

MT5600ZDX / ZDXV

V.90 Upgrade

Product Update



PN 82082300 Rev. A
May 6, 1998

This product update provides information on ITU V.90 support for the Multi-Tech MT5600ZDX and MT5600ZDXV modems. It describes some of the differences in the ITU-T V.90 code compared to the K56flex only code.

V.90 Support

V.90 is the ITU designation for what had formerly been called V.pcm. The ITU recommendation V.90 was determined at a meeting in Geneva ending February 6, 1998. The current draft revision date is 2/4/98; it is expected to be ratified later in 1998.

V.90 will replace K56flex and other proprietary solutions for PCM connections. Dual-mode client modem code will be important until all central-site digital modems are upgraded to V.90 and all interoperability problems have been resolved. Until that time, the Dual-mode client code will provide reliable connections in K56flex mode to the central-site modems currently deployed.

Your new modem code (e.g., MT5600ZDX firmware version x.yy) releases V.90 Alpha Dual-mode (K56flex/V.90) code.

This section documents these V.90 functions:

- New AT commands,
- New Result Codes,
- A-law/u-law selection.

(Note that the V.90 Upgrade Wizard is documented separately.)
These new functions are explained in the following sections.

Dual Mode Support

By default, a server supporting V.90 and K56flex will always indicate V.90 support through V.8, and K56flex support through V.8bis. Assuming the server and client support both V.90 and K56flex, the client modem makes the decision of preference between V.90 and K56flex. This preference is controlled using the **AT+MS** command. By default, the client will select V.90 before selecting K56flex.

The table below shows the possible client/server scenarios.

<u>Server</u>	<u>Client</u>	<u>V.8bis</u> <u>Success</u>	<u>Modulation</u>
V.90	V.90	yes	V.90
V.90	K56flex	yes	K56flex
K56flex	V.90	yes	K56flex
K56flex	K56flex	yes	K56flex
V.90	V.90	no	V.90
V.90	K56flex	no	V.90
K56flex	V.90	no	V.34
K56flex	K56flex	no	V.34

AT Commands

The **AT+MS** command has the same format as in the K56flex code, except that a <mod> parameter of 12 is added for V.90 modulation control, as shown below:

```
+MS=<mod>[,<automode>][,<min_rate>][,<max_rate>][,<x_law>][,<rb_signaling>]]]]]]<CR>
```

+MS=12... selects V.90 modulation as first priority.

+MS=56 ... selects K56flex modulation as first priority.

Server:

<u>Command</u>	<u>Modulation Priority</u>
AT+MS=56,1,300,56000....	K56flex, V.90, V.34, ...
AT+MS=12,1,300,56000.... (default)	V.90, K56flex, V.34 ...

Client:

<u>Command</u>	<u>Modulation Priority</u>
AT+MS=56,1,300,56000.... (default)	K56flex, V.90, V.34 ...
AT+MS=12,1,300,56000....	V.90, K56flex, V.34 ...

The **AT+MS** command accepts new min and max speed entries to support V.90, (28000, 29333,...,56000). If the connection is V.90, the connect message will be according to what is specified in the **+MS** command. However, if the connection is K56flex, a K56flex connect message is displayed, showing K56flex speeds. This is done by translating the modem's **AT+MS** speed to the closest corresponding K56flex speed. For example, you could enter **AT+MS=56,1,300,42667** to limit the speed to 42667. If it is a V.90 connection, the connect message will report 42667. If it is a K56flex connection, the connect message will report 42000.

Reporting Selected Options (+MS?)

The modem can send a string of information to the DTE consisting of selected options using the following command **+MS?**. The response is:

+MS:<mod>,<automode>,<min_rate>,<max_rate>,<x_law>,<rb_signaling>

For example,

+MS: 56,1,300,56000,0,0 [default value]

Reporting Supported Options (+MS=?)

The modem can send a string of information to the DTE consisting of supported options using the following command **+MS=?**. The response is:

+MS: (list of supported <mod> values), (list of supported <auto-mode> values), (list of supported <min_rate> values), (list of supported <max_rate> values), (list of supported <x_law> values), (list of supported <rb_signaling> values)

For example,

+MS: (0,1,2,3,9,10,11,56, 64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1)

V.90 Result Codes

The table below shows the result codes displayed in V.90 mode.

	Result Code	
<u>Speed</u>	<u>Carrier</u>	<u>Connect</u>
28000	180	180
29333	181	181
30667	182	182
32000	150	165
33333	183	183
34667	184	184
36000	152	167
37333	185	185
38667	186	186
40000	154	169
41333	187	187
42667	188	171
45333	189	189
46667	190	190
48000	158	173
49333	191	191
50667	192	192
52000	160	175
53333	193	193
54667	194	194
56000	162	177

A-law / u-law Selection

For coding speech it was found that with non-linear quantization, 8 bits per sample was sufficient for speech quality which is almost indistinguishable from the original. This gives a bit rate of 64K bs, and two such non-linear PCM codecs were standardized.

In America u-law coding is the standard, while in Europe the slightly different A-law compression is used. Because of their simplicity, excellent quality, and low delay, both of these codecs are still widely used today.

In V.90 mode, the client modem will detect if the server is A-law or u-law through the received INFO_{od} sequence, and will automatically configure itself accordingly.

In K56flex mode, the client modem will automatically select A-law or u-law through V.8bis if the server sends the proper ID. You can also manually select A-law or u-law using the **%U** command (i.e., **AT%Un** where n=0 for u-law and n=1 for A-law).

You can use the **+MS=** command (parameter #5) to select between A-law mode and u-law mode. For example, to select A-law mode, enter **+MS: 56,1,300,56000,1,0** .

To select u-lawmode, enter **+MS: 56,1,300,56000,0,0** .

The factory default setting is u-law mode. Note that a reset (**ATZ**) will return to the default setting (u-law mode.)

Speed Knob (AT! Command)

There are two independent speed knobs for V.90 mode and K56flex mode. To set the speed knob, use the command **AT!xxxx=y**, where **xxxx** is the address location to change, and **y** is the value to be set (e.g., **AT!0049=7**).

In K56flex mode, *SPEED_KNOB* (location \$0049) the default setting is 5. An increase to 6, 7, etc. makes the modem more aggressive. A decrease to 4, 3, etc. makes the modem more conservative.

In V.90 mode, *V90SpeedOffset* (location \$004A) defaults to 50. An increase to 60, 70, etc. makes the modem more conservative. A decrease to 40, 30, etc. makes the modem more aggressive.

Documentation Changes

Please note the following changes to the current version of the owner's manual:

- the Caller ID command (**#CIDn**) on page 3-22 should read **#CID=n**.
- the Connect Message Control (**Wn**) command parameters on page 3-6 should read **W0**, **W1** and **W2**; the command **W3** is not supported.

Remove the following commands, since they are for compatibility and perform no function:

- the **&Ln** (Leased Line) command.
- the **&T2** (Test command) value since it only returns an error.
- the **JMn** (MNP10 Cellular Power Level Adjustment) command
- the ***Hn** (MNP10 Link Negotiation Speed) command.
- the **-Qn** (MNP10 Enable Fallback to V.22bis / V.22) command.
- the **@Mn** (MNP10 Initial Cellular Power Level Adjustment) command.
- the **:En** (MNP10 Compromise Equalizer Enable) command.
- the **-SEC=n** (Enable/Disable MNP10-EC) command.
- the ***B** (View Numbers in BlackList) command.
- the ***D** (View Delayed Numbers) command.

Notes:

1. Additional documents are available in Portable Document Format (PDF) files at <http://www.multitech.com/support/manuals/IDCfiles/manuals.idc> . You can download the Acrobat Reader to view PDF files (you may want to bookmark <http://www.adobe.com/prodindex/acrobat/readstep.html> before following the “download” link).
2. For files with a .ZIP extension, you can download PKUNZIP.EXE to extract the zipped files from the Multi-Tech FTP site at: <ftp://ftp.multitech.com/Utilities/PKUNZIP.EXE>.
3. Using your favorite Web browser, go to <http://www.multitech.com/support/V.90upgrades.htm> for additional information on ITU V.90 support and other Multi-Tech products.