



# Ctek TCP Serial Pad Dialing and Control Options

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# Purpose

This TechNote describes the interaction of the SkyRouter's TCP PAD Service with various methods of establishing inbound and outbound sessions. Also described are control options that are not available on the Administrative screens.

Figure 1 below shows the SkyRouter TCP pad administrative screen and will be used throughout this document to indicate the various answer and originate mode settings.

**CTEK** **DB9 TCP PAD Configuration**

**Call Setup Parameters**

Answer Mode:  AT Cmd  Auto      AT Cmd Response:  On  Off      DTR Call Control:  On  Off

Dial Mode:  AT Cmd  Auto  Demand      AT Cmd Echo:  On  Off      Local Echo:  On  Off

AT Escape Sequence:  On  Off

**Outbound IP Parameters**

(Default) Destination 1 IP Address:       Destination 1 Port Number:

Destination 2 IP Address:       Destination 2 Port Number:

Destination 3 IP Address:       Destination 3 Port Number:

Destination 4 IP Address:       Destination 4 Port Number:

**Inbound IP Parameters**

Listen Port Number:

Accept calls from all IP addresses

Accept calls from only following IP addresses:

**Data Management Parameters**

Termination character (dec):       Block check length:       Session timer (0-60 min):

Transmit timer (100ms ticks):       Maximum block size:       Inactivity timer (0-60 min):

  

Figure 1

# Summary of active AT commands

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**Note** - All unsupported commands will be accepted and responded to with an OK and no action will be taken. This preserves backward compatibility with other types of command strings. Therefore, if you enter AT, you get an OK. If you enter any command that is not supported you also get an OK. When entering AT commands, the back space key works.

## Basic Commands

**AT** – Basic command prefix  
**ATD** - Dial  
**ATDT** – Dial Tone  
**ATDP** – Dial Pulse  
**ATH** – Hang up  
**ATO** – Go Online  
+++ - Escape Sequence

## Response summary (basic commands):

OK  
ERROR  
CONNECT  
RING  
NO CARRIER  
NO DIALTONE  
NO ANSWER  
BUSY

## SkyRouter Extended Commands

**AT+ACTIVATE** – Activate, Deactivate and get Activation Status  
**AT+BAUD** – Set Serial Interface Bit Rate  
**AT+CSQ** – Get RSSI, Service Status, Roam Status, Service Type, Service Band, System ID and Stability  
**AT+GETESN** – Return Radio ESN or IMEI in Decimal and Hexadecimal (ESN only) Format  
**AT+GETMDN** – Return Radio MDN or MSISDN  
**AT+GETWANIP** – Get Current IP Address Of WWAN Interface  
**AT+REBOOT** – Reboot Router  
**AT+SETLISTEN** – Get or Set TCP Pad Listen Port  
**AT+WWAN** – Enable, Disable, or get status of wireless WAN interface  
**AT+DEFAULTS** – Restore factory default settings  
**AT+GMR** – Get model and firmware release number

**Note** – Operation of the basic command set is covered in the section below on establishing an incoming TCP/IP session. The extended commands are described in detail in a section following that.

# Outgoing TCP/IP Sessions

---

## Establishing an Outgoing TCP/IP Session with AT Dialing

Dial Mode setting (Figure 1) = AT Cmd

In the following examples xxx.xxx.xxx.xxx represents the IP address and zzzzz represents the port. Each xxx group is variable length (1 – 3 characters) and zzzzz is variable between 1 and 5 characters.

```
ATD xxx.xxx.xxx.xxx
ATD xxx.xxx.xxx.xxx,zzzzz
ATD xxx.xxx.xxx.xxx zzzzz
ATDxxx.xxx.xxx.xxx
ATDxxx.xxx.xxx.xxx,zzzzz
ATDxxx.xxx.xxx.xxx zzzzz
ATD zzzzz
ATDzzzzz
```

```
ATDT xxx.xxx.xxx.xxx
ATDT xxx.xxx.xxx.xxx,zzzzz
ATDT xxx.xxx.xxx.xxx zzzzz
ATDTxxx.xxx.xxx.xxx
ATDTxxx.xxx.xxx.xxx,zzzzz
ATDTxxx.xxx.xxx.xxx zzzzz
ATDT zzzzz
ATDTzzzzz
```

```
ATDP xxx.xxx.xxx.xxx
ATDP xxx.xxx.xxx.xxx,zzzzz
ATDP xxx.xxx.xxx.xxx zzzzz
ATDPxxx.xxx.xxx.xxx
ATDPxxx.xxx.xxx.xxx,zzzzz
ATDPxxx.xxx.xxx.xxx zzzzz
ATDP zzzzz
ATDPzzzzz
```

### **Example:**

**ATDP 70.91.104.81,243** would dial IP address 70.91.104.81 port 243

**Note** - When either the IP address (xxx.xxx.xxx.xxx) or the port number (zzzzz) are left out of the dial string, values are taken from (Default) Destination 1 IP Address and Port Number that is specified on the HTML set op screen for the TCP serial PAD.

Some dialing programs will not support non-numeric characters in the dial string or disallow certain selected non-numeric characters.. To support these dialers Ctek offers an extensive range of alternative dialing methods based on a fixed length (12) character representation of desired IP address and an optional variable length (5 character maximum) representation of the desired TCP port assignment. In the following examples nnnnnnnnnnnn represents the IP address and zzzzz represents the port.

```
ATD nnnnnnnnnnnn
ATD nnnnnnnnnnnn,zzzzz
ATD nnnnnnnnnnnn zzzzz
ATDnnnnnnnnnnnn
ATDnnnnnnnnnnnn,zzzzz
ATDnnnnnnnnnnnn zzzzz
ATD zzzzz
ATDzzzzz
```

```
ATDT nnnnnnnnnnnn
ATDT nnnnnnnnnnnn,zzzzz
ATDT nnnnnnnnnnnn zzzzz
ATDTnnnnnnnnnnnn
ATDTnnnnnnnnnnnn,zzzzz
ATDTnnnnnnnnnnnn zzzzz
ATDT zzzzz
ATDTzzzzz
```

```
ATDP nnnnnnnnnnnn
ATDP nnnnnnnnnnnn,zzzzz
ATDP nnnnnnnnnnnn zzzzz
ATDPnnnnnnnnnnnn
ATDPnnnnnnnnnnnn,zzzzz
ATDPnnnnnnnnnnnn zzzzz
ATDP zzzzz
ATDPzzzzz
```

**Example:**

**ATD070091104081 243** would dial IP address 70.91.104.81 port 243

**Note** - When either nnnnnnnnnnnn or xxxxx are left out of the dial string, values are taken from (Default) Destination 1 IP Address and Port Number that is specified on the HTML set up screen for the TCP serial PAD.

## AT Dialing Responses:

In response to any of the above dialing sequences you can receive the following responses.

**ERROR** - improperly formatted address

**CONNECT** - Response to terminal unit when a connection is established. The connect message may be modified through the TCP pad configuration file described in Appendix 1.

**NO DIALTONE** - can't open a socket

**BUSY** - tcp setup rejected by remote host

**NO ANSWER** - no call set up

**NO CARRIER** - Call was disconnected after being established. This can happen any time during a connection if the tcp connection is broken for any reason.

## Establishing an Outgoing TCP/IP Session in Auto Mode

Dial Mode setting (Figure 1) = Auto

In auto dial (leased line) mode, the PAD provides auto-dial and auto-recovery facilities so that a connection is always available. The PAD may be configured to auto-dial as many as four destinations. If a connection cannot be established with one destination, the PAD will automatically attempt to connect with other configured destinations. Auto dial mode may be configured so that is controlled by DTR to implement DTR dialing. To use DTR dialing select DTR Call Control = On (see Figure 1).

## Establishing an Outgoing TCP/IP Session on Demand

Dial Mode setting (Figure 1) = Demand

Using the factory default settings the TCP PAD will respond to incoming characters by attempting to set up a call to the destinations configured as Destination IP addresses and ports in the Outbound Parameters panel as shown in Figure 1. The PAD may be configured to auto-dial as many as four destinations. If a connection cannot be established with one destination, the PAD will automatically attempt to connect with other configured destinations. The process begins with the first destination specified and continues until a call is successfully established. Subsequent call attempts will begin with the destination that successfully answered on the last outbound call. Demand calls may be terminated (torn down) by the inactivity or session timer.

The behavior of the demand dialing feature and the inactivity timers can be modified by parameters found in the SyyRouter's TCP pad configuration file at /etc/conf.d/ctk.tcp. This file and its associated parameters are described in Appendix 1 near the end of this document.



# Incoming Sessions

---

## Establishing an Incoming TCP/IP session with the serial interfaces

On incoming requests to establish a TCP IP session to a serial port (Incoming calls), if auto answer is on and an incoming call (Connection) request is present the SkyRouter puts out

RING

followed by

CONNECT

and you are online.

If auto answer is off, SkyRouter puts out:

**RING** - at a typical ring cadence.

You application must then do an **ATA** and you will then get a **CONNECT**

**Note** - IF you are online you can enter the +++ command to escape to command mode. From that point you can force a hang-up with the ATH command or you can go back online with the ATO command

# Details of the Extended Command Set

---

**Note** – AT+ACTIVATE is only for CDMA/EVDO/1xRTT models. This command will return an error when applied to HSPA/UMTS/GPRS models.

## AT+ACTIVATE – Activate, Deactivate and get Activation Status

### Get Router Activation Status

at+activate?  
+ACTIVATE: p1

OK

P1:     Activation Operation State  
Not Activated  
      Activated  
      In Progress  
      Saving data  
      Failed

### Initiate Router Activation Operation

at+activate=1

OK or ERROR

If an OK response is received, the progress of the activation operation may then be monitored using the at+activate? command. An error response will be returned if an activation operation is initiated when network stability has not yet been achieved or when an activation operation is already in process.

### Initiate Router Deactivation Operation

at+activate=0

OK or ERROR

This command executes immediately and only impacts the internal status of the router. Therefore, there is no need to track its status after receiving the OK response. The error response will be returned if a deactivation operation is initiated when an activation operation is in process.

## AT+BAUD – Set Serial Interface Bit Rate

at+baud=p1

OK or ERROR

p1:     Bit Rate  
      0 = 300  
      1 = 1200  
      2 = 2400  
      3 = 4800  
      4 = 9600  
      5 = 19200  
      6 = 38400  
      7 = 57600  
      8 = 115200

The new bit rate will take effect immediately after the OK responses is sent. A restart is not necessary. An error response will be returned if p1 is invalid.

## AT+CSQ – Get RSSI, Service Status, Roam Status, Service Type, Service Band, System ID and Stability

at+csq

For CDMA/EVDO/1xRTT - CSQ: p1,p2,p3,p4,p5,p6,p7

For HSPA/UMTS/GPRS/EDGE - CSQ: p1,p2,p3,p4,p5,p6

OK

Return position	Description	CDMA/EVDO/1xRTT	HSPA/UMTS/GPRS
P1	RSSI	RSSI in dbm (-127 if no service)	RSSI in dbm (-127 if no service)
P2	Service Status	No Service In Service	No Service In Service
P3	Roaming Status	Roaming Not Roaming	Roaming Not Roaming
P4	Service Class	CDMA – No Data 1xRTT EvDO Rev 0 1xRTT/EvDO Rev 0 EvDO Rev A 1xRTT/EvDO Rev A	WCDMA EGPRS GPRS
P5	Service Band in use	Cellular PCS	WCDMA800 WCDMA1900
P6	System ID or Network Name	System ID (SSID) – Numeric ID, 1 – 5 digits in length	Network name e.g. AT&T
P7	Network Stability Status For Activation	Not OK for Activation OK For Activation	<b>Not Returned or Used</b>

**Note** - If parameter p2 indicates “No Service”, the value of all other parameters should be ignored.

## AT+GETESN – Return Radio ESN in Decimal and Hexadecimal Format

at+getesn

For CDMA/EVDO/1xRTT - +GETESN: p1,p2

OK

p1: ESN in eleven digit decimal format. Example: (09611801024)

p2: ESN in eight character hexadecimal format. Example: (60B411C0)

For HSPA/UMTS/GPRS/EDGE - +GETESN: p1

p1: IMEI in 15 or 17 digit format. Example: (012056004193817)

OK

## AT+GETMDN – Return Radio MDN

```
at+getmdn
+GETMDN: p1
```

OK

p1: MDN in ten digit decimal format. Example: (8885551212)

## AT+GETWANIP – Get Current IP Address Of WWAN Interface

```
at+getwanip
```

```
+WANIP: p1
```

OK

p1: IP Address Response  
NO IP  
nnn.nnn.nnn.nnn (current address in dotted decimal format)

## AT+REBOOT – Reboot Router

```
at+reboot
```

This command will not return an OK response as the router will immediately reboot when the command is issued.

## AT+SETLISTEN – Get or Set TCP Pad Listen Port

### Get TCP PAD Listen Port

```
at+setlisten?
SETLISTEN:p1
```

OK

### Set TCP PAD Listen Port

```
at+setlisten=p1
OK or ERROR
```

p1: Listen Port  
nnnn (valid port number in decimal format)

The new port number will not take effect until the router is rebooted. An error response will be returned if port number is invalid.

## AT+WWAN – Enable, Disable Or Get Status Of Wireless WAN Interface

### Get WWAN Interface Status

```
at+wwan?  
WWAN: p1
```

OK

```
p1: WWAN Status  
Disabled  
Enabled
```

### Enable WWAN Interface

```
at+wwan=1
```

OK

### Disable WWAN Interface

```
at+wwan=0
```

OK

**Note** - If the state of the WWAN is changed through this command, the new WWAN state will not take effect until the router is rebooted.

## AT+DEFAULTS – Restore Factory Default Settings

### Restore Default Settings

```
at+defaults
```

OK

## AT+GMR – Get Model and Firmware Release Number

### Get Model and Firmware Release

```
at+gmr  
+GMR: model,version
```

OK

### Example:

```
at+gmr  
+GMR: 4200U,4.00.00
```

OK

Indicates that the unit is a model 4200U using firmware release 4.00.00

## Suggested Steps for Activation

```
// Ensure Router is set to deactivated
if(at+activate? p1 == 1)
    at+activate=0

// Ensure that WWAN interface is disabled
if ( at+wwan? p1 == 1)
{
    at+wwan=0
    at+reboot
}

// Wait for network stability
while(at+csq p5 == Not Stable)
    sleep(1)

// Perform activation
at+activate=1

// Wait for completion
while(at+activate? p2 != 2)
    sleep(1)

// Enable WWAN and reboot upon completion
at+wwan=1
at+reboot
```

## Suggested Steps for Deactivation

```
// Ensure Router is set to deactivated
if(at+activate? p1 ==1)
    at+activate=0

// Ensure that WWAN interface is disabled
if ( at+wwan? p1 == 1)
{
    at+wwan=0
    at+reboot
}
}
```

**Important note on deactivation** - It is important that you disable the WWAN interface as part of your deactivation process. If this not done, the router will continue attempts to connect with the wireless carrier.

## Appendix 1 - TCP Pad Configuration File

---

The TCP pad configuration file is found at /etc/conf.d/ctk.tcp. This file is updated when you execute the HTML configuration screen for the DB-9 TCP PAD. However the first four parameters of the configuration file are not modified or destroyed when the configuration screen updates the file. These parameters must be updated with a text editor. The four parameters and their default values are shown below.

**Note** – If the SkyRouter is configured with the TCOPlus option you will be able to edit the TCP pad configuration file using the screen editor found under Options - Tools in the main menu. If the screen editor is not available you should contact Ctek to determine the best way to proceed.

-----  
CONMSG="CONNECT"

DMDCHAR="0"

INACTUNIT="M"

INACTDIR="B"  
-----

Each parameter is discussed below.

**CONMSG** – Some terminal devices require a specific connection message. The **CONMSG** parameter allows the connect message text to be modified. Example: If you want the connect message to be CONNECT 2400, put that value in the file so that it reads CONMSG="CONNECT 2400".

**DMDCHAR** – If you wish to use a specific character to initiate the demand dialing sequence it can be defined in this parameter. The default setting, “0” allows any character to initiate demand dialing. To define a specific character specify that character as a decimal value between 1 and 255. Example: If you want to demand dial based on the ASCII character ENQ (CTL E) character, replace the 0 with a value of 5 so that it reads DMDCHAR="5".

**INACTUNIT** - This parameter defines the units that will be used for the inactivity timer setting on the administrative interface.

M = minutes

S = is for seconds

If you have an M in the field, the TCP PAD HTML configuration screen will indicate that you can enter a value between 0 and 60 minutes. If you have an S in the field, the configuration screen will indicate that you can enter a value between 0 and 3600 seconds. In either case, if you enter a value of 0 on the configuration screen, the inactivity timer is disabled.

**INACTDIR** - If you have the inactivity timer enabled, this parameter indicates when the inactivity timer will be in effect:

O - Originate (The alpha letter O not the number 0): This indicates that the inactivity timer will be in effect when the router originates a call.

A – Answer: This indicates that the inactivity timer will be in effect when the router answers a call.

B – Both: This indicates that the inactivity timer will be in effect for both answer and originate operations.