to Coordinator either directly or through another intermediate Router.

• When NetRecover is off, and network disrupt happens, End Devices and Routers will try to rejoin the network following the above behaviors.

When NetRecover is on and network disrupt happens, End Devices and Routers doesn't need to track the Coordinators following the above behaviors, because the original neighbouring table is remembered.

Scenario (NetRecover On versus Off on different ZDO)

Coordinator on, End-Device off

When network disrupts, C remembers E's information (mac & short address etc.) whereas E doesn't remember C. E will request C for permission to join. Since E's mac is the same, C will automatically send the same short address, the one in its own neighbor table, to E.

Coordinator off, End-Device on

After network disrupts, C will not remember E whereas E remembers C. C will not be able to send data to E, but E will be able to send to C. The only way to solve the problem is turning E's NetRecover off to allow it to rejoin C.

Coordinator on, End-Device on

After network disrupts, both device will restore its previous neighbour table, and remember each other without the need to re-establish the connection.

Coordinator on, Router on, End-Device off

After network disrupts, C and R will restore its previous neighbour table which contains E's information. However, E itself does not know that it belongs to the network. E will attempt to find C either directly or through R. Since C already has E in its neighbour table, C will send out the same short address to E and accept its request to join.

Advantage

- save time for network re-establishment
- easy to remember and keep track of the short address of each node within the network

Disadvantage

- the network must be stable, or secure
- self-healing mesh network will automatically be disabled.
- when node were interrupted within a network, after re-join, End Devices and Router will normally be assigned a new short address. It is difficult to keep track of nodes within network if the short addresses are constantly changing. The node will need to be identified by its mac address instead.