UI Gate

Version 0.1.2

by

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Preface

Thank you for your interest in this product. I developed this product because I wanted to have the capability to transmit and receive messages without having to be at my main station. What I needed was a product that would gate all the traffic from my local 2-meter digital network onto the 900Mhz channel on which the Cybikos operate and vice versa. UI Gate allows you to roam around with one or more other Cybikos running UI Messenger within the coverage area of the Cybiko running the UI Gate software.

The software is mainly developed for use within the Amateur Radio Service, and I assume that the reader is familiar with certain common terms used within the service.

This manual describes how to use the UI Messenger Software. Since I'm still developing this product, this manual will continue to be a work in progress. I hope this manual will answer some of the questions you may have.

If you notice any discrepancies with the actual product, errors or have comments, suggestions or questions, please don't hesitate to email me at **kr1st@amsat.org**

The latest versions of the software and manuals can be found on my web site at:

http://www.kr1st.com

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1 Overview

UI Gate acts as a gateway between your local digital ham network and the 900Mhz channel on which Cybikos operate. Everything that is being received from the ham radio transceiver/TNC will be relayed onto a 900MHz channel where other Cybikos running UI Messenger are operating. Everything that originates from these Cybikos running UI Messenger will be relayed onto your local digital network. Only AX.25 UI frames will be relayed; no other AX.25 packets will be relayed.

The UI Gate software allows you to roam around with your second (or third..) Cybiko and still be able to send and receive messages, monitor traffic on the local network and view the position of other stations on a map as long as you are within the coverage area of the Cybiko running the UI Gate software. You could say that UI Gate creates a wireless network.

UI Gate contains provisions to allow only certain authorized stations to be gated onto the local/national network. It also operates as a simple local digital repeater that enables you to send and receive messages from other Cybikos running UI Messenger.

1.1 Hardware requirements

For a basic installation you need at least the following:

- A radio capable of receiving and transmitting on your local network frequency (144.390 MHz in North America, 144.800 MHz throughout most of Europe)
- A TNC which supports the KISS mode
- A null modem adapter
- A Cybiko Classic
- Another Cybiko (Classic or Xtreme)

The radio can be a simple handheld radio, or a base unit. Use whatever is most convenient for you and will interface with the TNC you want to use.

UI Gate communicates with the TNC using the KISS protocol. This means that the TNC you use with UI Messenger must have KISS mode capabilities. Most commercially available TNC do have this capability. I have successfully used the Kantronics KPC3 and the PIC TNC described in the November 2000 issue of QST.

Because the Cybiko really expects another computer on the other end of the serial cable and not a modem device, you will need a null modem adapter. For

some TNC you also may need a gender changer or a DB9 to DB25 converter, or both.

Of course you'll also need a Cybiko to run the software on. This needs to be the Classic Cybiko. Unfortunately, they are out of production, but since they introduced a new model they should be able to find cheap used models. The software runs on the new Xtreme model, however, the current TNCs only have serial ports and the Xtreme only has a USB port.

The second Cybiko running the UI Messenger software can be either a Classic or an Xtreme version.

1.2 Software requirements

To ensure proper operation of the UI Gate software you need to have System Pack 57 installed on your Cybiko. You can check what System Pack your Cybiko is running by pressing the question mark button while on the desktop. When you hit this button you will see all kinds of system information. The third item on the list will show you the System Pack version that is loaded on your Cybiko. If it shows 57 or higher then everything is ok. If it is a lower number, the software may work just fine but it is not tested with that System Pack. Hit the escape key to exit this screen.

To install the latest System Pack you will need Cyberload. You can download this at http://www.cybiko.com/download/CyInstallInstruction.asp. When you start Cyberload with the Cybiko hooked up to your PC and turned on, it will automatically detect if you are not running the latest System Pack and it gives you the option to upgrade. There is also a button on the Cyberload screen, which allows you to upgrade to the latest System Pack.

If your Cybiko already has System Pack 57 or later installed, then you still have to install Cyberload to install the UI Gate software.

Before you install UI Gate, make sure you have at least 100kb available on the flash disk. You can check this also on the system information screen (hit question mark button while on the desktop). The fifth item on the list shows you how much space is available on the flash disk. If this is less than 100,000 bytes then delete some files (games that you don't play for instance) with the Uploader & File Manager application in the application menu.

1.3 Navigating through the software

The user interface of UI Gate looks very much like Motif. It uses buttons, a console screen, lists and forms.

To go from one item to the next press the <tab> key. The currently active item is always highlighted. To activate a button, press the <enter> key.

You can scroll through the text on a console screen by using the <up> and <down> arrow keys. Console screens, like the one that shows raw packets, can hold more text than is actually shown. When you press the <up> arrow key it will scroll back through the text, or as in this case, previously received packets.

The same goes for lists. Use the <up> and <down> arrow keys to move the highlighted bar in a list and hit the <enter> key to select that item from the list.

In items on a form where you can fill out text, you can use the <left> and <right> arrow keys to move the cursor through the text. If you press the <Fn> key first before you press the <right> arrow key then the cursor will advance to the end of the text. Pressing <Fn> before you hit the <left> arrow key will advance the cursor to the start of the text. You can use the <backspace> key to delete a character and if you would like to delete everything in an item, press <Fn> before you hit the <backspace> key.

2 Installation

The installation process consists of three steps. First you will have to download the necessary files from the web site. Then you will have to install the files on your Cybiko. And finally, you will have to run the installation program on your Cybiko.

2.1 Downloading

From the web site you have to download 2 compressed files from the download page. The names of these files are `files.zip` and `install.zip`. Place these file in a directory on your PC and unzip these. You will now find the files `files.app` and `install.app` in the directory. These two files will have to be installed on your Cybiko.

2.2 Installing the files on the Cybiko

When Cyberload was installed on your computer it made an association of the Cyberload application with files having the .app extension. The files that were extracted in the previous step will have the Cybiko logo as an icon next to it when you look at these files with Windows Explorer. Now hook up the Cybiko to your PC and start it. When you see the desktop on the Cybiko, double click on the `files.app` file. This will start Cyberload and it will install the file on your Cybiko. When Cyberload is finished, double click on the `install.app` file to install it on the Cybiko. Now you are ready to run the installation program on your Cybiko.

2.3 Running the installation program

Go to the Application menu on your Cybiko. Somewhere in that menu you should see the icon of the installer program that looks like:

If you don't see it then you may have to reboot your Cybiko.

Start the installer program by hitting the <enter> key while you're on the icon. The installer will first determine if there is enough space on the flash disk. If there is not enough space it will notify you and it will abort. You can then delete some files and then restart the installer program.

The installer will now install all necessary files on your Cybiko. If the installation is actually an upgrade of the UI Messenger software you will see that it first removes the old files before it installs the new files. When the installer is finished it will pop up a message reminding you to reboot after you exit the installer program. To exit the installer program simply hit the <esc> key. You will see that the installer icon has changed to this:

This is normal. The installer program has deleted itself including the container file (files.app).

You can reboot the Cybiko by either resetting it or holding down the <esc> key until you see the "Power Off" message. Then hit the <esc> key again to start the Cybiko.

When the Cybiko is rebooted go to the Applications menu. You will see that the installer icon has disappeared and that two new icons appeared:
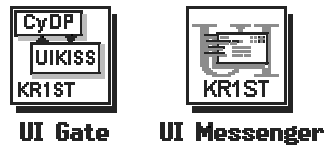
The UI Gate icon will start the UI Gate application. The icon on the right will start the UI Messenger application. See the UI Messenger manual for details. You are now ready to start UI Gate.

3 Configuration

Within UI Gate you can configure the Access Control List, the KISS parameters, TNC and Power settings. Every time you install a new version of UI Gate you will have to re-enter the settings. It is a good idea to write these settings down after you have set up UI Gate.

The first time you start UI Gate it will create a new configuration file with default values for the KISS and TNC settings. However if you ran UI Messenger before starting UI Gate, UI Gate will use the settings from UI Messenger. In fact, on the same Cybiko, UI Messenger and UI Gate share the same configuration files. That way you only have to set up certain parameters once.

You can access the settings directly from the main screen by pressing the appropriate button.

3.1 Access Control List

The Access Control List consists of a list of callsigns of stations who are allowed to gate from the 900MHz channel to your local (2 meter) network. If activated, UI Gate will check each packet originating from the 900MHz side against this list and only gates this packet if the callsign in the packet appears in the ACL. All traffic originating from the TNC (your local 2 meter network) will always be gated to the 900MHz side.

The ACL is default turned off. To add callsigns to the ACL and to activate it, press the "ACL" button on the main screen.

On the Edit Access Control List screen you can enter up to 50 callsigns. You can also activate the ACL from this screen by entering a "Y" in the "Activate ACL" field. To enter or change a callsign in the ACL simply go to that entry with the <up> and <down> arrow keys and hit <enter> on that entry.
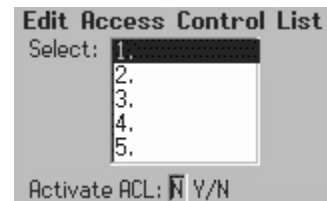
On the Edit ACL Call screen that pops up enter the new callsign you would like to add to the list. If there was already a callsign on that entry in the list it will be shown in the edit box so you can edit that callsign or replace it.
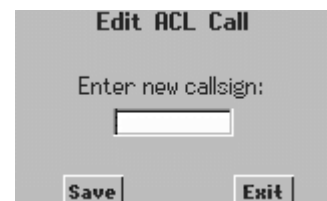
To save the callsign on the list simply hit the <enter> key when you're done or press the "Save" button. If you changed your mind hit the <esc> key or press the "Exit" button.

Press the <esc> key on the ACL screen to return to the main screen.

3.2 KISS Parameters

The KISS Parameters Screen will allow you to enter the usual KISS parameters. Changes will take effect immediately as soon as the settings are saved.
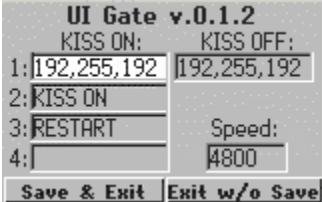
The table below describes the parameters that can be specified on this screen. It is taken from a paper titled "The KISS TNC: A simple Host-to-TNC communications protocol" by Mike Chepponis, K3MC and Phil Karn, KA9Q.
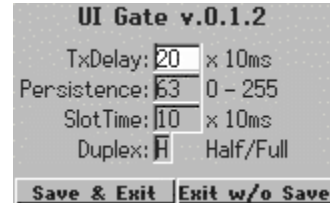
TxDelay:	This is the transmitter key up delay in 10 ms units. The default start-up value is 20 (i.e., 200 ms).
Persistence:	This is the persistence parameter, p, scaled to the range 0 - 255 with the following formula: $$P = p * 256 - 1$$ The default value is P = 63 (i.e., p = 0.25).
SlotTime:	The next byte is the time to hold up the TX after the FCS has been sent, in 10 ms units. This command is obsolete, and is included here only for compatibility with some existing implementations.
Duplex:	This is H for half duplex, F for full duplex. The default is H (i.e., half duplex).

3.3 TNC Configuration

The TNC Settings Screen allows you to enter strings that will be sent to the TNC to put it in KISS mode. You can specify up to four strings to be send to the TNC.

The first string consists of decimal values separated by commas. You can use this field to define a KISS command you'd like to have sent to the TNC upon startup. Most times you'll find here "192,255,192,13", which are the two KISS delimiters FEND (192), the exit command (255) and the <enter> command (13). This sent to ensure that the TNC is not in KISS mode before you send any of the following commands defined in field 2, 3 and 4. The 13 at the end is needed on some TNC to get a "cmd:" prompt. You can leave this field empty if you wish.

Fields 2, 3 and 4 can be used to enter text commands, which you need to send to the TNC to put it in KISS mode. The KISS driver will append a [CR] (ASCII 13) to each text string (2, 3, 4), so there's no need for you to add it.

The KISS OFF string will be sent upon exit of UI Gate. The format of the string is the same as the first field of the KISS ON commands. Usually you'd put the KISS command (255) here, which will take the TNC out of KISS mode.

All the above-mentioned fields may be left empty. Nothing will be sent to the TNC in that case. You could do this for TNCs that only operate in KISS mode.

You can set the baud rate in the baud rate field. This is the speed between the Cybiko and the TNC, not the on the air speed.

When you are done, just hit the "Save & Exit" button to save the settings. You can hit the <esc> key or press the "Exit w/o Save" button to leave this screen without saving the changes. All changes take effect immediately when you save the settings.

3.4 Power

One of the undocumented features of the Cybiko is it allows you to switch between two power levels, high and low. This feature is only accessible through software and not through any of the settings menu on the Cybiko. I have made this feature available on UI Gate through the main menu. Simply hit the "Power" button, which will bring you to the Power-setting screen.

This screen informs you what the current setting is and gives you the opportunity to change this. Select either the "High" or "Low" button to make the new setting active.
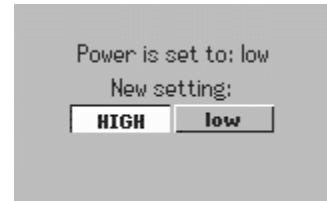
Switching the Power to the high setting means that the drain on the batteries increases about 10 to 15% and the signal strength will increase by about 10dB. Upon exit of UI Gate, the software will return this setting to low.

4 Running UI Gate

Now that you fully configured UI Gate you are ready to run it. Running UI Gate is actually very uneventful since it doesn't offer any other functionality than gating packets from one side to the other.

4.1 Starting UI Gate

Start UI Gate by pressing <enter> on the UI Gate icon on the desktop.

UI Gate will first initialize the TNC before it shows the main screen. This means that the initialization strings entered on the TNC configuration screen are being transmitted to the TNC. This will ensure that the TNC is put in KISS mode before UI Gate will start exchanging traffic.
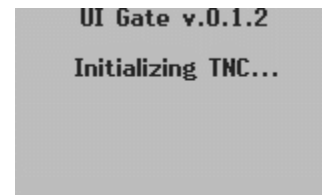
4.2 Main Screen Layout

After initialization the main screen will be shown. The image below shows the layout of the main screen.
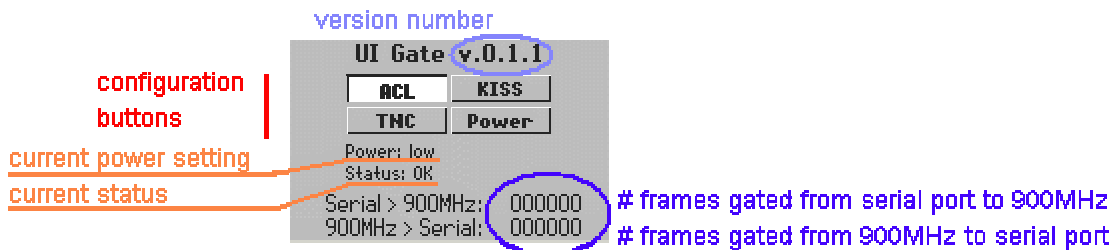
The top for buttons (ACL, KISS, TNC and Power) can be used to access the various configuration screens as described in chapter 2.

The current power setting is shown in the middle of the screen together with the current status. The status field will normally show "OK". In case any error occurs, a message will be displayed in this screen.

The bottom of the screen shows how many packets are being sent from one side to the other side. This gives you an indication if UI Gate is still operating properly.

4.3 Running UI Messenger through UI Gate

If you would like UI Messenger to communicate through UI Gate, then you will have to indicate this when you start UI Messenger.

Upon starting UI Messenger it will ask you on which port to start. Select the "900MHz Port" if you would like to use UI Gate. As you will notice, UI Messenger will directly go to the main screen without trying to initialize the TNC.
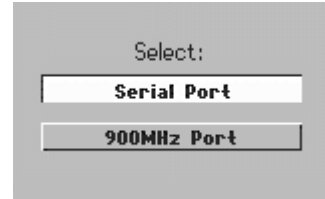
You will see that UI Messenger will display a message in the console window indicating that it is listening on the 900 MHz Port.

When you select the 900MHz port at startup of UI Messenger and there's no UI Gate around, UI Messenger will indicate this with a splash screen. It will still start and listen on the 900MHz port since it could be that you start UI Gate after you start UI Messenger.

Once UI Messenger is started you can use it as if a TNC was directly connected to the Cybiko running UI Messenger, except you now have the freedom to roam around.

4.4 Exiting UI Gate

You can exit UI Gate by pressing the <esc> key on the keyboard of your Cybiko. UI Gate will ask you to confirm this before exiting. Press <enter> to exit or select the "No" button or hit the <esc> key if you changed your mind.

If you chose to exit then UI Gate will send the "KISS OFF" string to put the TNC back in command mode. After this you will be returned to the desktop.

UI Gate will also broadcast a message to all UI Messenger application that it is exiting.