UVK-200/UCW-100 Programmer's Manual

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Overview

Newer PCs, especially lap tops often do not have COM or LPT ports which are frequently used to interface PCs to Ham Radio equipment. This series of adapters solve this problem by using USB to connect to the PC. The UCW-100 is a basic USB to CW adapter. The UVK-200 is a USB interface to the VK-64 combination voice/CW keyer.

The VK-64 can be controlled through the printer port. The user may have another use for the LPT port. The other cable out of the UVK-200 has a DB-25 connector, and plugs into the DB-25 on the rear of the VK-64. No VK-64 changes or upgrades are required to use the VK-64 with the UVK-200.

The UCW-100 has two output cables. One has a ¼" phono phone used by most transceivers for the CW key input. There is also an RCA type plug for PTT.

Unless otherwise noted, the name UVK-200 will be used for both models of USB interfaces in this document. To the computer, the UVK-200 looks like a serial COM port. Keyer commands and letters to be sent as Morse characters are simply ASCII codes sent to the COM port. This makes adding USB support to logging and other Ham Radio programs extremely easy. No complex timing by the PC application is required.

Installation

Installation of the UVK-200, like other USB devices is relatively easy. Windows® will recognize that a new device is present when the UVK-200 is plugged into a free USB port. It will then direct the user through installation of the driver. The driver tells Windows how to talk to the hardware device.

The UVK-200/UCW-100 will work with WIN 98 SE/2000/M/XP. Linux and Mac developers should contact Unified Microsystems for information on using these devices.

Installation steps

Step 1 –Determining current COM ports.

Bring up the Windows **Control Panel** program. Click on the **System** icon. When the System Properties box pops up, click on the **Device Manager tab.** Scroll down the hardware device list until you see the entry **Ports (COM & LPT).** If a '**+**' is to the left of the cable symbol click on the plus sign to show the list of current COM and LPT ports.

Each current COM port will have an entry: Communications Port (COM1). Additional serial ports will have different (COMn) designations. If you have a USB serial adapter it will show up as something like "USB Serial Port (COM3)".

Make a note of the COM ports currently residing on your PC.

Step 2 – Installing the device driver

Plug the UVK-200 into a USB port on your PC. Windows will come up with a message saying it has found new hardware and is looking for a driver. Depending on your version of Windows, the exact sequence will differ, but it will ask you to put in the disk with the new driver. Specify the floppy or CD where the driver resides. Follow the instructions Windows gives you for installing the driver.

Step 3 – Determining the port assignment.

Repeat Step 1 to find what COM port Windows assigned the UVK-200. It will show up as a new entry "USB Serial Port (COMn). Make a note of the COM port number. You may wish to put a label on the UVK-200 indicating the port number. You will need to tell your logging or control program what port the UVK-200 is located at.

Note that each UVK-200 has a unique serial number. This allows you to have multiple units on a single computer.

Software Port configuration

The UVK-200 looks like a serial port to the PC. It is in reality a serial port with the serial lines from the USB interface IC communicating with an on board microcontroller that provides all the smarts.

When the application program opens up the COM port it will need to set up the communications parameters. The UVK-200 COM port should be set up as follows:

Baud: 9600
Stop bits: 1
Parity: None
Number of bits: 8
Flow Control: hardware

Voice Keyer Control
 Voice keyer control is only available on the UVK-200. The UCW-100 will ignore any voice keyer commands sent to it.

The VK-64 has four voice messages of up to 15 seconds of audio each. To play a voice message it is only necessary to send the proper ASCII code for that message. If the wrong message is started, it can by cancelled by sending the ABORT command. The voice message control codes are as follows:

0xB0 - Abort voice message
0xB1 – play voice message 1
0xB2 – play voice message 2
0xB3 – play voice message 3
0xB4 – play voice message 4

The VK-64 does not provide status information for voice message. PC control of recording voice messages is not provided. Voice message recording is controlled by the VK-64 front panel controls.

CW Keyer Control

Both versions of the USB interface contain microcontrollers that convert ASCII data sent over the USB Bus to Morse code. The UCW-100 outputs this directly on the CW output cable.

A standard was created with early DOS programs that allowed the PC to generate the Morse characters and put them out through the printer port. The VK-64 keyer follows this hardware standard to allow PC generated CW to be interfaced to the PC. The UVK-200 output cable uses a DB-25 with the LPT signals needed by the VK-64.

The UVK-100/UVK-200 supports two methods of CW generation. The default mode uses the modem control lines DTR (Data Terminal Ready) for sending CW and RTS (Request To Send) for controlling PTT. This is a standard for sending CW through a serial port that dates back to DOS days, and many programs support this standard.

With Windows, generation of CW is more difficult. Windows is a multi-tasking operating system that is not very good when precise timing is required, as in high-speed CW generation. A problem is that CW generated by Windows PCs sounds choppy in some circumstances. If the PC is fast enough, and the number of programs running is minimized, this method will work under Windows.

In the internal keyer mode, the UVK-200 gets around Windows timing problems by incorporating a microcontroller that converts ASCII characters to Morse characters. Text strings are transmitted to the UVK-200 at rates hundreds of times faster than the fastest CW, and delays caused by the PC or USB data transmission are not a problem. The UVK-200 stores characters in a 36 character buffer.

CW commands such as speed control are also sent as ASCII bytes.

If you are adding CW support to your program, using the internal keyer will greatly reduce your programming effort.

The unit will default to the DTR/RTS PC generated CW when the USB port initializes at power up or connection. The following commands will switch between internal and external CW and PTT generation.

0xAE - enable internal CW keyer
0xAF - enable external (PC) CW generation

If your program enables the internal CW keyer, disable it when your program exits. If the user runs another program after leaving yours, and it uses PC CW generation, it will not operate properly.

Morse Characters

The following letters, numbers and punctuation marks are converted to Morse code:

A-Z 0-9   , . / ? - (The space character between words will generate the proper word space).

Note that the letters must be upper case. Lower case letters are used for setting CW speed.

CW Speed

Lower case letters set the speed. Speed commands are executed immediately. If a long string of text is sent, the text will start sending at the current speed. If a new speed command is sent before the text is complete, the remainder of the characters will be sent at the new speed.

Embedding lower case letters inside upper case text strings to adjust the CW speed of sections of the text will not work. The text string will be parsed and letters for Morse conversion are put into a buffer while command strings are executed immediately.

Use the "Increase/Decrease CW Speed" commands for temporary changes to the CW speed.

The speed commands are as follows:
a = 6 WPM
b = 8 WPM
c = 10 WPM
.
.
.
v = 52 WPM

Speed commands are stored in non-volatile memory. This means the last speed command will be remembered even if the UVK-200 is unplugged.

Cancel CW message

A CW message sent to the UVK-200 can be cancelled by sending the CW message abort command. This will stop CW sending and clear the text buffer.

0xA1 – abort CW message

Increase/Decrease CW Speed
Temporary speed changes can be embedded inside text strings for temporary speed changes. For example some contesters like to send the signal report part of an exchange faster than the serial number. "5NN001" might send the 5NN at 30WPM, but the serial number at 26WPM.

The commands for this function are:

0x01 – decrease speed by 10 WPM
0x02 – decrease speed by 8 WPM
0x03 – decrease speed by 6 WPM
0x04 – decrease speed by 4 WPM
0x05 – decrease speed by 2 WPM
0x06 – Reset to default speed
0x07 - increase speed by 2 WPM
0x08 - increase speed by 4 WPM
0x09 - increase speed by 6 WPM
0x0A - increase speed by 8 WPM
0x0B - increase speed by 10 WPM

A change in speed with one of these commands will stay in effect until a new temporary speed change command is sent. Send the 0x06 command to restore the default speed.

Example: Send 5NN001 with the 5NN sent at 6 WPM faster than the current default speed. The string sent to the UVK-200 would be '0x09 5NN 0x06 001'

These commands will not allow the speed to be below the minimum speed of 6 WPM or faster than 52 WPM.

CW Weight

CW weight can be changed by these commands. 0x96 provides the standard 3:1 weighting. Like the speed command, this command is executed immediately and is stored in memory until changed.
0x94 – 2:1

0x95 – 2.5:1
0x96 – standard 3:1
0x97 – 3.5:1
0x98 – 4:1
0x99 – 4.5: 1

CW PTT

The UVK can generate PTT to the transmitter. The delay between asserting PTT and the start of the first character is set to 25 or 50 msec by different commands. PTT commands should be sent when the UVK-200 is not actively sending CW. PTT commands may not take effect on characters currently in the buffer. PTT commands are stored in non-volatile memory.

0xAA – No PTT
0xAB – 25 msec PTT
0xAC – 50 msec PTT

CW Status Commands

0xA5 - Get CW status
This command will return a byte with the current CW status. Bit 7 indicates if the unit is sending CW. A '1' indicates CW is active. A '0' indicates there are no text characters in the buffer. The lower 7 bits (bits 0-6) indicates the amount of free space remaining in the buffer. The current buffer size is 36 bytes, but this could change in future versions of the UVK-200.

If the buffer is empty, it will read 36. As additional characters are sent to the UVK-200 for transmission, the free buffer space will decrease by one for each new character in the string. As each character is converted to Morse and sent, the free buffer space will increase by one.

The PC program should not allow the buffer to be overwritten, or some of the text may be lost.

0xA6 - Get CW speed
Returns CW speed in the form of speed commands (a = 6 WPM., b = 8 WPM, etc.). Note that if this command is sent while a temporary speed change is in effect, the base speed is returned, not the current effective speed.

Get Version Command

0xA7 – Returns 4 bytes indicating model and software revision level
example: V100

V = UVK-200 Additional USB products are in development. They will have different letters to indicate the product.
100 = Software revision 1.00 (decimal point implied after first number)

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Command Table Summary

Keyer Select
0xAE – enable internal keyer
0xAF – Disable internal keyer (use PC generated Morse, power up default)

MORSE CHARACTERS
0-9, A-Z, ,-./? (Also space character)

CW Speed
a-v = 6-52 WPM

Increase/Decrease CW Speed
0x01-0x0b   (0x06 returns to normal base speed)

CW Weight
0x94 – 0x99 (0x96 is standard weighting)

CW PTT
0xAA – No PTT
0xAB – 25 msec PTT
0xAC – 50 msec PTT

Abort CW Message
0xA1

Voice Message Control
0xB0 – Abort voice message
0xB1 – play voice message 1
0xB2 – play voice message 2
0xB3 – play voice message 3
0xB4 – play voice message 4

Get Status Commands

0xA5 - CW status, returns 1 in bit 7 if sending CW, lower 6 bits give buffer space left
0xA6 - CW speed – returns CW speed
0xA7 - Get model/version #