

Skywire TCP Socket Examples

NimbeLink Corp

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1. TCP SOCKET OPERATIONS

The following examples illustrate a few TCP socket operations performed with a Skywire EVDO modem using the Telit "Enhanced Easy GPRS(R) Extensions". The same AT command sequences apply to the 1XRTT version as well.

The goal of this document is to highlight the minimum required AT commands that need to be issued to the modem to both configure it and perform the TCP socket or related operation discussed.

Pseudo-code with real AT commands are provided so that the user can experiment with the commands using a terminal emulator connected to the modem before any software development has begun.

1.1 Outbound TCP Socket Connect

We can initiate an outbound TCP socket connection from the modem to any internet host with the Socket Dial command. In this example we will connect to the NIST time server on TCP port 13 and receive a time-of-day string.

Example:

```
AT#SGACT=1,1 ; get on network, get IP address  
#SGACT: "75.238.58.122" ; IP address returned on success
```

```
AT#SKTD=0,13,"time.nist.gov",0 ; connect to time.nist.gov:13  
CONNECT
```

```
56776 14-04-29 16:17:55 50 0 0 806.2 UTC(NIST) *
```

```
NO CARRIER
```

```
AT#SGACT=1,0 ; get off the network
```

1.2 Open Modem Firewall

Telit modems have a built-in network firewall, that by default, blocks all incoming TCP connections. In order to allow a TCP connection to the modem from another Internet host, this firewall must be opened for the

specific hosts or networks from which connections to the modem will be made. As of device software revision 15.00.024, all of the TCP/IP operations with the modem are IPV4.

The firewall is very simple with **ACCEPT** rules (an opening) for specific hosts or network ranges added or removed from the filter chain.

The AT command for controlling the firewall is,

AT#FRWL

refer to section 3.5.6.5.18 in the Telit DE910 AT Commands Reference Guide (rev 4)

The command has three forms,

AT#FRWL=0,<ip_address>,<net_mask>

; remove a firewall opening

AT#FRWL=1,<ip_address>,<net_mask>

; add a firewall opening

AT#FRWL=2

; remove ALL firewall openings

For an understanding of network numbering, subnetting and netmasks, refer to this Wikipedia entry:

<http://en.wikipedia.org/wiki/Subnetwork>

Example:

Open the firewall so that any host from the network range 197.158.1.1 to 197.158.255.255 can connect,

AT#FRWL=1,"197.158.1.1","255.255.0.0"

Example:

Add another firewall opening for the single host 71.195.57.16,

AT#FRWL=1,"71.195.57.16","255.255.255.255"

Example:

Remove the network range that was added in the first example,

AT#FRWL=0,"197.158.1.1","255.255.0.0"

Example:

Open the firewall to the world,

AT#FRWL=1,"1.1.1.1","0.0.0.0"

**** WARNING ** This allows ANY Internet host to connect to this modem!**

However, in a number of applications, this may be a desired configuration. When the Skywire modems are used on the Verizon network, they may be provisioned into a VPN within Verizon's cloud. This VPN prevents the wide-open Internet from accessing the modems while still allowing other modems and hosts within that VPN to connect. By opening the firewall to all hosts still while residing in a VPN, the modem can accept connections for any of its peers without having to know the actual IP address range the VPN occupies and can rely on that VPN configuration within the cellular cloud to prevent the wide-open Internet from gaining access and to provide security.

1.3 Inbound TCP Socket Listen

In this example we will open the firewall on the modem, get on the Verizon network to obtain an IP address, then we will wait for a TCP socket connection on port 2000, inject a few lines of text sent from a remote host to this modem via that socket connection and then loop after the peer closes the connection. With a loop around the socket instantiation, we can repeatedly accept connections on the socket.

Example:

```
AT#FRWL=1,"1.1.1.1","0.0.0.0" ; open firewall to the world
AT#SGACT=1,1 ; get an IP address
#SGACT: "75.238.58.122" ; IP address returned on success

while (1) { ; loop, repeatedly opening socket
; and accepting connections

AT#SKTL=1,0,2000,0 ; start tcp listener on port 2000

+CONN FROM: 71.195.57.16 ; connection comes in
CONNECT ; additional connection message
line 1 from peer ; peer sends a line
line 2 from peer ; again
line 3 from peer ; and again
NO CARRIER ; peer closes socket
}

AT#SGACT=1,0 ; get off the network
```

1.4 ICMP Ping Support

This example configures the modem so that it can be ping'd (ICMP echo) from any Internet host.

Example:

```
AT#FRWL=1,"1.1.1.1","0.0.0.0" ; open firewall to the world  
AT#ICMP=1 ; enable ICMP Ping support  
AT#SGACT=1,1 ; get an IP address  
#SGACT: "75.235.54.207"
```

A Linux host on the internet pings the modem,

```
% ping 75.235.54.207 ; ping Skywire from another  
internet host  
PING 75.235.54.207 (75.235.54.207) 56(84) bytes of data.  
64 bytes from 75.235.54.207: icmp_seq=1 ttl=234 time=1812 ms  
64 bytes from 75.235.54.207: icmp_seq=2 ttl=234 time=889 ms  
64 bytes from 75.235.54.207: icmp_seq=3 ttl=234 time=242 ms  
64 bytes from 75.235.54.207: icmp_seq=4 ttl=234 time=221 ms  
64 bytes from 75.235.54.207: icmp_seq=5 ttl=234 time=193 ms  
  
AT#SGACT=1,0 ; get off the network
```