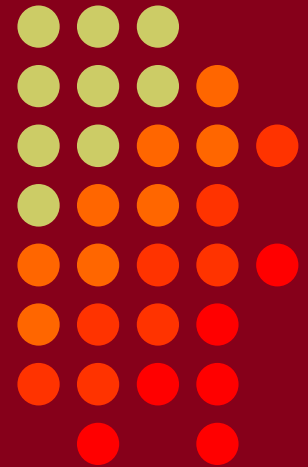


# Everything You Need to Know About USB and Serial Interfaces

Presented by N6TV

[n6tv@arrl.net](mailto:n6tv@arrl.net)



• CTU •  
CONTEST  
UNIVERSITY

# Presentation Overview

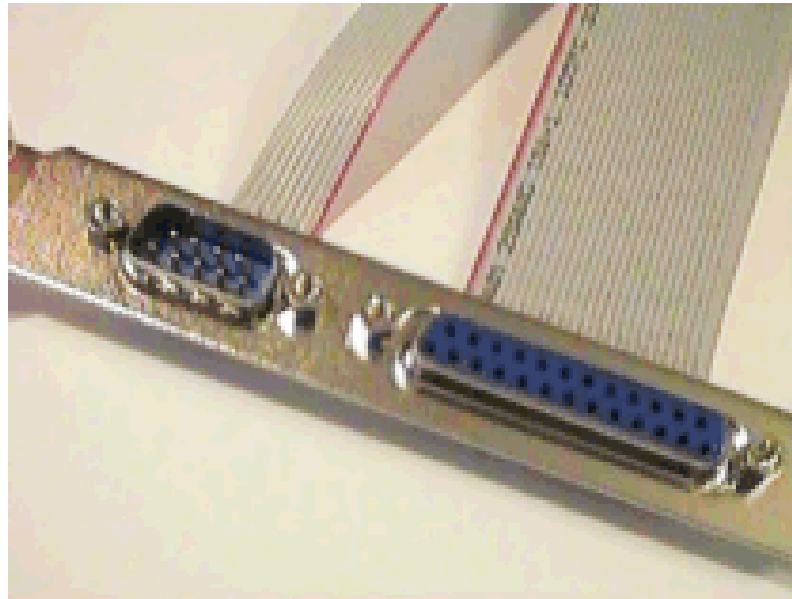


- Legacy PC Serial Ports
- USB Ports and Devices
- USB-to-Serial Adapters
- Using the Windows Device Manager
- Managing Serial Port Numbers
- Using Serial Ports for CW / FSK / PTT Keying
- Sharing Serial Ports
- USB Sound Cards
- Q & A

# Legacy PC Serial Ports



- Originally a 25-pin male D-SUB connector (DB-25M), used with dial-up modems
- Smaller 9-pin male serial connector became standard (DE-9M) for serial, DB-25F for printers



# Life was Simple



- One or two male DE-9 connectors on PC
- Accessed as COM1: or COM2:
- One DE-9 “CAT” or “RS232” connector on radio
  - Female: Elecraft IC-7700 & IC-7800



- Male: Yaesu



- Kenwood

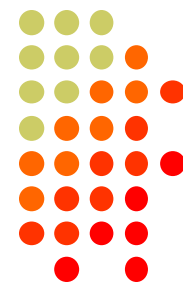


# Computers “Improved”



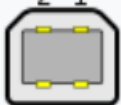
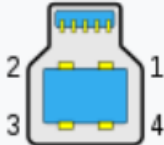


- “Real” serial and parallel ports disappear, replaced by USB ports
- Radios (until recently) still had 9-pin serial ports
- Peripherals still need to access 9-pin serial ports
  - Automatic linear amplifiers, RemoteRig boxes, rotator controllers, SteppIR antenna controllers, band decoders, etc.
- Common Solution: USB-to-Serial adapters

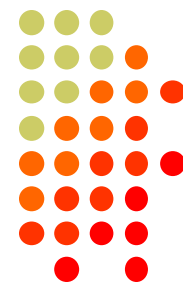
# USB 2.0 and 3.0 Ports



- Standard connector on most PCs and MACs

PC:	<p>Type A</p>  <p>1 2 3 4 Type-A</p>	<p>Type A</p>  <p>9 8 7 6 5 1 2 3 4 Type-A SuperSpeed</p>
Radio:	<p>Type B</p>  <p>2 1 3 4 Type-B</p>	<p>Type B</p>  <p>9 8 7 6 5 2 1 3 4 Type-B SuperSpeed</p>

# USB-to-Serial Adapters



- Reliability and Compatibility Varies Greatly
  1. Edgeport – Excellent, stable, supports MMTTY directly
  2. Eltima – Included with microHAM interfaces
  3. FTDI – very good, stable, requires EXTFISK for MMTTY. Used internally by Elecraft K3 & K4.
  4. Silicon Labs (built-in to Icom, Kenwood, Yaesu)
  5. Prolific – **AVOID!** Uninstall drivers, recycle.



# Digi International Edgeport/4



- One USB 2.0 Type B connector
- Four independent DE-9M serial ports
- Windows automatically finds and installs drivers





# Digi International Edgeport/8



- One USB 2.0 Type B connector
- Eight independent DE-9M serial ports
- Windows automatically finds and installs drivers

# StarTech.com ICUSB2324I 4-Port FTDI



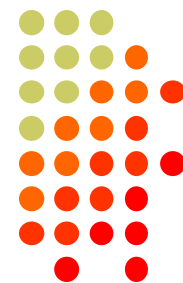
- One USB 2.0 Type B connector
- Four independent FTDI DE-9M serial ports
- Separate 5V Power Supply

# StarTech.com ICUSB2328I 8-Port FTDI

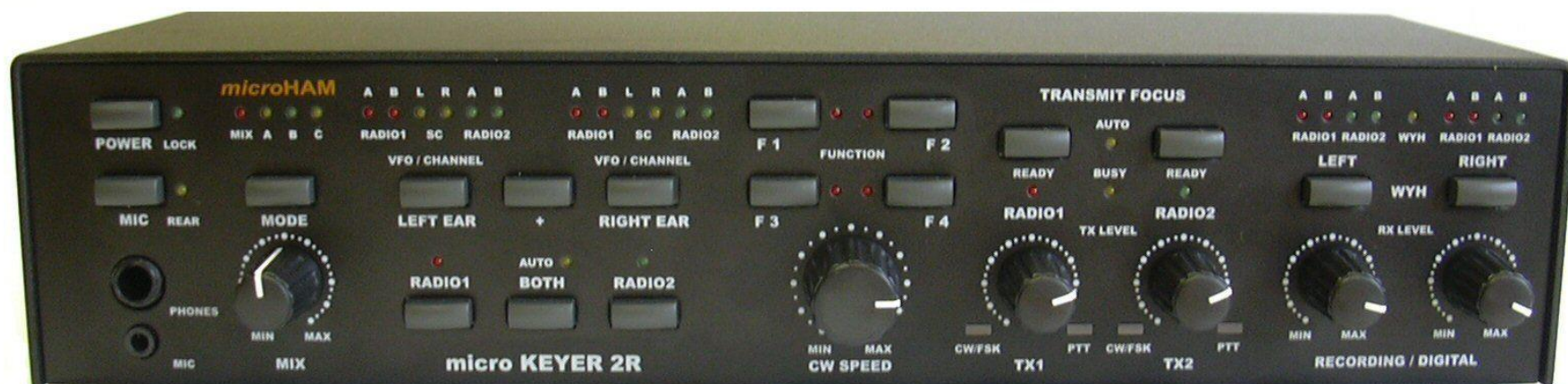


- One USB 2.0 Type B connector
- Eight independent FTDI DE-9M serial ports
- Separate 5V Power Supply

# microHAM uses Eltima drivers



## microHAM MK2R+



- One USB Type B connector
- Custom Eltima serial port device drivers
- Custom cables for transceiver ports
- Virtual serial ports created by microHAM “Router”



# Recommended FTDI USB-to-Serial Adapters

**FTDI CHIPI-X10 - \$20**



**GearMo 2-port - \$32**



**GearMo 4-port - \$40**



# Prolific USB-to-Serial Adapters



- Widely available, cheap (but many counterfeits)
- Device Driver does *not* play well with others
- Please DO NOT USE them, ever
- **Uninstall** any Prolific device drivers with Device Manager
- Devices often look like this:



# Connecting USB-to-Serial Adapters



- Connect FTDI, Elecraft, or Edgeport device to PC
- Windows (usually) locates and installs appropriate device driver(s)
- COM ports numbers assigned sequentially
- Use **Windows Device Manager** to view assigned COM Port number
- COM port number will change if you connect a device to a different USB Hub (e.g. from USB 2.0 port to USB 3.0 port)

# Connecting USB Radios / Devices





- Important: Install the manufacturer's device driver first, *then* connect the device
  - Icom, Kenwood, Yaesu, microHAM
  - (Usually not required for Elecraft / FTDI)
- If you forget and connect radio first, use Device Manager to uninstall "Unknown Device", then start over
- COM port numbers assigned sequentially
- COM port numbers can be changed



# Using the Windows Device Manager



- **Right click** on Windows **Start Button** 
- **Click Device Manager**  
-or-
- Windows Key  + R (Run):  
**devmgmt.msc**
- Important Tip: (before Windows 10)  
Always set the System Environment  
Variable  
**devmgr\_show\_nonpresent\_devices** to 1

# Setting System Environment Variable



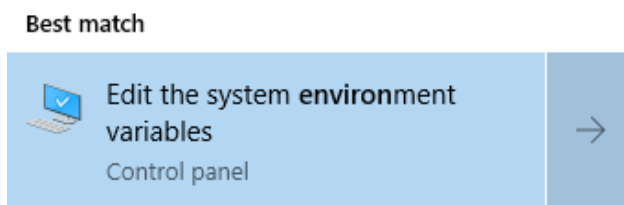
- Type “Environment” in Windows Search box or Windows Settings Search box



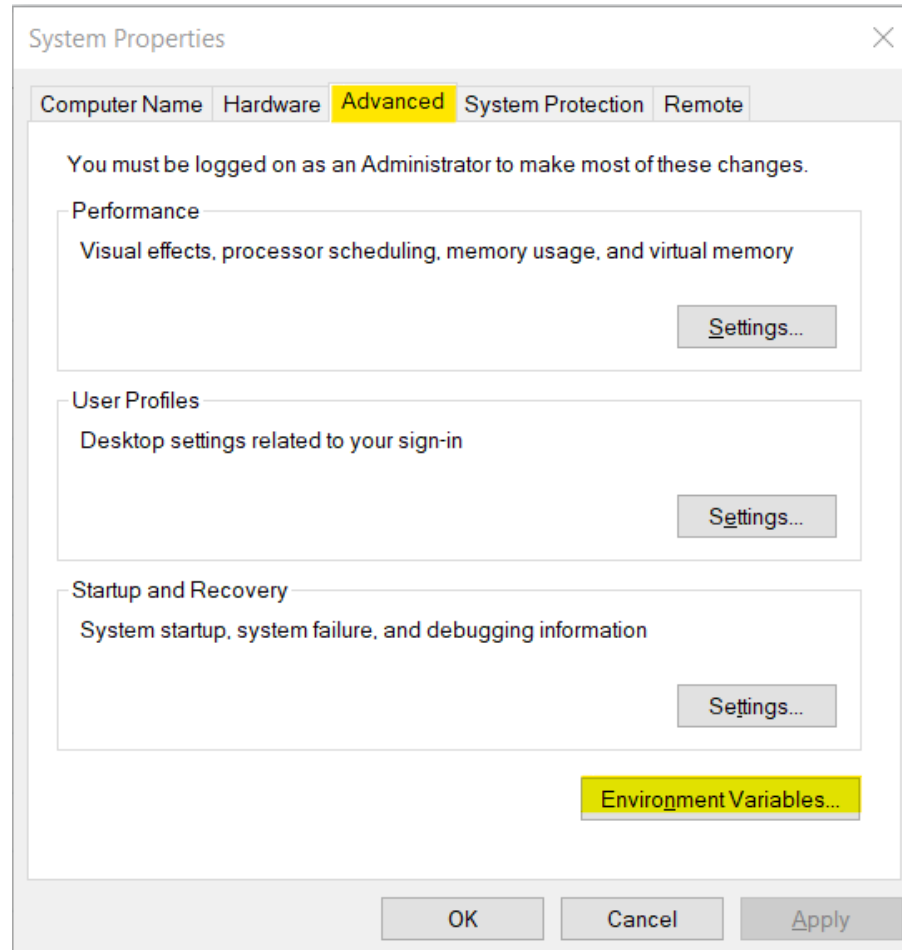
Windows Settings



- Click “Edit the System Environment Variables”

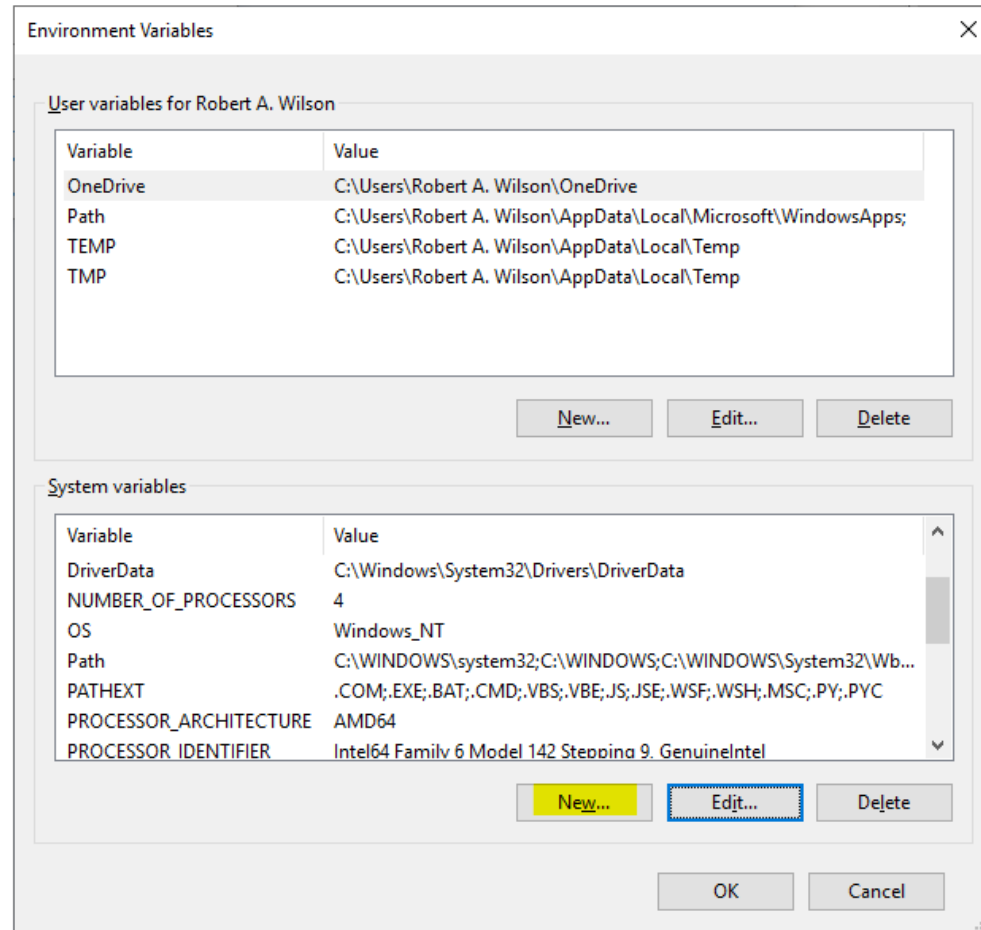


# Step 1 – Under Advanced tab click Environment Variables...





## Step 2 – Under System variables, click New...





## Step 3 – Add the new environment variable

Name: **devmgr\_show\_nonpresent\_devices**

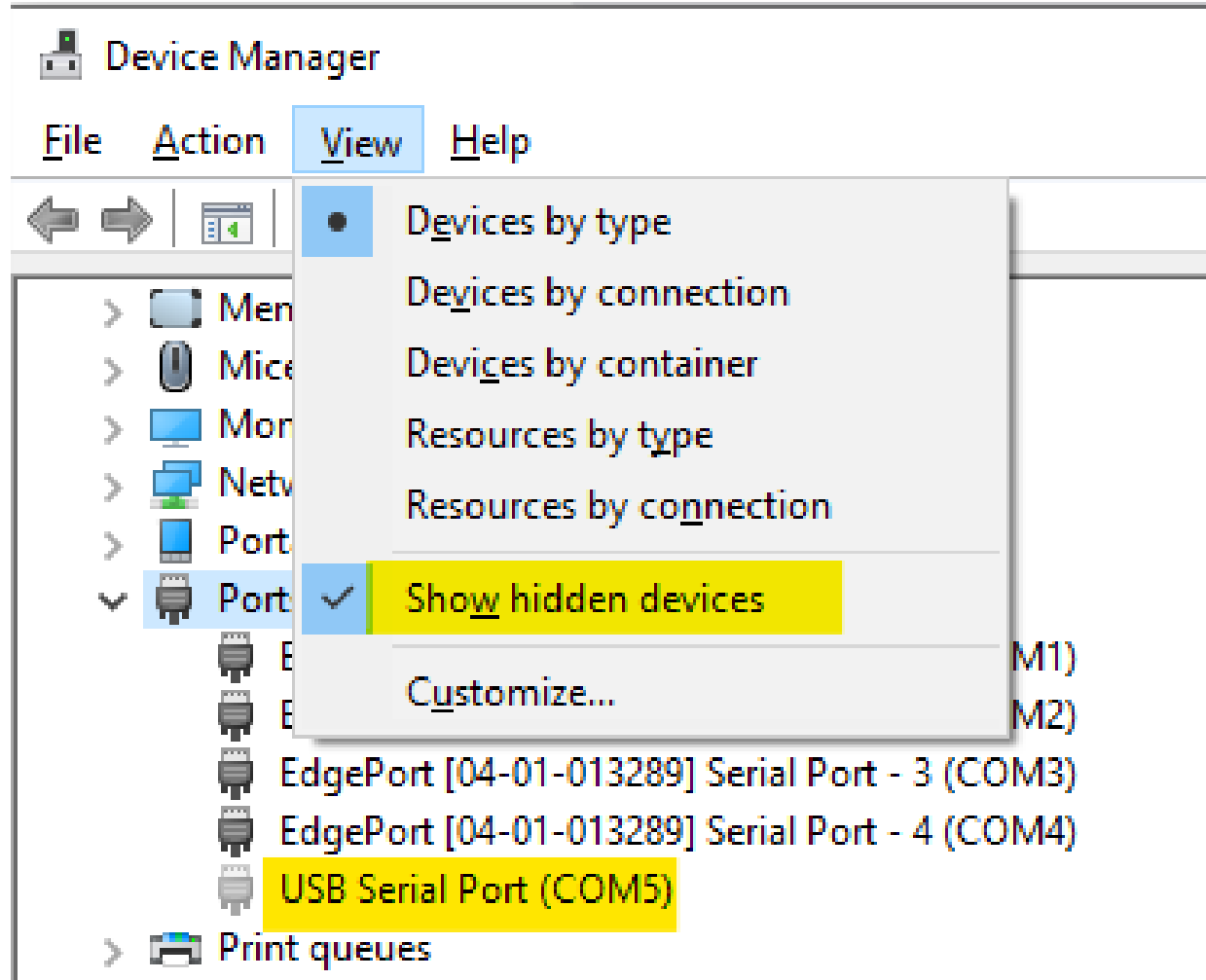
Value: **1**

The screenshot shows a Windows 'Edit System Variable' dialog box. It has a title bar with a close button (X). Inside, there are two text input fields: 'Variable name:' containing 'devmgr\_show\_nonpresent\_devices' and 'Variable value:' containing '1'. Below these fields are four buttons: 'Browse Directory...', 'Browse File...', 'OK', and 'Cancel'. The 'OK' button is highlighted with a blue border.

Click **OK**, *then* start Windows Device Manager

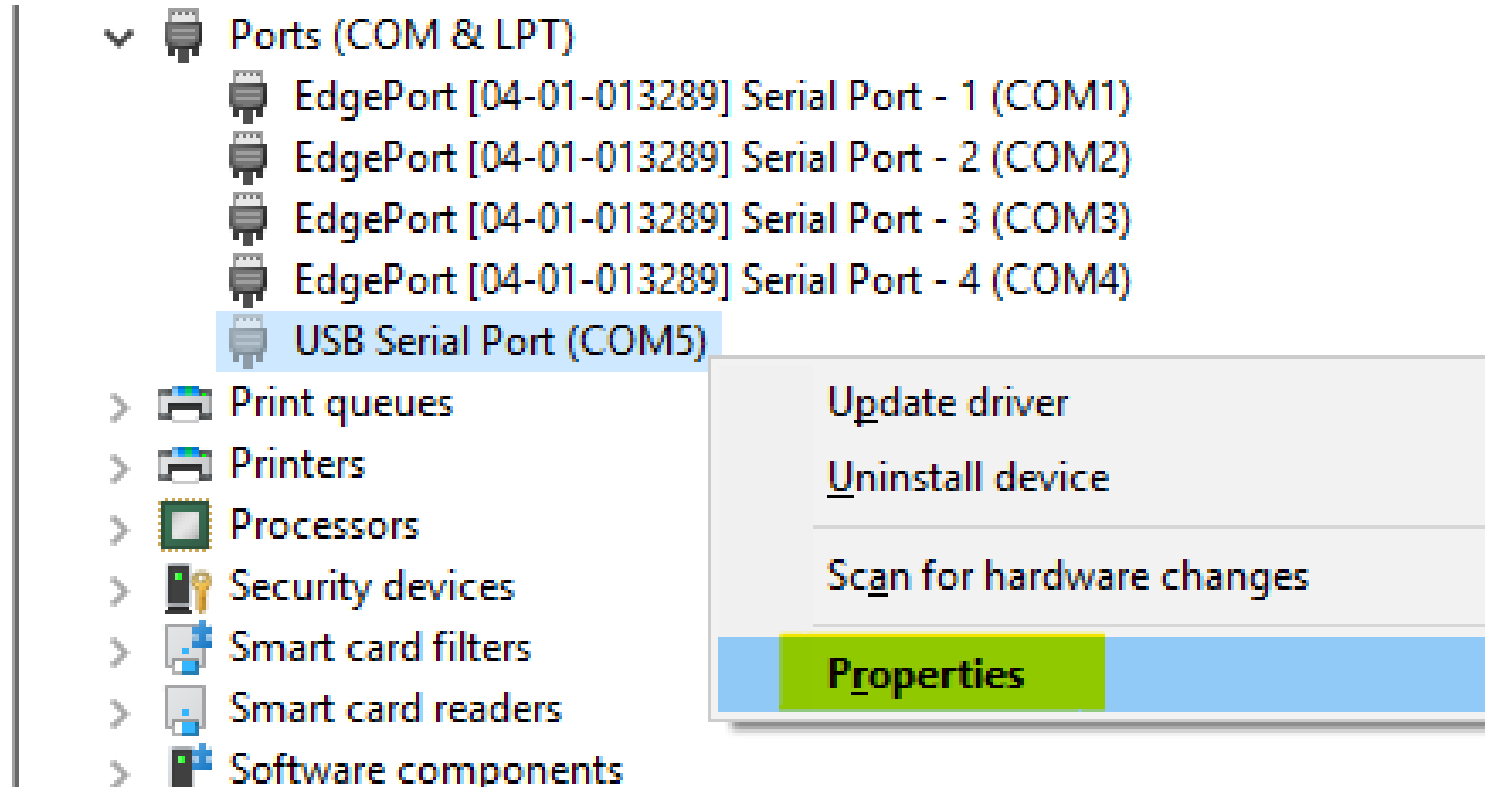
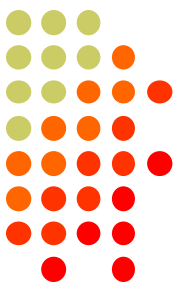
# Windows Device Manager:

Always select **View** → **Show hidden devices**



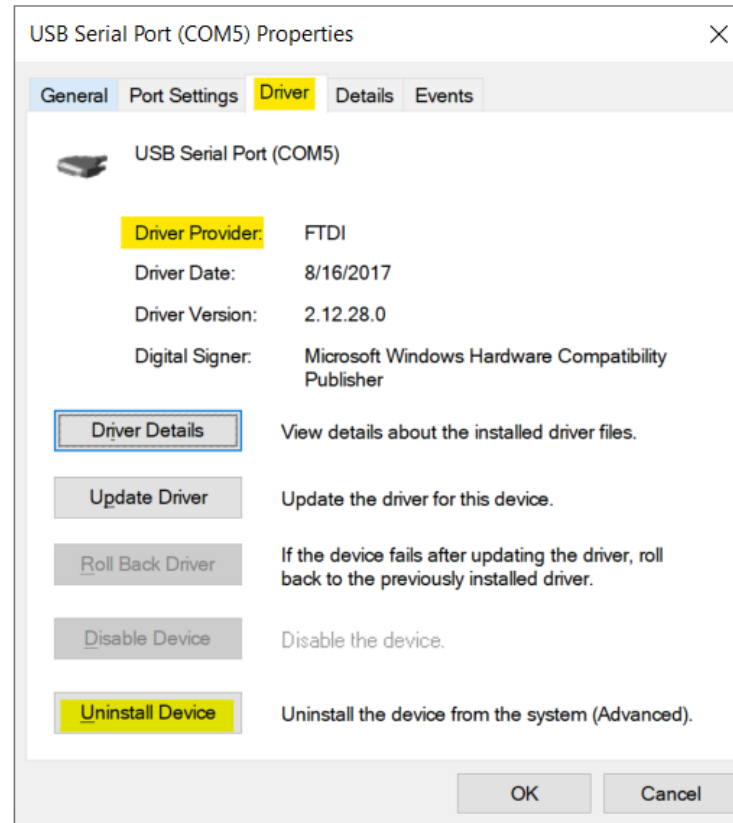
# Expand Ports section

Right click gray (offline) devices, **Properties**



# Click Driver Tab

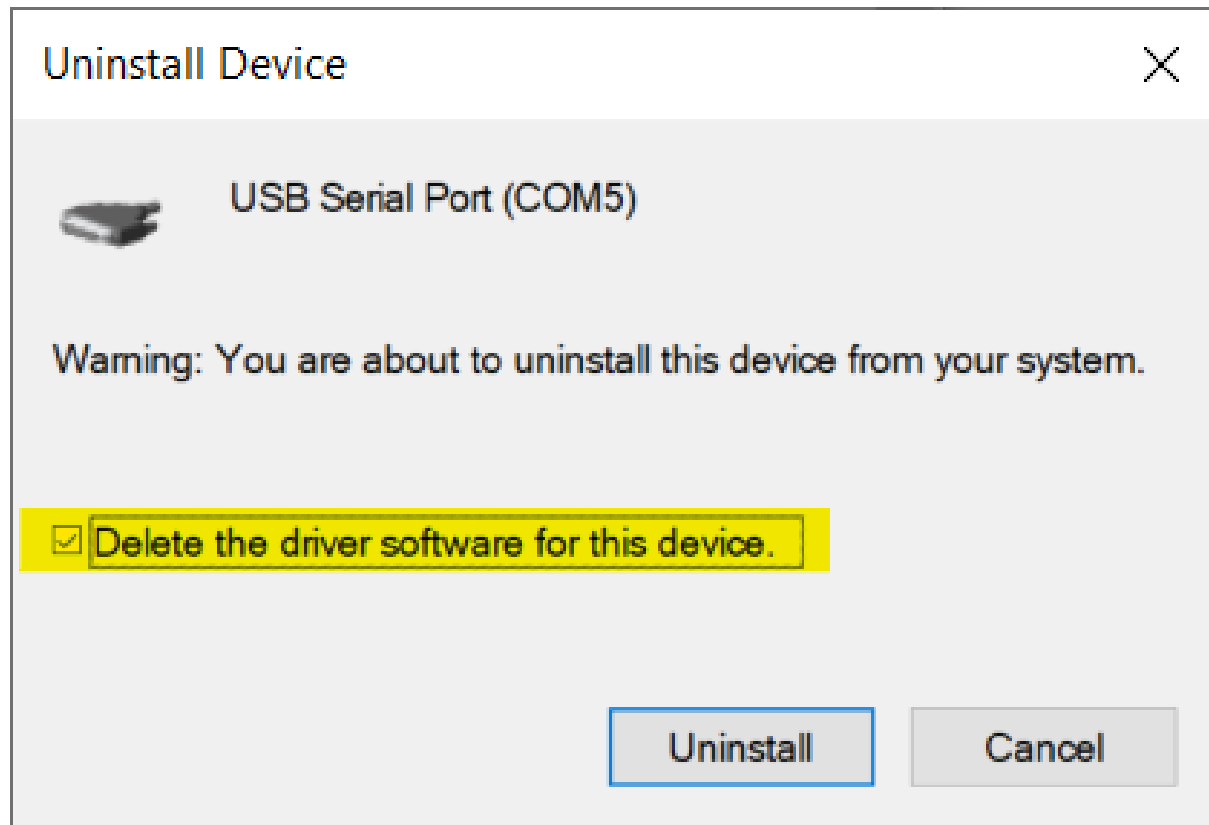
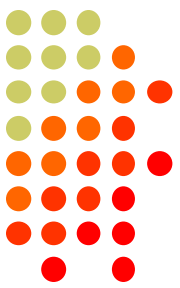
## Check that Driver Provider is *not* Prolific



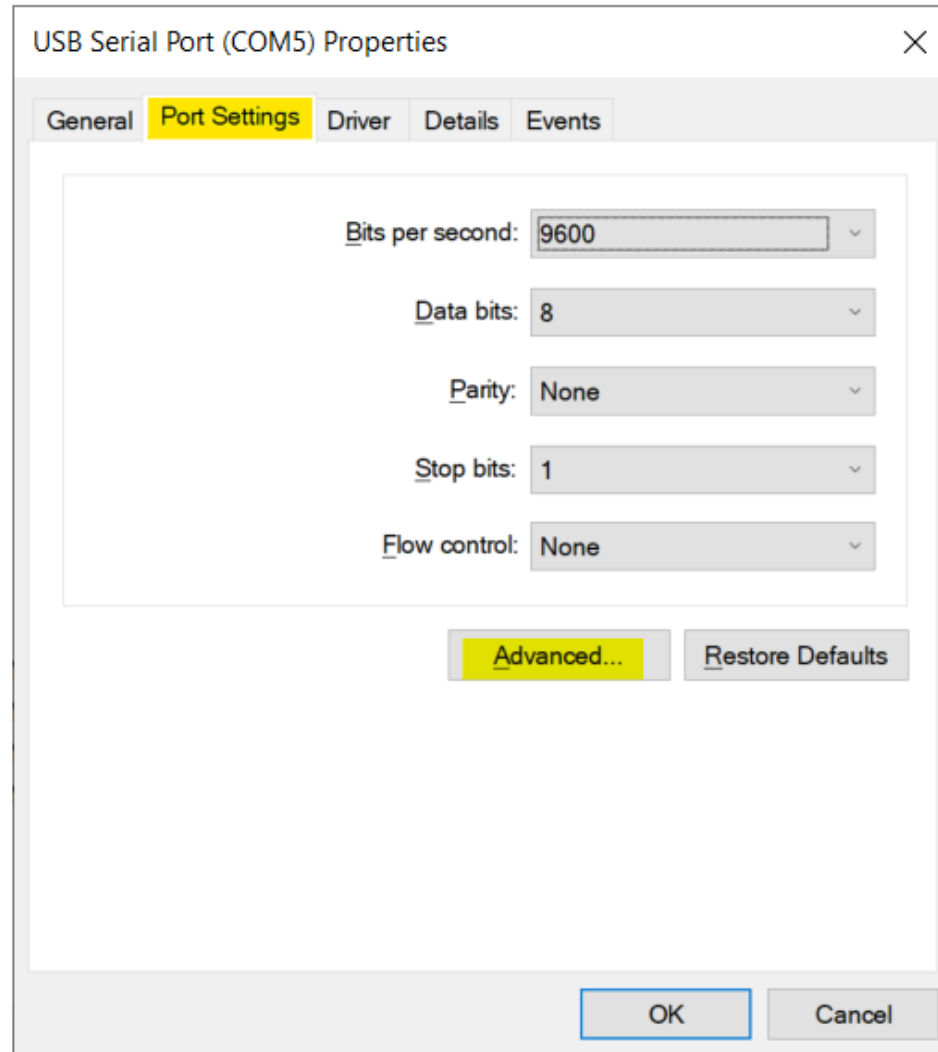
- If you see **Prolific**, click **Uninstall Device**

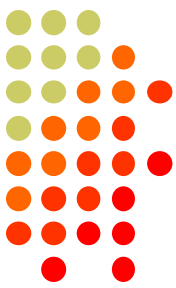


# Uninstall the Prolific Device *and Delete the Driver Software for this device.*



If Driver is FTDI, go to Port Settings tab  
Click Advanced... button





# FTDI Default Options – not good, keys radio

Advanced Settings for COM5

COM Port Number: COM5

USB Transfer Sizes

Select lower settings to correct performance problems at low baud rates.

Select higher settings for faster performance.

Receive (Bytes): 4096

Transmit (Bytes): 4096

BM Options

Select lower settings to correct response problems.

Latency Timer (msec): 16

Timeouts

Minimum Read Timeout (msec): 0

Minimum Write Timeout (msec): 0

Miscellaneous Options

Serial Enumerator ☒

Serial Printer ☐

Cancel If Power Off ☐

Event On Surprise Removal ☐

Set RTS On Close ☐

Disable Modem Ctrl At Startup ☐

Enable Selective Suspend ☐

Selective Suspend Idle Timeout (secs): 5

OK

Cancel

Defaults

# Change the FTDI Options To This



Miscellaneous Options

Serial Enumerator	<input type="checkbox"/>
Serial Printer	<input type="checkbox"/>
Cancel If Power Off	<input type="checkbox"/>
Event On Surprise Removal	<input type="checkbox"/>
Set RTS On Close	<input type="checkbox"/>
Disable Modem Ctrl At Startup	<input checked="" type="checkbox"/>
Enable Selective Suspend	<input type="checkbox"/>
Selective Suspend Idle Timeout (secs):	5

## Disabling Serial Enumeration (unwanted keying) on Legacy Serial Ports (COM1:, COM2:)

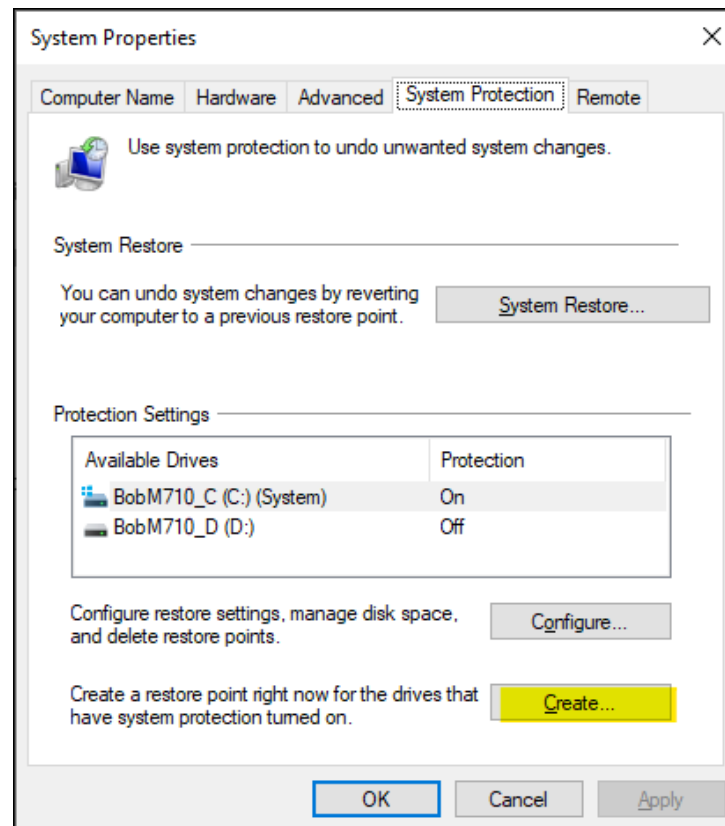


- **Requires Registry Edit (run regedit)**
- **Create a System Restore Point to allow recovery, just in case**
- **Locate “UpperFilter” key under  
HKEY\_LOCAL\_MACHINE\SYSTEM\  
CurrentControlSet\Enum\ACPI\PNP0501\0  
(or similar)**
- **Rename key to OldUpperFilter**
- **No more unwanted keying**



# Creating a Restore Point

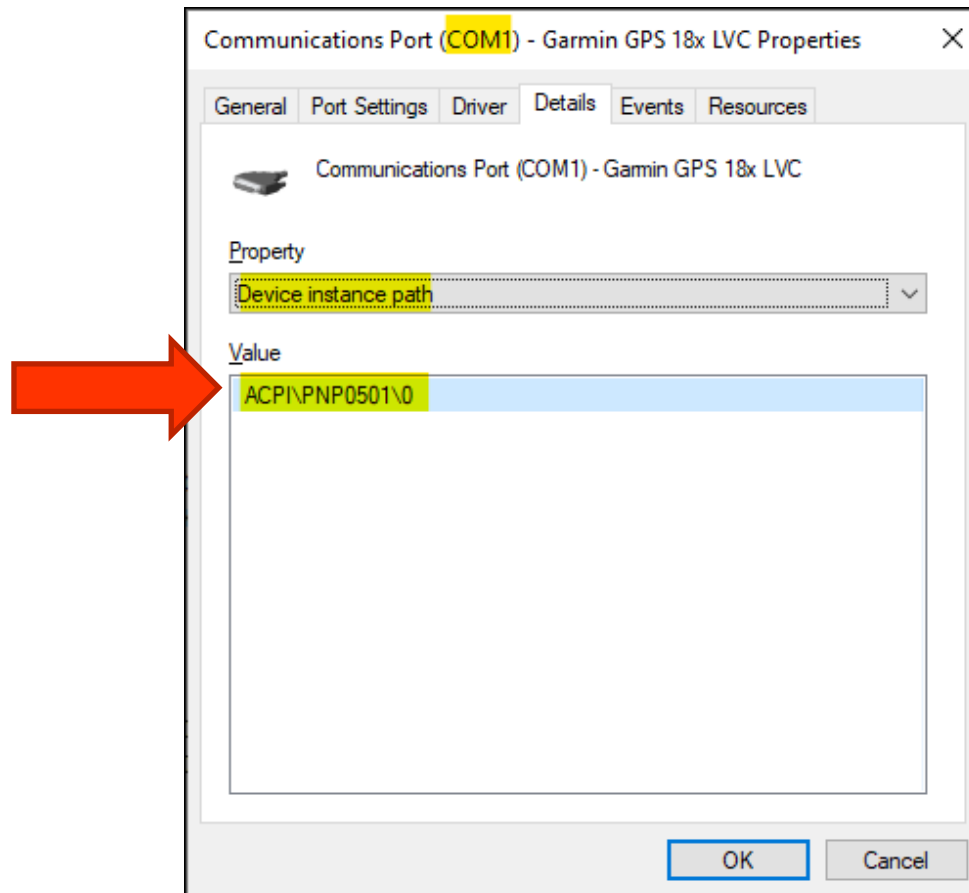
- **System Properties, System Protection, Create (or use Windows Search box)**



# Locate Device Instance Path in Device Manager



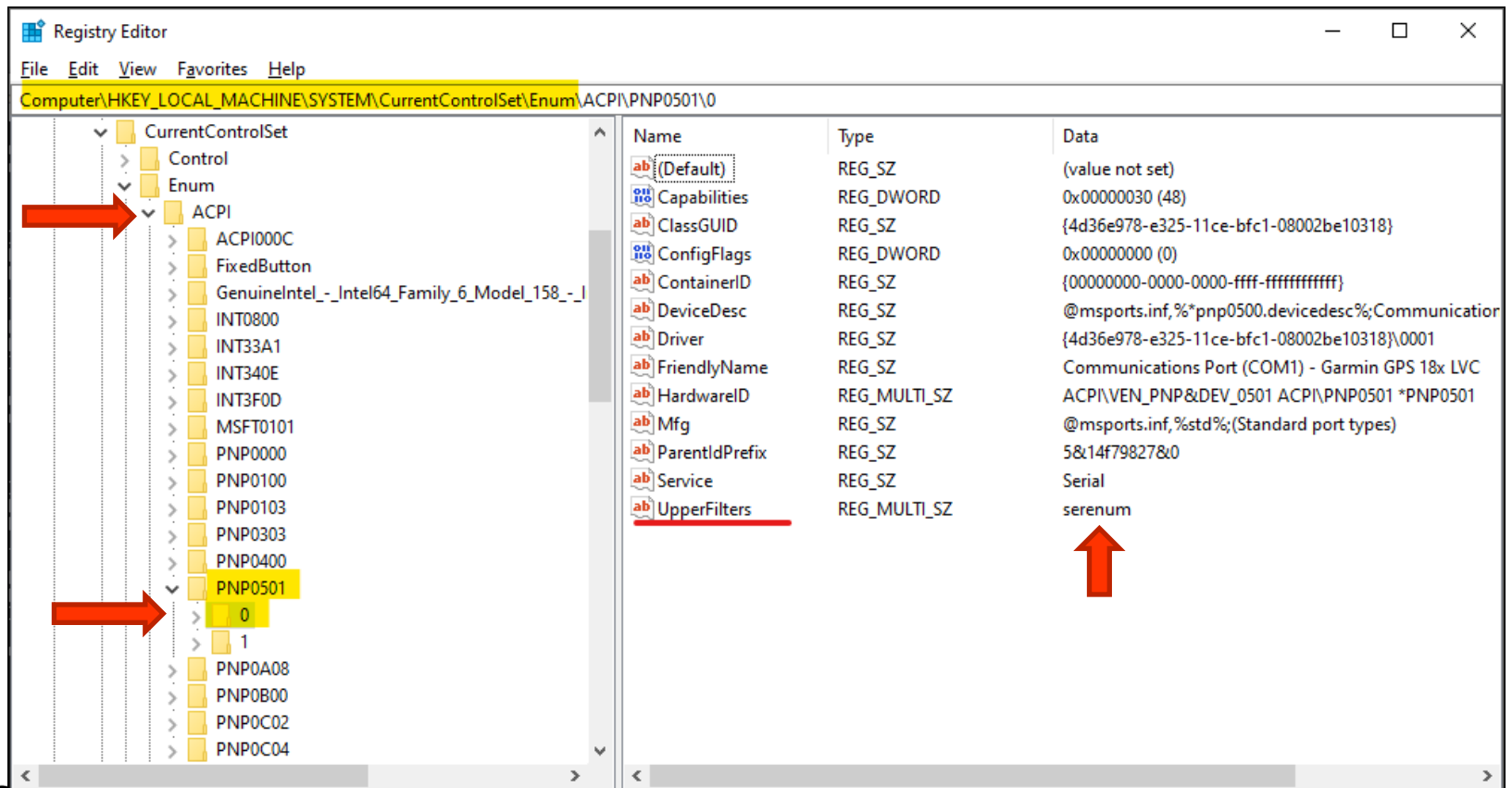
- **Device Manager (devmgmt.msc), COM1:, Properties, Details**



# Locate Device Instance Path in Registry

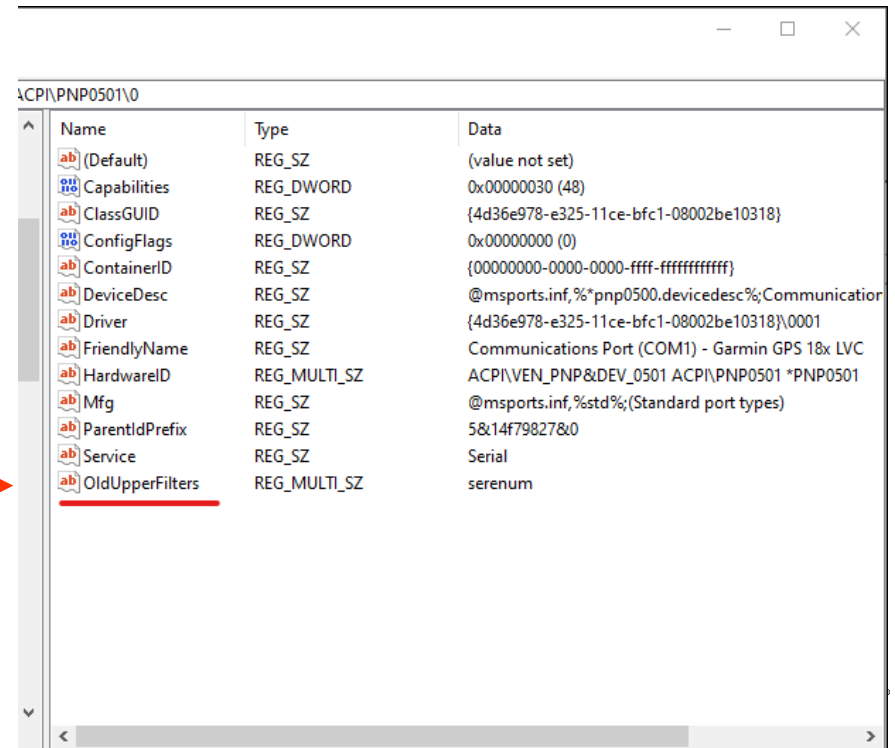
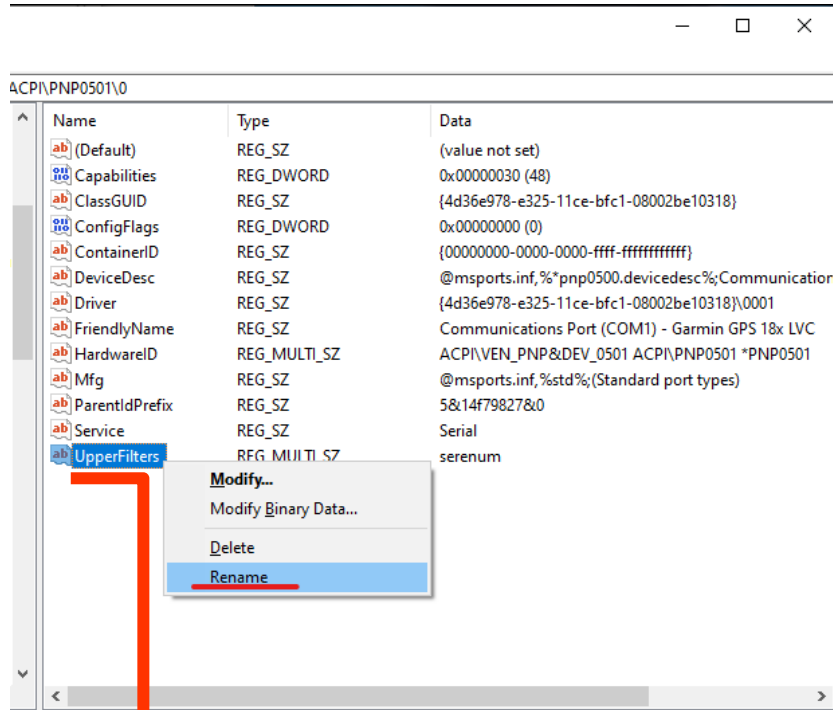


- Regedit: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Enum

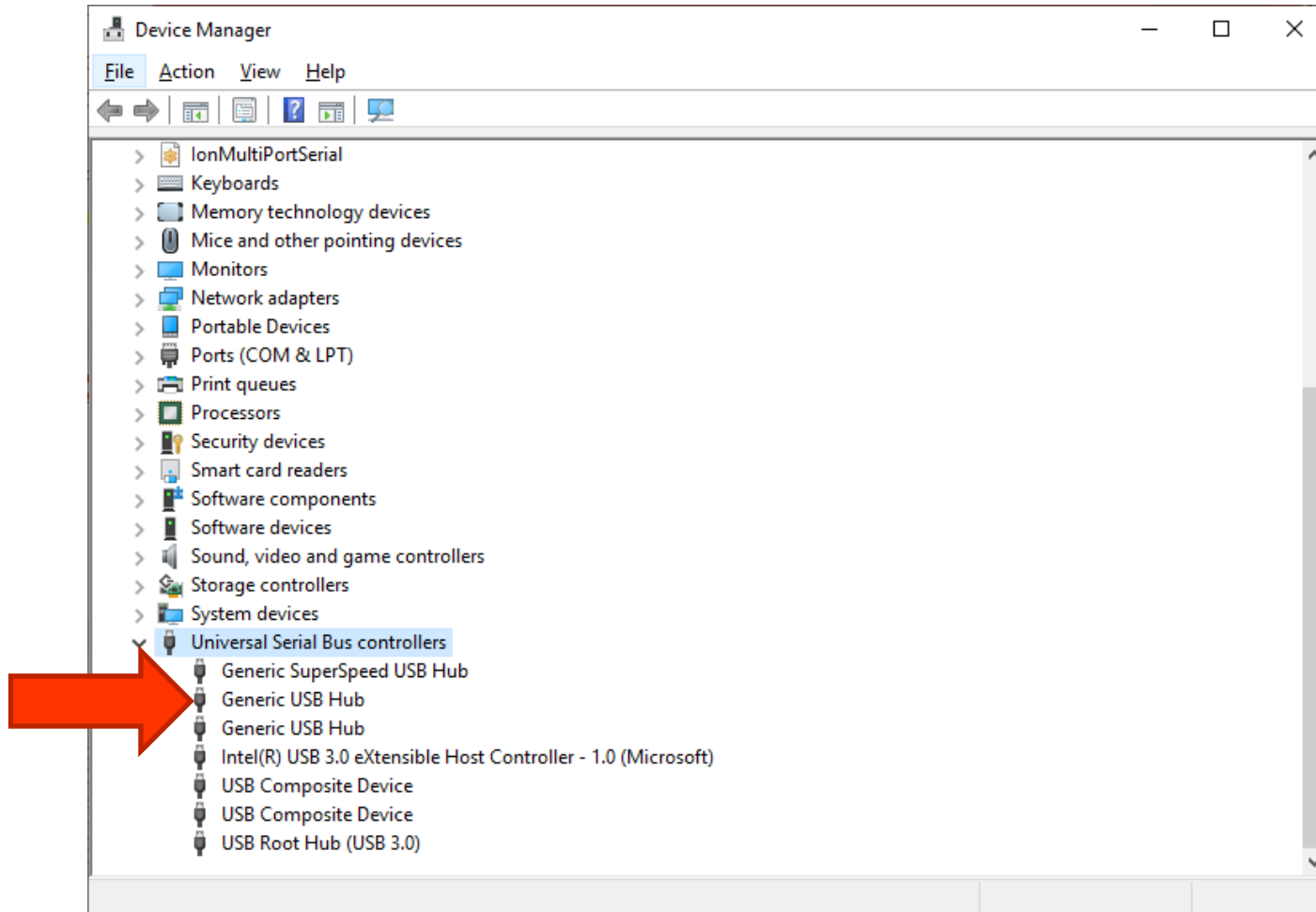




# Right Click, Rename key UpperFilters → OldUpperFilters

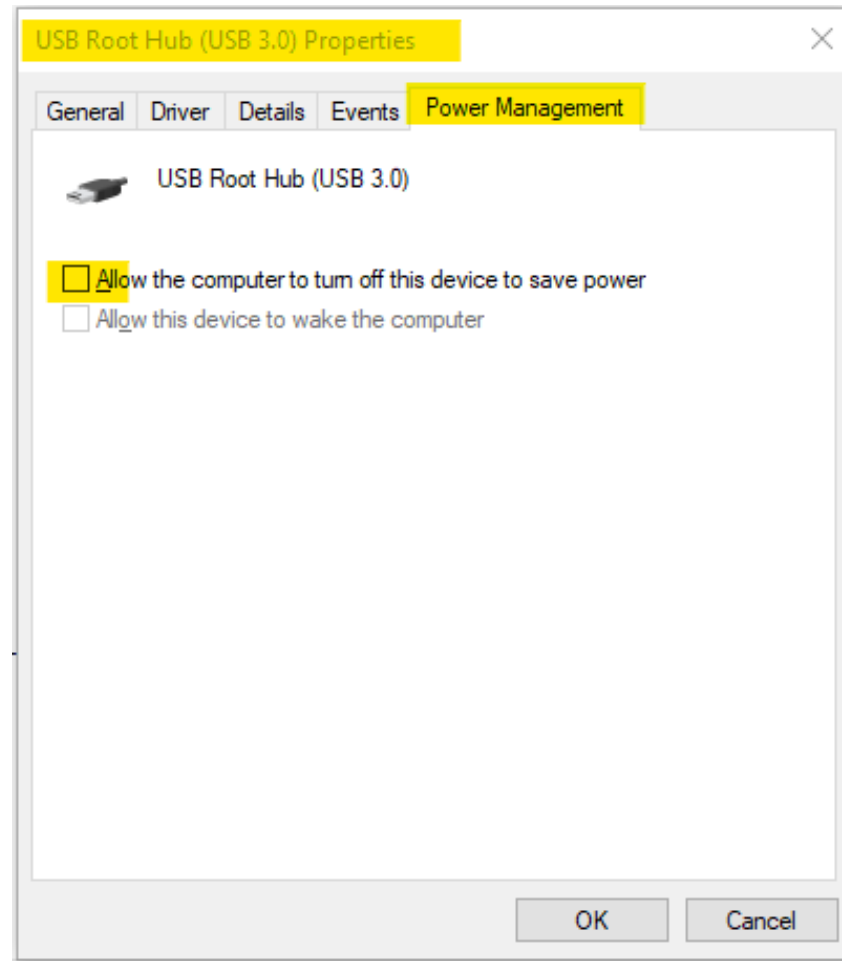


# Under USB Serial Bus Controllers: Right-Click each “Hub” device, Select Properties



# Look for Power Management Tab

## Do *not* allow computer to turn off this device



# Another USB Dev. Management Tool: NirSoft's USBDeview



- Stands for USB Device View
- [https://www.nirsoft.net/utils/usb\\_devices\\_view.html](https://www.nirsoft.net/utils/usb_devices_view.html)
- Scroll Way Down to the “Feedback” section to find download link:

## Feedback

If you have any problem, suggestion, comment, or you found a bug in my utility, you can send a message to [nirsofer@yahoo.com](mailto:nirsofer@yahoo.com)

[Download USBDeview](#)

[Download USBDeview for x64 systems](#)

# USBDeview Screen Shot



USBDeview

File Edit View Options Help

Description	Device Type	Service Name	Drive Letter	Serial Number	Connected	Created Date	Last Plug/Unplug Date
Edgeport/4	Vendor Specific	EdgeSer		04-01-013289	No	3/12/2019 7:00:09 PM	12/13/2018 2:37:38 AM
USB Serial Converter	Vendor Specific	FTDIBUS		FT0F59X0	No	12/18/2018 9:12:08 A...	12/18/2018 9:12:08 AM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1P91QU	No	3/5/2019 5:35:00 PM	3/5/2019 5:35:00 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1P91TN	No	1/23/2019 1:38:04 PM	1/18/2019 7:14:30 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1P9J2B	No	2/21/2019 6:14:56 PM	2/21/2019 6:14:56 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1P9QFU	No	2/22/2019 4:56:01 PM	2/14/2019 5:07:08 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1P9UYS	No	3/14/2019 4:37:40 PM	3/14/2019 4:37:40 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1PC6NN	No	1/21/2019 6:09:53 PM	1/21/2019 5:59:32 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1PC8M1	No	3/11/2019 4:29:13 PM	2/20/2019 6:56:30 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1PCCIE	No	2/11/2019 6:51:25 PM	1/19/2019 7:05:05 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1TQHCM	No	3/5/2019 5:33:41 PM	3/5/2019 5:33:41 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT1TSBDH	No	2/14/2019 4:53:40 PM	2/14/2019 4:53:40 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FTYWN20G	No	1/14/2019 10:59:41 P...	1/14/2019 10:59:41 PM
USB Serial Converter	Vendor Specific	FTDIBUS		FT06EEKQ	No	12/26/2018 12:32:04 ...	12/13/2018 2:37:35 AM
USB Serial Converter	Vendor Specific	FTDIBUS	COM5	FT06EEK7	No	3/26/2019 3:42:28 PM	3/19/2019 10:06:35 AM
Logitech USB Wheel Mouse	HID (Human Interface D...	HidUsb			No	3/16/2019 9:39:15 PM	3/16/2019 9:39:15 PM
Logitech USB Wheel Mouse	HID (Human Interface D...	HidUsb			No	3/12/2019 7:00:08 PM	12/13/2018 2:36:51 AM

45 item(s), 1 Selected

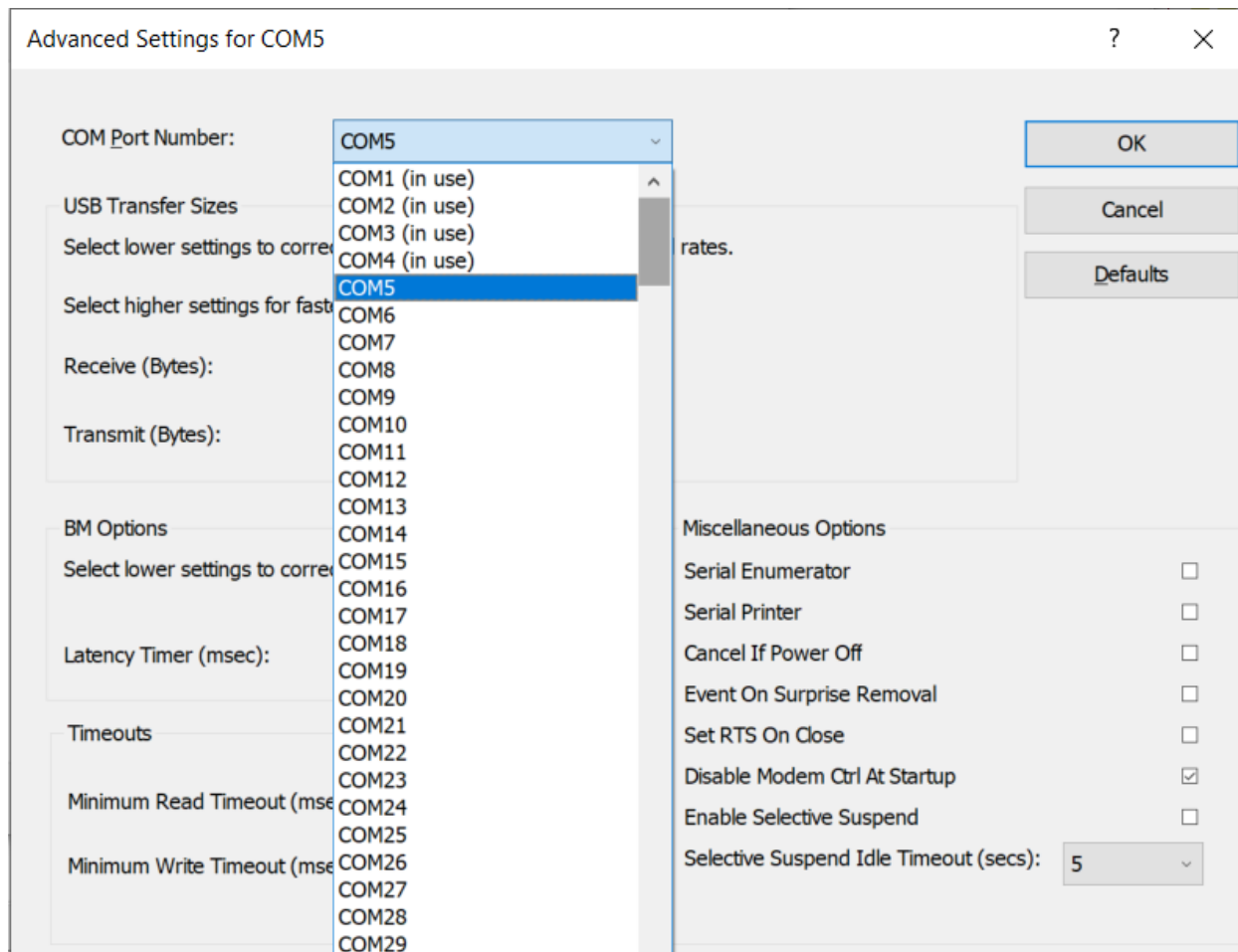
NirSoft Freeware. <http://www.nirsoft.net> usb.ids is not loaded

# Managing COM Port Numbers



- Over time, ever increasing unique COM port numbers are assigned by Windows, difficult to keep track
- Some software doesn't support COM13: or higher
- Suggestion: renumber serial ports “left to right” to match your station layout, starting with transceivers
- First, use Windows Device Manager to uninstall all serial devices that you no longer use
- Right click on remaining COM ports, Properties, **Port Settings** tab. Click **Advanced...** button
- Renumber ports sequentially, COM3:, COM4:, COM5:, etc., “left to right”

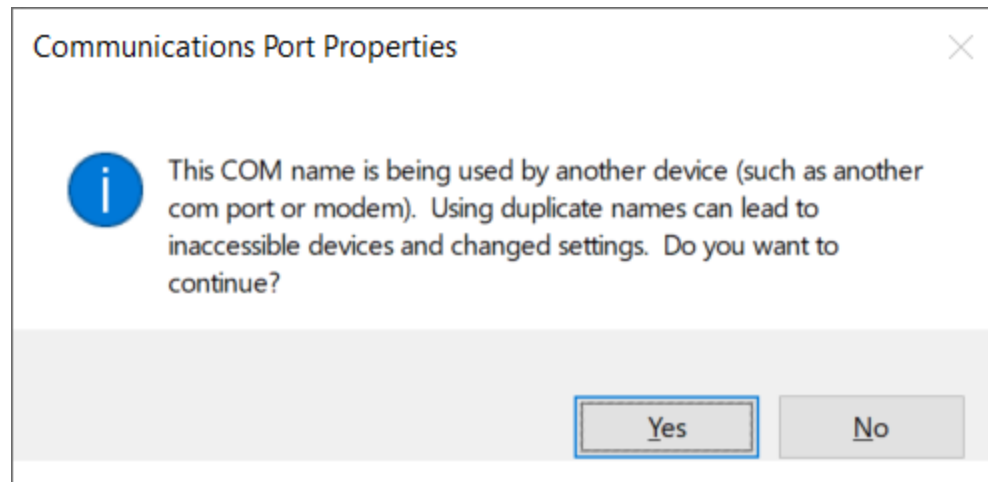
# Renumbering Serial Ports with Device Manager: Right click, Properties, Port Settings tab, Advanced



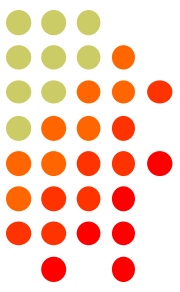


# What does “In Use” Mean?

- It means this COM port number was assigned to some device, maybe years ago
- It usually does *not* mean that you can't use it during reassignment, especially if it is “grayed out” (hidden)
- Uninstalling disconnected devices first will help
- Usually safe to ignore this warning and click YES:







# Labeling Serial Ports

- Example:



## Ports (COM & LPT)



Communications Port (COM1) - Garmin GPS 18x LVC



Communications Port (COM2) - KPA500 0016



Printer Port (LPT1)



USB Serial Port (COM3) - K4 A 0073 USB1



USB Serial Port (COM4) - K4 A 0073 USB2



USB Serial Port (COM5) - K4 B 0157 USB1



USB Serial Port (COM6) - K4 B 0157 USB2



USB Serial Port (COM7) - KPA1500 A 0096



USB Serial Port (COM8) - KPA1500 B 0023

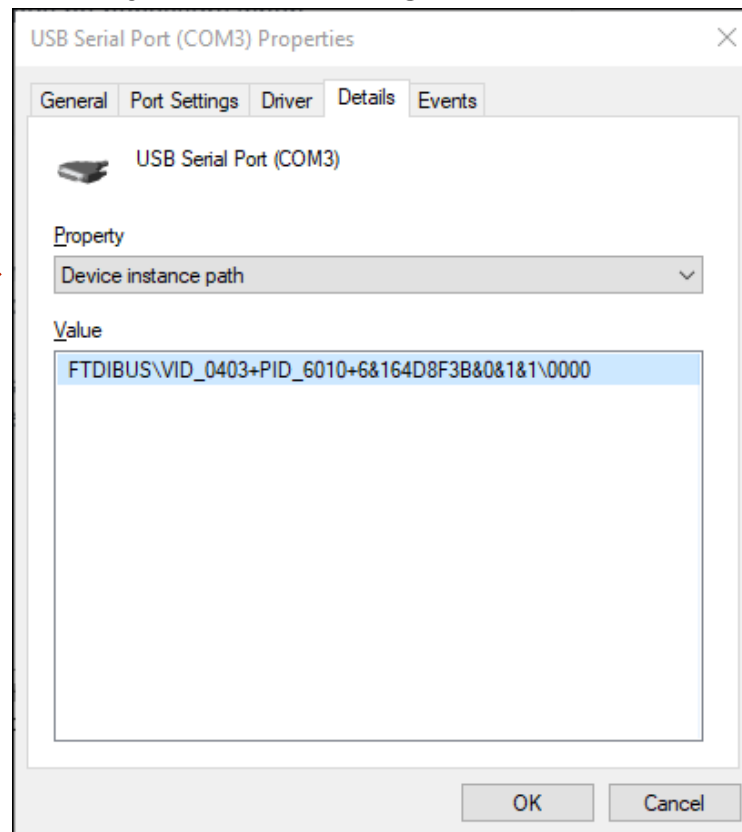


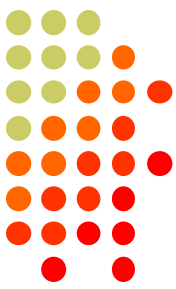
USB-SERIAL CH340 (COM9) - Mortty



## Step 1 – Note the “Device instance path”

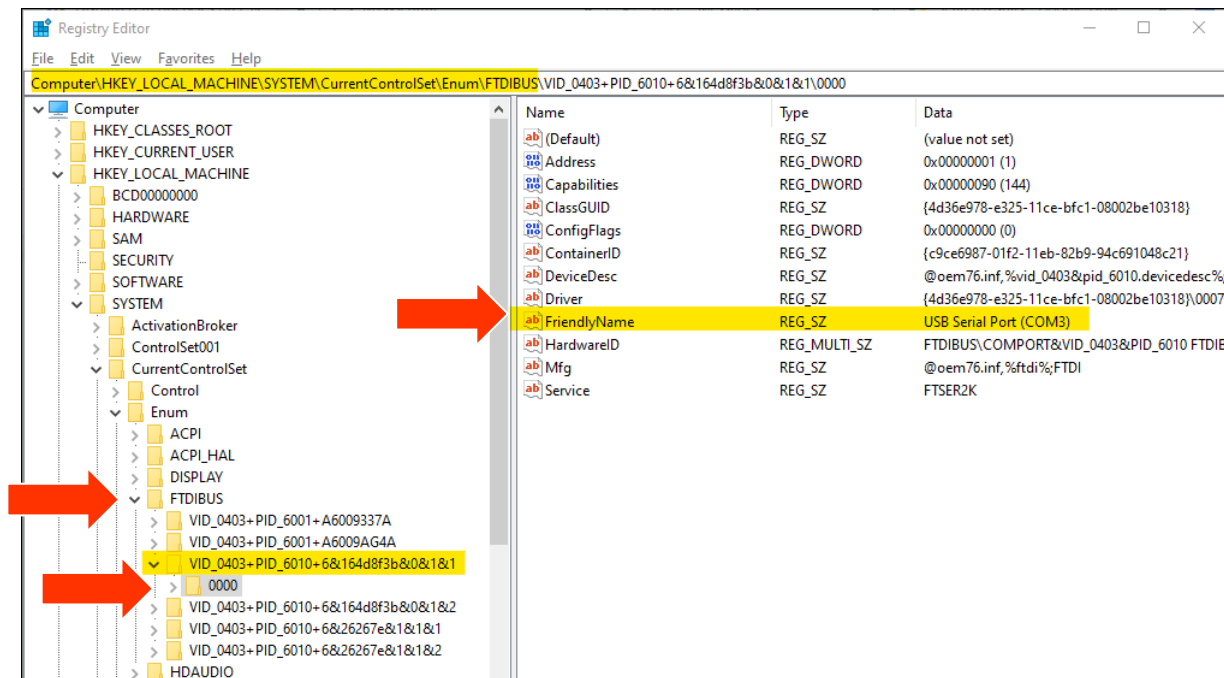
- Right click on Serial Port, select Properties, select Details
- Tip: tap “D” on keyboard to jump to “D” section of drop-down list:





## Step 2 – Use Registry Editor (regedit)

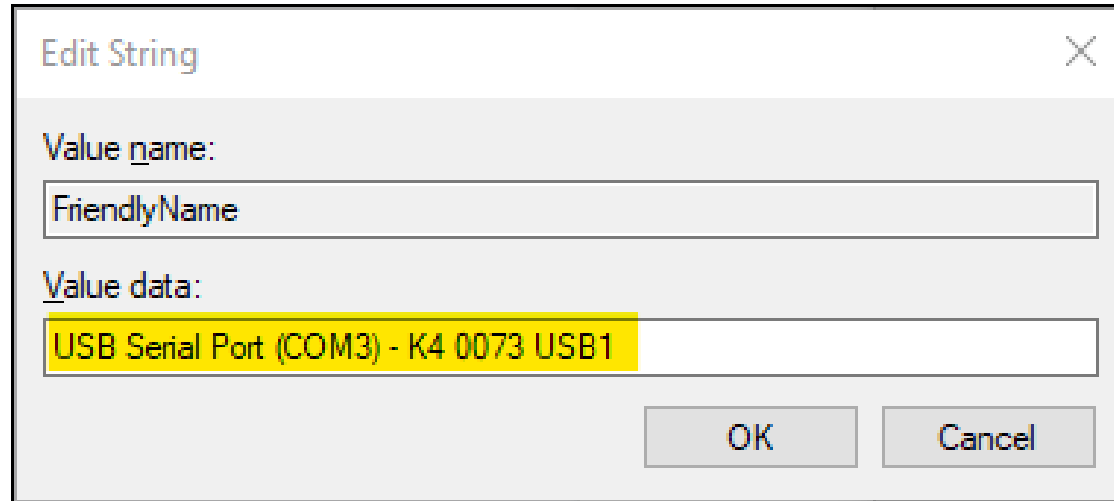
- Navigate to  
HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Enum
- Device Instance Path, Subkey 0000 will have the  
**FriendlyName**





## Step 3 – Change the FriendlyName

- Double-click on **FriendlyName** (or Right-click, **Modify...**)
- Edit the FriendlyName value and click **OK**



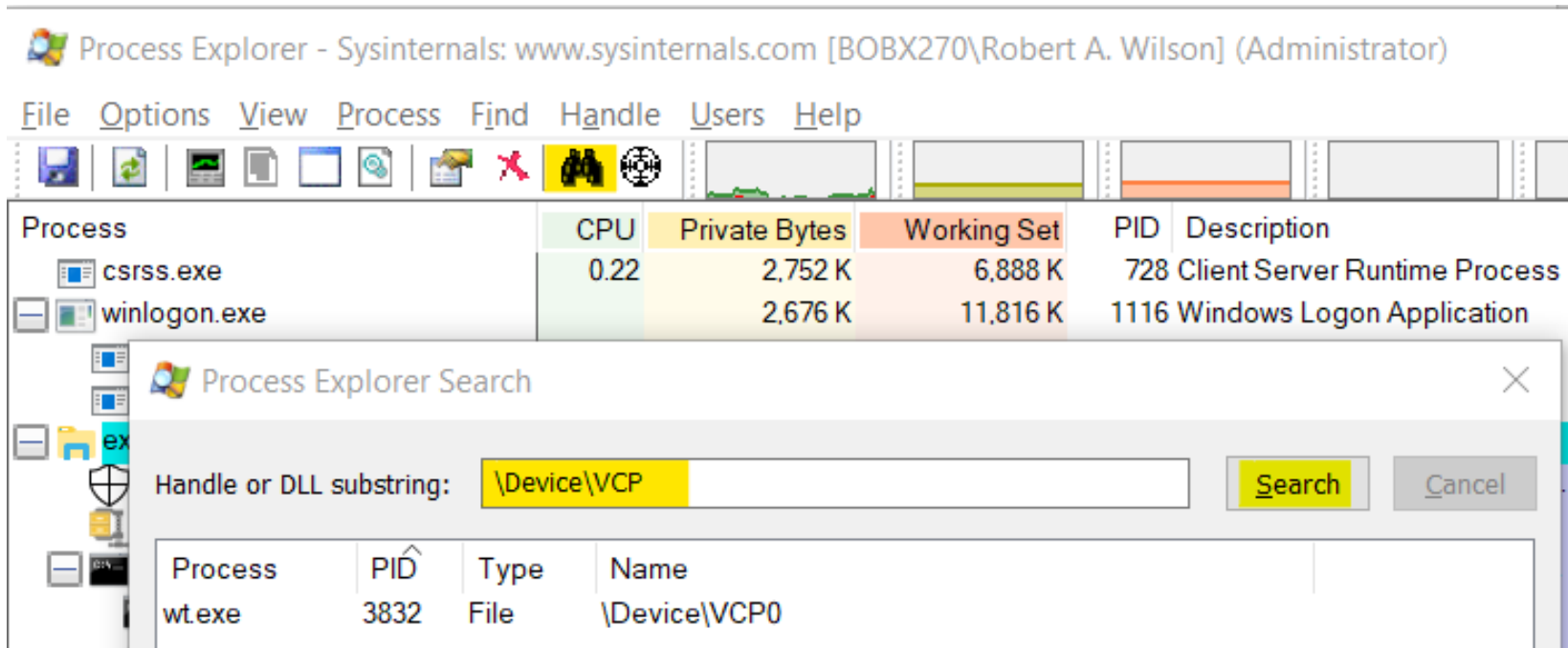
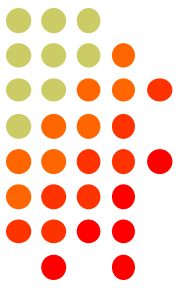
- Note: If you renumber a serial port, Windows will change the name back to the default, so renumber first, then rename

# What program is currently using my serial port?



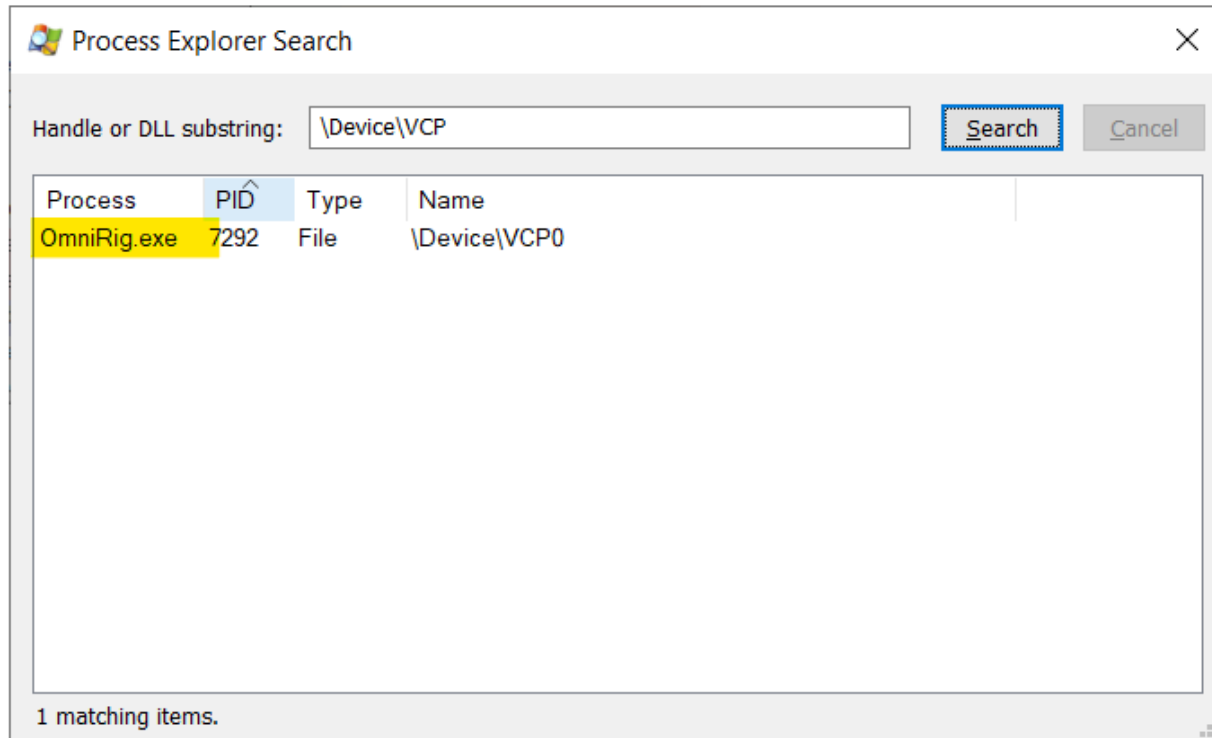
- Use Windows Process Explorer
- <https://docs.microsoft.com/en-us/sysinternals/downloads/process-explorer>
- On Windows 10, run **procexp64.exe** as **Administrator**
- Click Search button (binoculars icon)
- Enter one of the following partial search strings:
  - \Device\VCP** - FTDI virtual COM ports
  - \Device\Edg** - Edgeport devices
  - \Device\Ser** - Built-in (COM1:), Mottty (Arduino)
  - \Device\Sil** - Icom/Kenwood/Yaesu (Silicon Labs)
  - \Device\VSer** - Eltima / vspMgr virtual serial ports

# Process Explorer Search – Example 1



Win-Test (**wt.exe**) has opened the Virtual COM Port

# Process Explorer Search Example 2

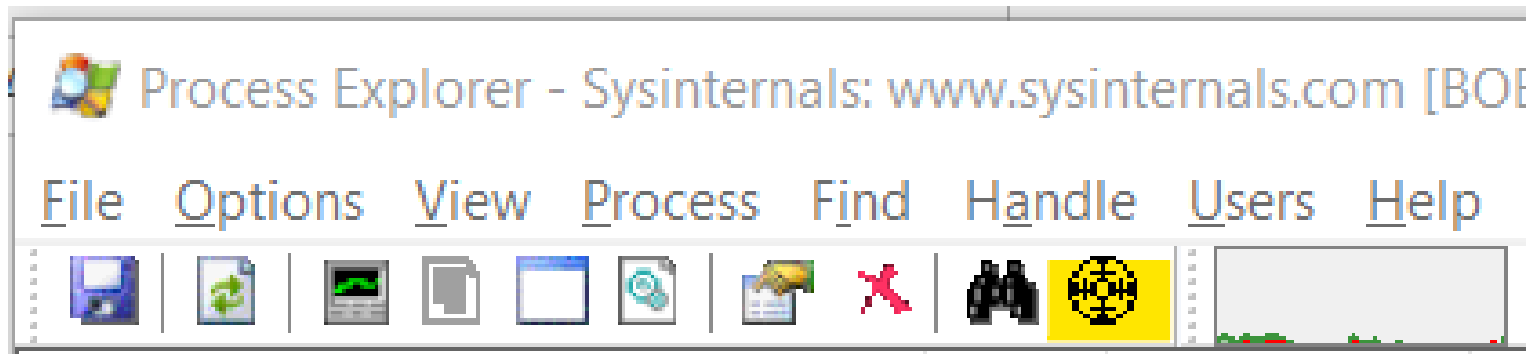


**OmniRig** (e.g. WSJT-X, Log4OM) has opened the FTDI VCP



# Not sure what to search for?

- Open a program known to use a particular serial port
- In Process Explorer, *drag* the “Find Windows Process” icon on top of the program window



- Process Explorer will jump to the process corresponding to that program window

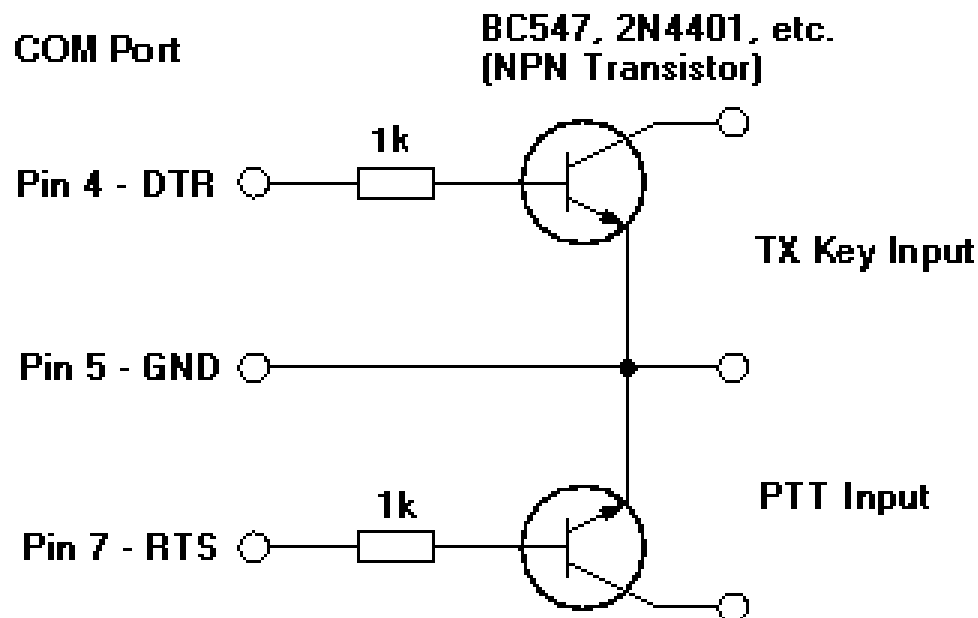


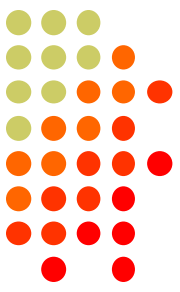


# Computer CW, PTT, and FSK RTTY Keying Using Serial Port pins (DTR=CW or FSK, RTS=PTT)



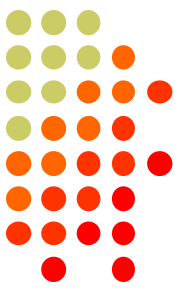
- A simple hardware “open collector” keying circuit, used for decades:





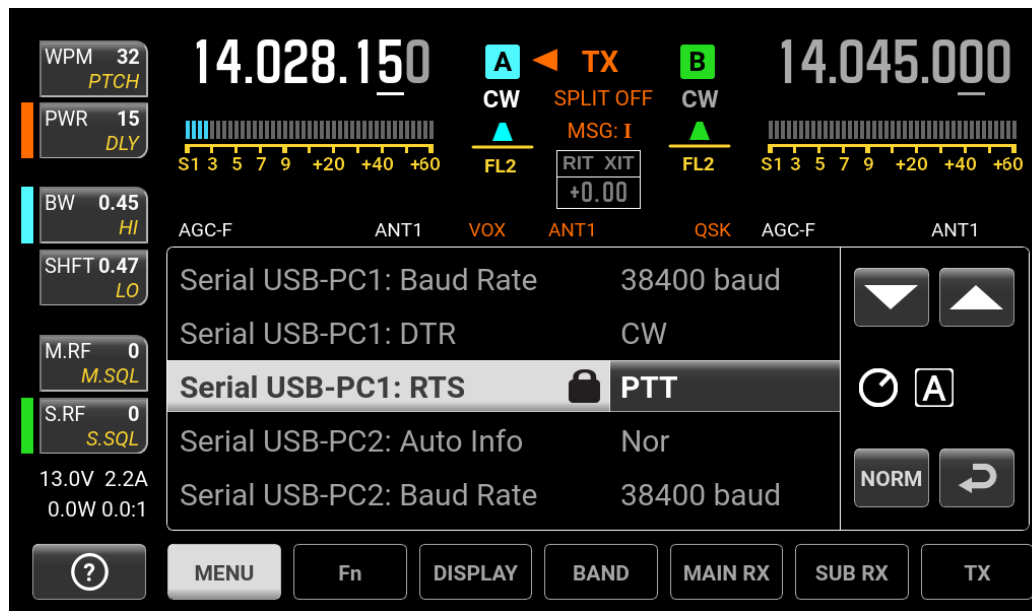
# Elecraft K3 / K3S keying via serial port

- First transceiver to include computer keying circuit *inside the radio*
- Does not use RTS and DTR pins for RS232 “Handshaking”, freeing them for other purposes
- In K3, set **CONFIG:PTT-KEY** to **RTS-DTR** (vs. **OFF-OFF**)
- Works the same over a standard serial cable (CONFIG:RS232 = 38400) -or- the K3S USB connection (CONFIG:RS332 = USB)
- To prevent unwanted transmissions when PC reboots, change FTDI Port Settings:
  - Uncheck “Serial Enumerator”
  - Check “Disable Modem Ctrl At Startup”



# Elecraft K4 keying via virtual serial port(s)

- Same as K3, but THREE (3) serial ports available for CW, PTT, and FSK keying and rig control
- In K4 menu, scroll to the **Serial**, entries, modify as shown:

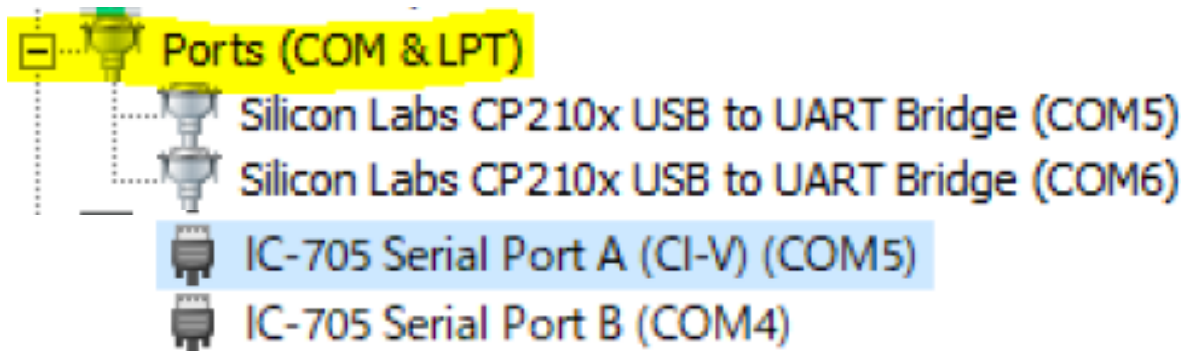


- Change FTDI Port Settings:
  - Uncheck “Serial Enumerator”
  - Check “Disable Modem Ctrl At Startup”



# ICOM Copies Elecraft K3, Adds FSK Keying

- CW, PTT, and FSK keying timing OK over USB virtual serial port
- Supported by IC-705, IC-7300, IC-7610, IC-7850, IC-7851
- IC-7300 generates just one virtual serial port
- IC-705, IC-7610, IC-7850, IC-7851 generate *two* virtual serial ports:

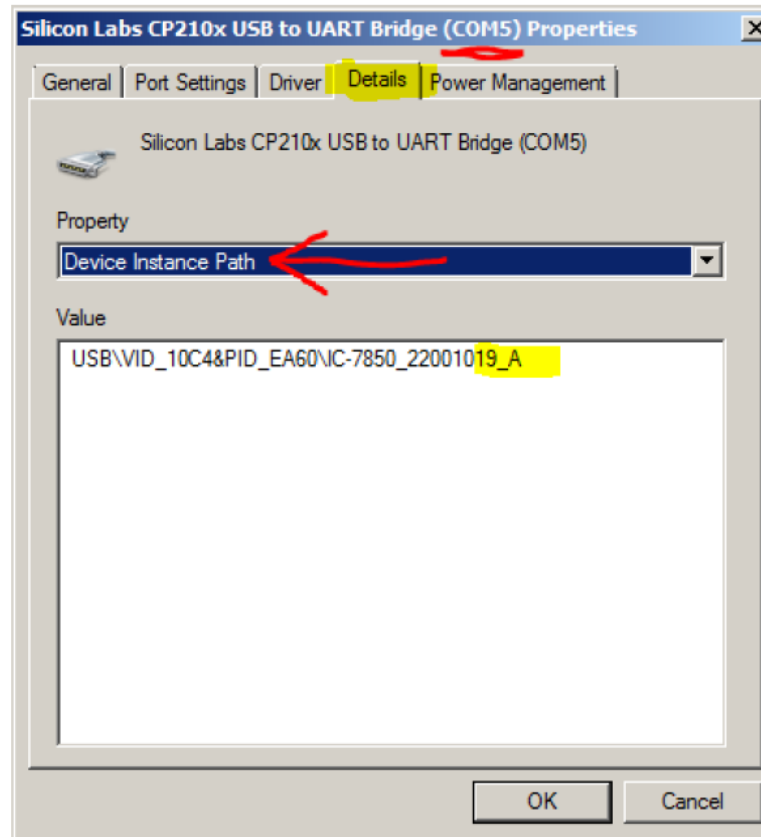


- To keep it simple use DTR pin for keying, RTS pin for PTT
- Use port “B” for MMTTY exclusively
- Mnemonic: CW : DTR : FSK • PTT : RTS : Send



# ICOM: Determining COM Port A and B

- Use Windows Device Manager, right click on first COM port, Properties, Details tab, Device Instance Path, check last letter





# ICOM IC-7300 Keying via USB Cable

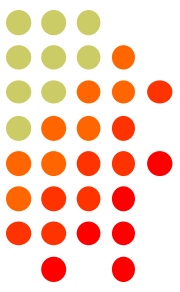
- USB cable provides *one* virtual serial port
- In IC-7300 **SET > Connectors** menu:  
Set **USB Keying (CW)** to **DTR**  
-or-  
Set **USB Keying (RTTY)** to **DTR**
- Set **USB Send** to **RTS**
- Logging Software, rig control Port (USB), set DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **EXTFSK64** to select COM port. **Cannot use logger at same time; rig has just one serial port.** But you can use the **REMOTE (CI-V)** connector with CT-17 or equivalent for rig control.



# ICOM IC-705 Keying via USB Cable

- USB cable provides *two* virtual serial ports
- In IC-7610 **SET > Connectors > USB Send/Keying:**  
Set **USB Keying (CW)** to **USB (A) DTR**  
Set **USB Keying (RTTY)** to **USB (B) DTR**  
Set **USB Send** to **USB (A) RTS** or **USB (B) RTS**
- In Logging Software, rig control COM Port (A):  
DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **EXTFSK64** to select second COM Port (B):  
FSK=DTR, PTT=RTS
- Cannot set *both* ports to use hardware PTT, so use “Software PTT” on Rig Control Port (A) if necessary.





# ICOM IC-7610 Keying via USB Cable

- USB cable provides *two* virtual serial ports
- In IC-7610 **SET > Connectors > USB Send/Keying:**  
Set **USB Keying (CW)** to **USB1(A) DTR**  
Set **USB Keying (RTTY)** to **USB1(B) DTR**  
Set **USB Send** to **USB1(A) RTS** or **USB1(B) RTS**
- In Logging Software, rig control COM Port (A):  
DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **ESTFSK64** to select second COM Port (B):  
FSK=DTR, PTT=RTS
- Cannot set *both* ports to use hardware PTT, so use “Software PTT” on Rig Control Port (A) if necessary.



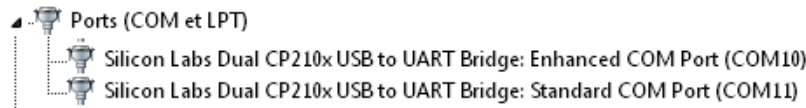
# ICOM IC-7850, IC-7851 Keying via USB Cable

- USB cable provides *two* virtual serial ports
- In IC-785x **SET > Others** menu:
  - Set **USB Keying (CW)** to **USB1 DTR**
  - Set **USB Keying (RTTY)** to **USB2 DTR**
  - Set **USB Send** to **USB1 RTS** (CW) or **USB2 RTS** (RTTY)
- In Logging Software, rig control COM Port (USB1)  
set DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **ESTFSK64** to select second  
COM port (USB2)  
FSK=DTR, PTT=RTS
- Cannot use *both* ports for hardware PTT, so use “Software  
PTT” on Rig Control Port (USB1) if necessary.



# Yaesu FT-991 Keying via USB Cable

- USB cable provides *two* Silicon Labs virtual serial ports:

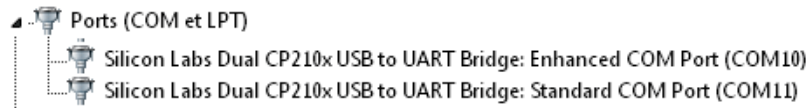


- In Yaesu Menu, set  
**030 232C TOT: 1000 msec** (default is only 10 msec)  
**033 CAT RTS: Disable** (Turns off RS232 handshaking)  
**060 PC Keying: DTR**  
**071 DATA PTT SELECT: RTS**  
**098 RTTY SHIFT PORT: DTR**  
**110 SSB PTT SELECT: RTS**
- In Logging Software, rig control is via the “Enhanced” COM Port, CW / PTT via “Standard” COM Port: DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **ESTFSK64** with the “Standard” COM port: FSK=DTR, PTT=RTS



# Yaesu FTdx101D or FTdx101MP Keying via USB

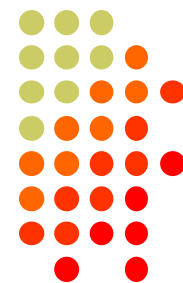
- USB cable provides *two* Silicon Labs virtual serial ports:



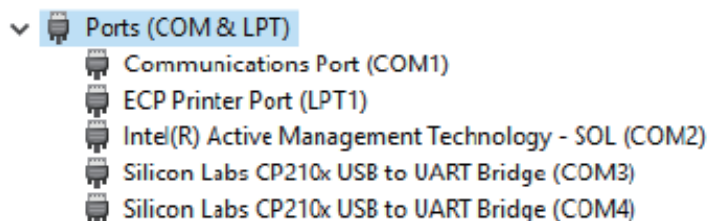
- In Yaesu Menu, set

- OPERATION SETTING / GENERAL:  
**232C TIME OUT TIMER: 1000 msec** (default is only 10 msec)  
**CAT RTS: OFF** (Turns off RS232 handshaking)
- RADIO SETTING / MODE SSB, RTTY, and PSK/DATA:  
**RPTT SELECT: RTS** (FSK will be by **DTR**)
- RADIO SETTING / MODE CW:  
**PC KEYING: DTR** (PTT will be by RTS)
- In Logging Software, rig control is via the “Enhanced” COM Port, CW / PTT via “Standard” COM Port: DTR=CW, RTS=PTT
- In MMTTY, use **EXTFSK** or **ESTFSK64** with the “Standard” COM port: FSK=DTR, PTT=RTS

# Kenwood TS-890



- USB cable provides *two* Silicon Labs virtual serial ports:



- Right click, Properties, Details tab, Location Path:  
USB1 is “Standard” Serial Port, USB2 is “Enhanced”
- In Logging Software, rig control is via the “Standard” COM Port  
CW / PTT / FSK keying may be assigned to DTR or RTS of either port
- **Menu 17 Virtual Standard COM Port RTS: PTT**  
**Menu 18 Virtual Standard COM Port DTR: CW Keying**  
**Menu 19 Virtual Enhanced COM Port RTS: PTT**  
**Menu 20 Virtual Enhanced COM Port DTR: RTTY Keying**



# N1MM+ Contest Software Configuration

- Select Config, Configure Ports, view Hardware Tab
- Check CW/Other box next to Rig's Serial Port
- Click Set button

The screenshot shows the 'Configurer' window with the 'Hardware' tab selected. The window contains a table for configuring serial ports and radio settings. The 'COM12' row is highlighted, and the 'CW/Other' checkbox is checked. The 'Set' button for this row is also highlighted. To the right of the table, there are radio buttons for 'S01V', 'S02V', and 'S02R', with 'S01V' selected. Below these, the text '38400,N,8,1,DTR=CW,RTS=PTT,Tx=1' is displayed.

Port	Radio	Digi	CW/Other	Details
COM11	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
COM12	Elecraft K3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
COM9	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT1		<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT2		<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT3		<input type="checkbox"/>	<input type="checkbox"/>	Set

S01V S02V S02R

38400,N,8,1,DTR=CW,RTS=PTT,Tx=1



## N1MM+ Contest Software Config. (cont'd)

- Set DTR (pin 4) = CW, RTS (pin 7) = PTT



Com12

Speed	Parity	DataBits	Stop Bits
38400	N	8	1

DTR (pin 4)	RTS (pin 7)	Radio Nr
CW	PTT	1

PTT Delay (msec)  
0

☐ Enable Both Hardware & Software PTT  
☐ PTT via Radio Command SSB Mode  
☐ PTT via Radio Command CW Mode  
☐ PTT via Radio Command Digital Mode

☐ Allow ext interrupts

Two Radio Protocol	FootSwitch (pin 6)
None	None

Radio Polling Rate  
Normal

Suggested Elecraft K3 Settings:  
19200 - 38400, N, 8, 1, Always Off, Always Off

Help OK Cancel



# Win-Test and DXLog.net Contest Software

- Set DTR (pin 4) = CW, RTS (pin 7) = PTT

Win-Test:

COM5 properties [Alt+H for help]

Port properties

Bits per seconds: 38400

Data bits: 8

Parity: None

Stop bits: 1

Options

DTR (pin 4): CW

RTS (pin 7): PTT

Active with: Both radios

K3 Elecraft default settings

OK Cancel

DXLog.net:

Keying & Control

DTR (pin 4): CW

RTS (pin 7): PTT

DSR/Footswitch (pin 6): None

Active with: Radio 1

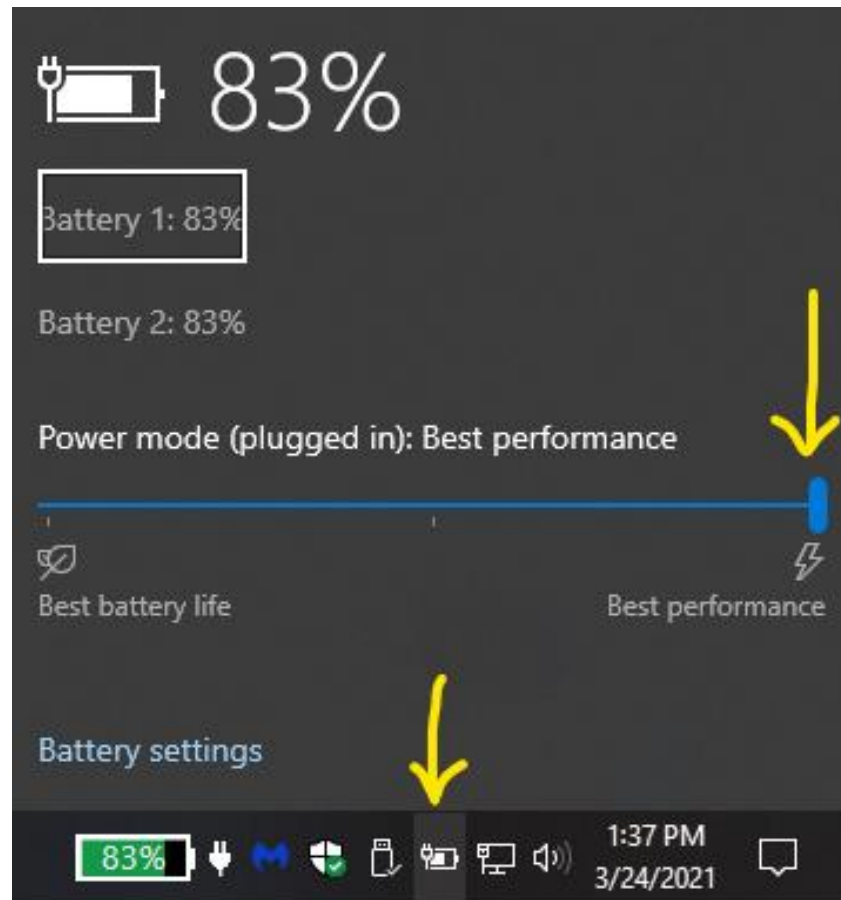
☐ Do not use PTT with voice keyer



# Notebook PC:

## Windows Power Mode Affects CW Timing

- CW Timing over USB is usually very good *if* you set Windows **Power Mode** to **Best Performance**:

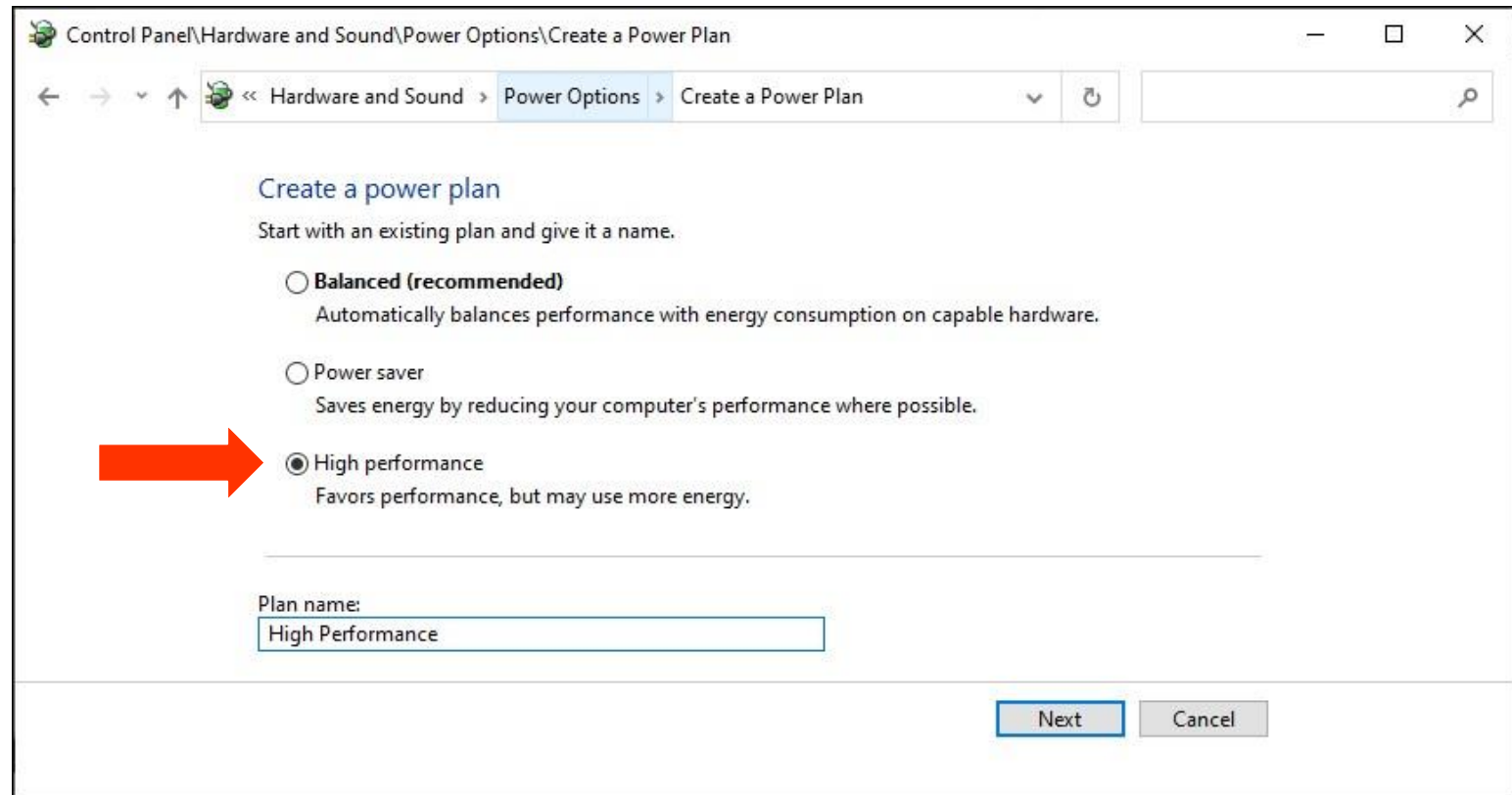


# Desktop PC:

## Windows Power Options Affects Timing



- CW Timing over USB is usually very good *if* you set Windows **Power Options** to **High performance**:



# FSK RTTY Keying: MMTTY Setup Menu, TX Tab

- Set **Port** to **EXTFSK64**, then click **Radio Command**



Setup Ver1.68A

Demodulator | AFC/ATC/PLL | Decode | **TX** | Font/Window | Misc | SoundCard

**DIDDLE**

☐ NONE  
☐ BLK  
☒ LTR

☐ Random  
☐ WaitTimer

**TX**

☒ UOS

☐ Double shift

☐ Disable Wait

☐ Disable Rev

☐ Always fix shift

Digital Output

Char. Wait

Diddle Wait

**PTT & FSK**

Port **EXTFSK64**

☐ Invert Logic

**Radio command**

**TxBPF/TxLPF**

☒ Tx BPF Tap 48 f

☐ Tx LPF Freq 100 Hz

HAM Set Default(Demodulator) ? OK Cancel

# MMTTY Setup Menu

## Radio command button



- Set **Port** to **NONE**, Group to **Clear**

Radio command

Port definition

Port **NONE** Baud 57600 Char. wait 0 ms

Data length  
☐ 7bits  
☒ 8bits

Stop  
☒ 1bit  
☐ 2bits

Parity  
☒ None  
☐ Even  
☐ Odd

flow control  
☐ XON/XOFF  
☐ CTS

DTR/RTS  
☐ PTT

Commands

Init

Rx

Tx

Model **NONE** Polling interval 1 secs

Frequency offset  
☒ OFF ☐ LSB ☐ USB

Group **Clear** Load Save ? OK Cancel



# MMTTY Setup Menu, Misc Tab

- Set TX Port to **COM-TxD(FSK)**, click **USB Port**

Setup Ver1.68A

Demodulator | AFC/ATC/PLL | Decode | TX | Font/Window | **Misc** | SoundCard

Sound Card

FIFO  
RX 12 TX 4

Priority  
☐ Normal ☐ Highest  
☒ Higher ☐ Critical

Device Identifiers  
RX 0 TX 0

Source  
☐ Mono ☐ Right  
☒ Left

Clock  
11025 Hz Adj  
0.00 Hz  
Tx offset

Sound loopback  
☐ OFF  
☒ Int.  
☐ Ext.(SAT)

Tx Port  
☐ Sound  
☐ Sound + COM-TxD (FSK)  
☒ **COM-TxD(FSK)** **USB Port**

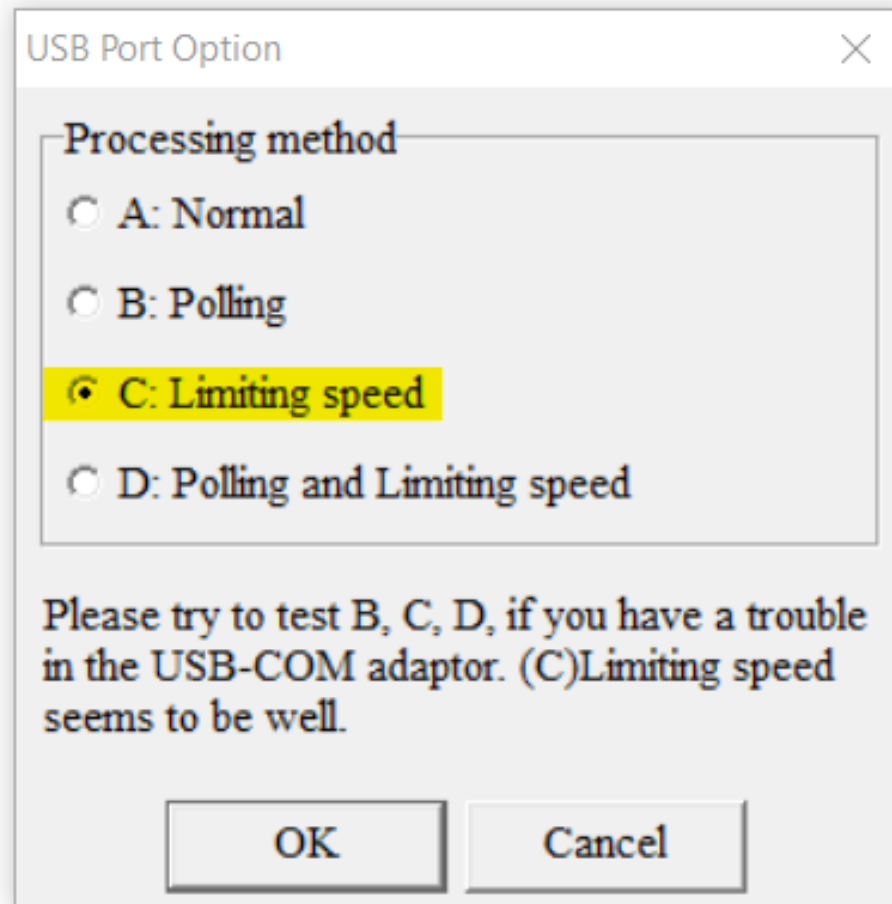
System Font  
Window Times New Roman Set 0  
Fixed pitch Courier New Set 0  
Japanese English

HAM Set Default(Demodulator) ? OK Cancel



# MMTTY USB Port Menu

- Set Processing Method to **C: Limiting Speed**





## EXTFSK Pop-Up Menu

- Select second COM Port, FSK=DTR, PTT=RTS

EXTFSK 2.0e

Port  Status:OK ☐

FSK output

☐ TXD

☐ RTS

☒ DTR

PTT output

☐ TXD

☒ RTS

☐ DTR

☐ Inv. FSK ☐ Inv. PTT 45 baud

# Serial Port Sharing and Conflicts



- In RS232 protocol, only **one** TXD line (Pin 3) can be connected between a PC and a Radio
- No other device may connect to Pin 3 if a PC is connected
- PC Polls radio on Pin 3 (TXD), Radio sends response on Pin 2 (RXD).
- AUTO INFO mode provides same output without PC polling
- Multiple devices (SteppIR & Baby Loop controllers, Band Decoders, Elecraft / ACOM / SPE amplifiers) may *monitor* the RXD line in parallel by only connecting to Pin 2.
- RF-Kit amplifiers require connection to *both* Pins 2 and 3



# Shameless Plug



- The N6TV “Serial Box” (S-BOX and S-BOX-USB with FTDI) provides parallel connections to a rig’s serial port via standard D-SUB cables:

<https://bit.ly/S-BOX>



- Connects rig to SteppIR controllers, ACOM amps, SPE amps, ...
- Includes *four* NPN keying circuits for rigs that do not support CW, PTT, or FSK keying via DTR or RTS, such as: Elecraft **KX2 KX3**, Yaesu **FT-1000MP FTdx3000 FTdx5000**, Kenwood **TS-590s TS-990s**, ICOM **IC-7600 IC-7700 IC-7800**, etc.

# Software for Sharing Serial Ports



- Software sharing: multiple programs simultaneously access the radio's rig control serial port
- Implemented by VE3NEA's [OmniRig](#) software
- OmniRig may be used by Win-Test, Writelog, HDSDR, WSJT-X, Log4OM, etc. for rig control
- But OmniRig is NOT supported by N1MM+, N3FJP, others
- OmniRig owns the serial port, acts as traffic cop, no collisions or conflicts between applications
- CW / PTT / FSK Keying via OmniRig port is not supported
- Consider [N4PY Pegasus Plus](#)  
Allows sharing of Radio COM port with up to five other applications
- Can I use VSPE instead? vspMgr? COM0COM?  
Maybe, but command collisions or VCP driver conflicts may occur

# Radios with both **USB** *and* **DE-9** connectors

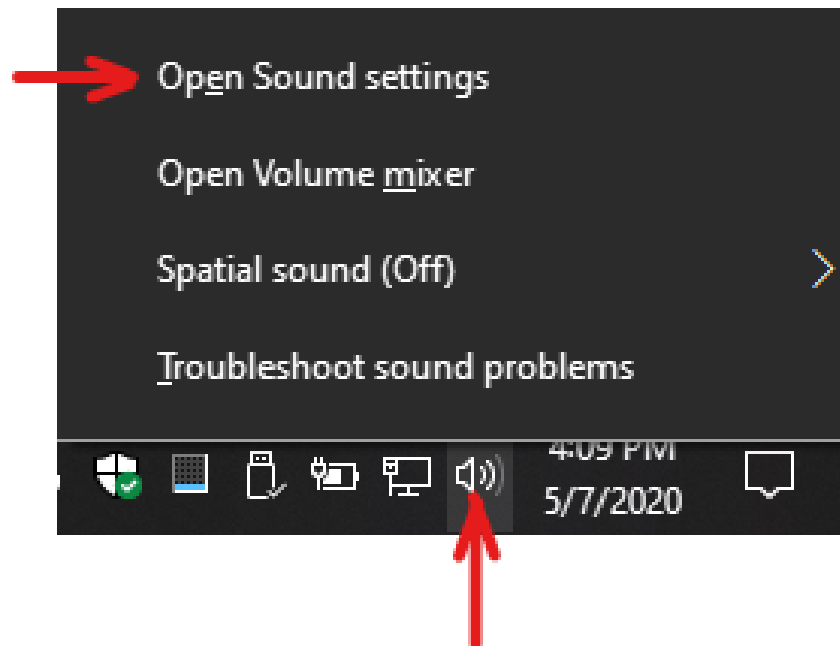


- Elecraft **K3S**, Yaesu **FTdx3000**: USB and Serial Port do not operate independently (must pick one)
- USB and Serial Port *do* operate independently in:
  - Elecraft **K4**
  - Kenwood **TS-590S**, **TS-890S**
  - Yaesu **FTdx101D**, **FTdx101MP**
- ICOM USB and CI-V Ports (3.5mm, not DE-9) mostly operate independently (if you set **USB CI-V Port** to **Unlink from [REMOTE]**)
- Two devices can poll the radio at same time via independent serial ports, one USB and one DE-9 or CI-V “REMOTE” connector

# USB connection to radio adds a new Windows Sound Card

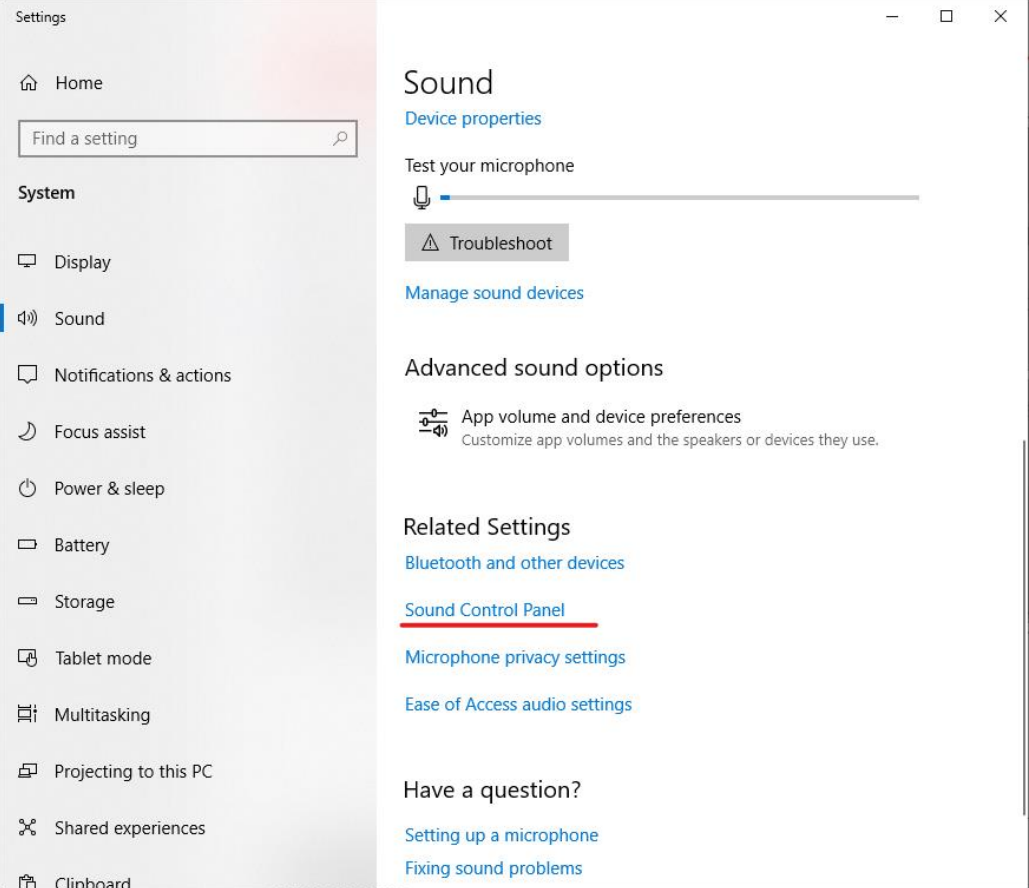
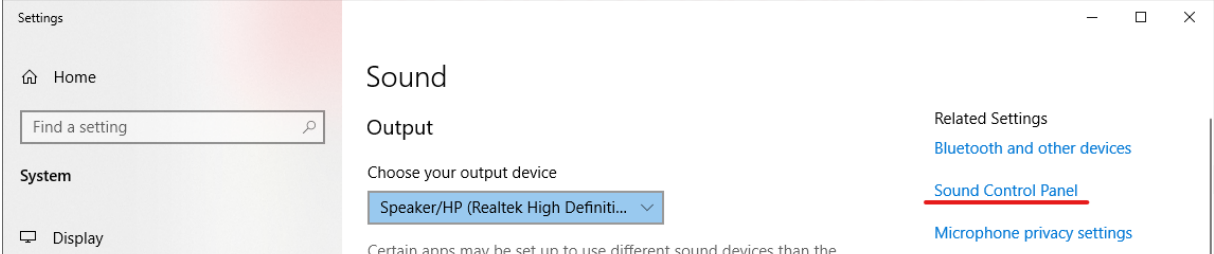


- **USB Audio CODEC**
- Can be use for contest recording, voice keying, RTTY / FT8 decoding
- Multiple “USB Audio CODEC” devices – which one is my radio?
- Right click on Speaker icon, then **Open Sound Settings**





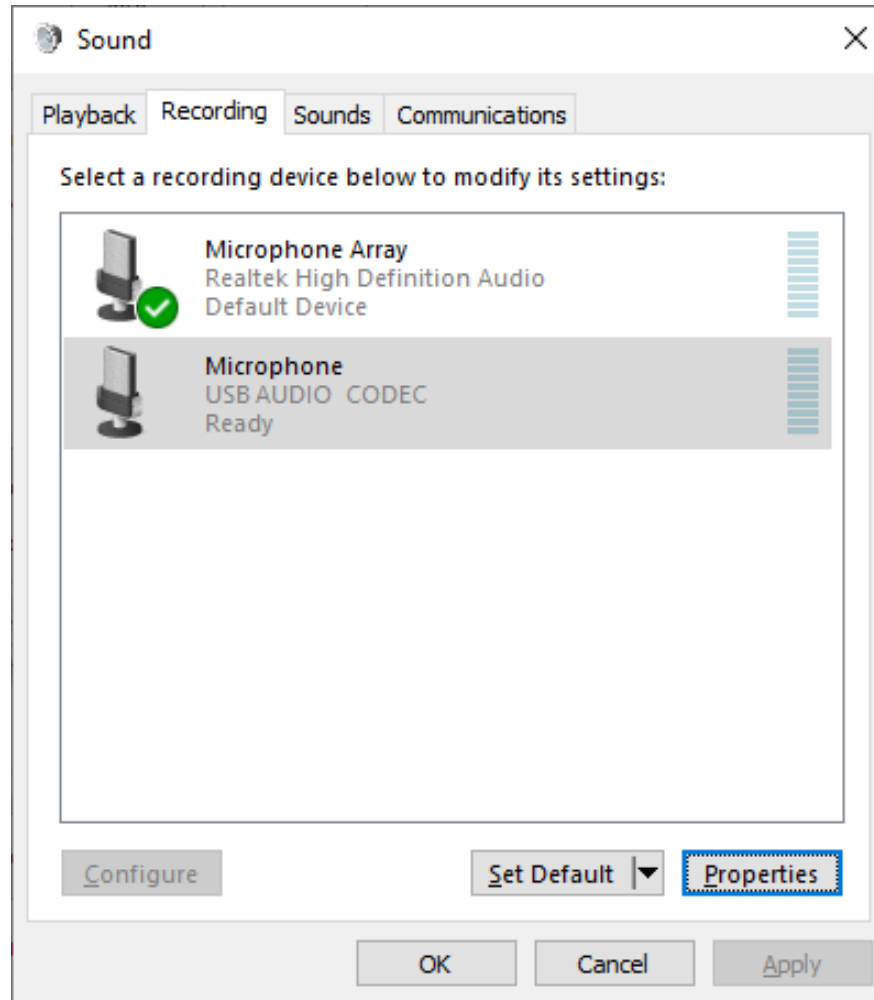
# Click Sound Control Panel



- **Faster way:**  
**Windows Key**  
**+ R (run):**  
**mmsys.cpl**



# Windows Sound Control Panel, Recording Tab



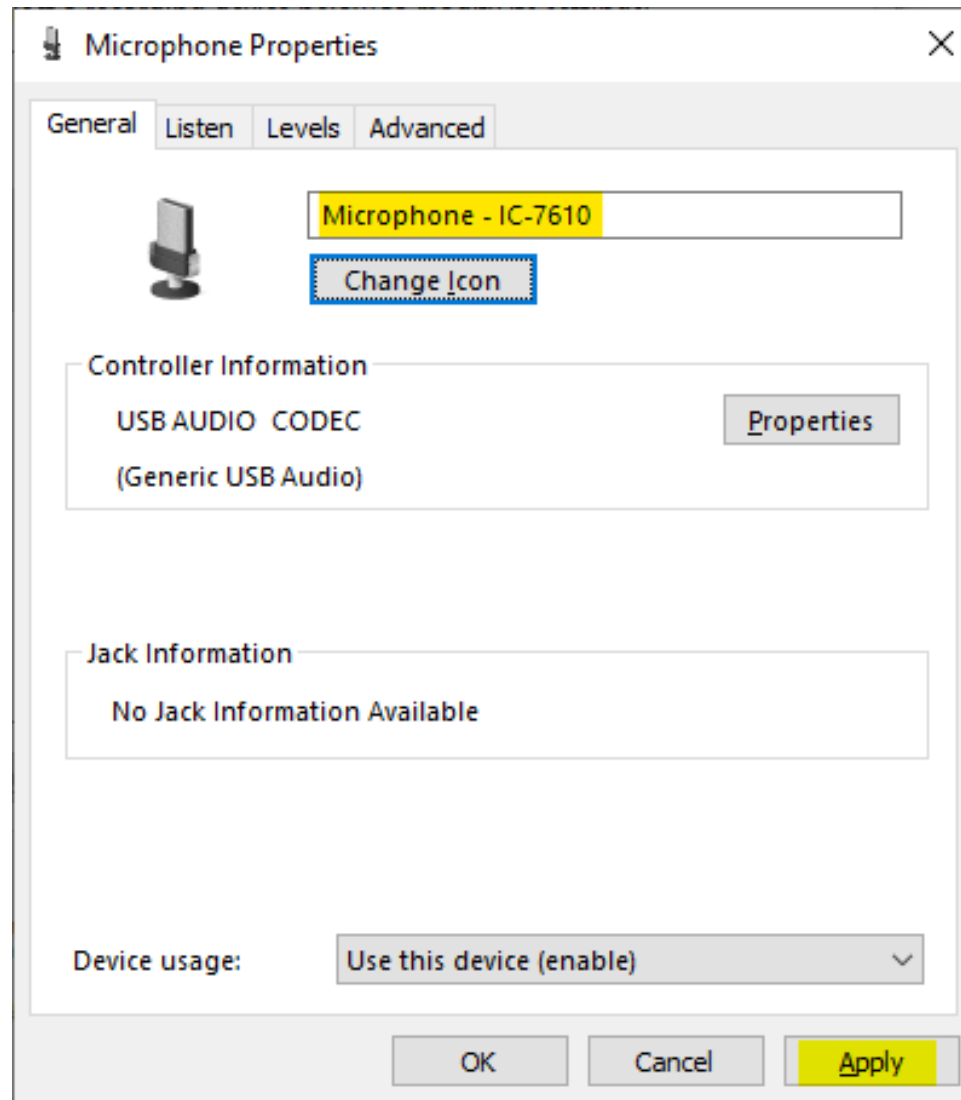
# In Sound Control Panel, which sound card is my radio?



- Watch **USB AUDIO CODEC** devices
- A device will disappear and reappear when you disconnect and reconnect the USB cable from the back of the radio
- Select that device, then click **Properties** button
- Label both the **Recording** and **Playback** tabs with name of device, click **Apply**



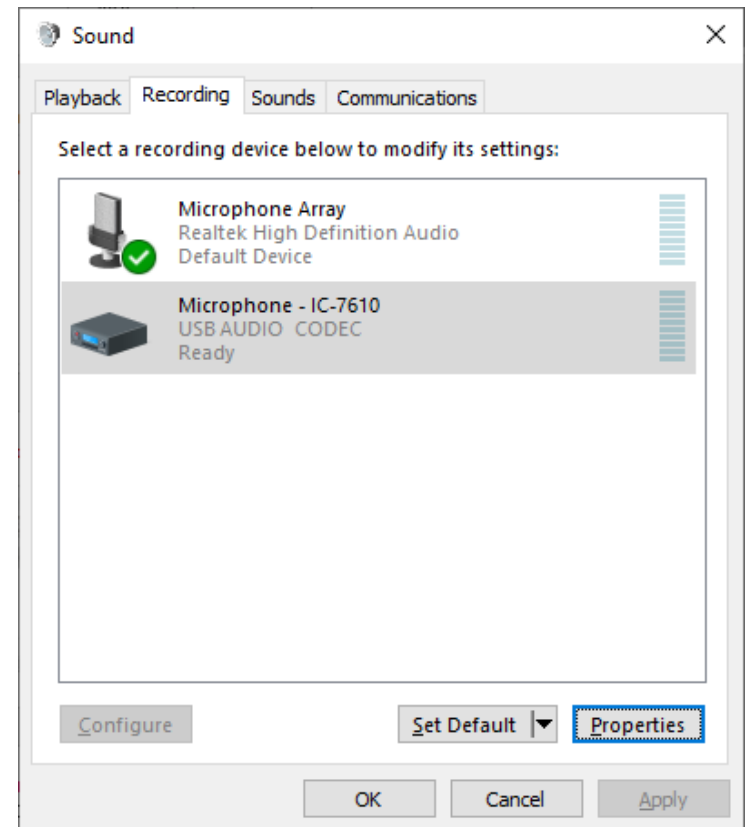
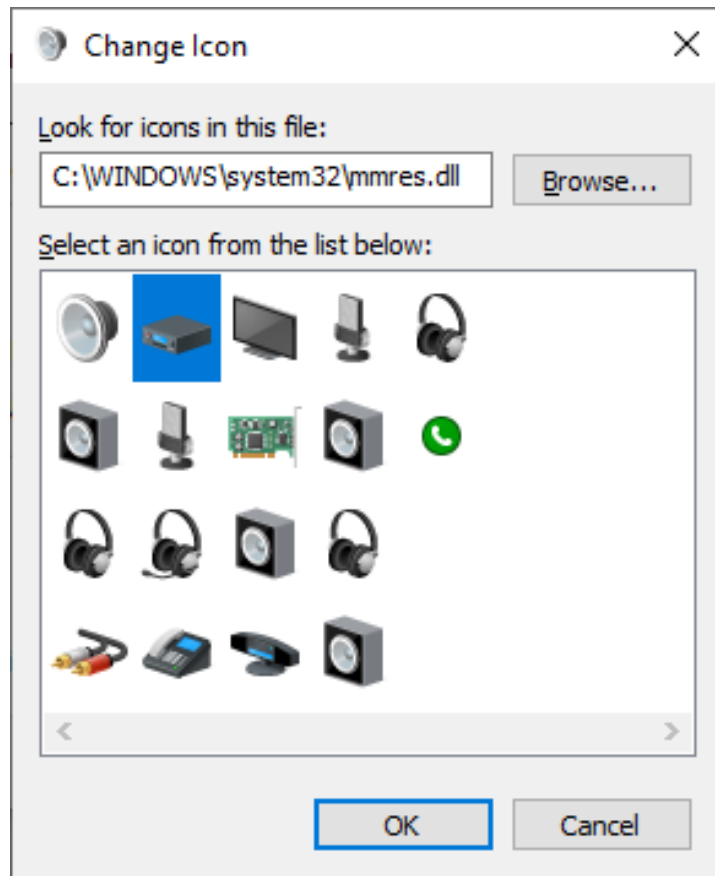
# Change Label and Icon of USB Audio CODEC







# Change Icon of USB Audio CODEC Device



# Key Points to Remember



- Use the Windows Device Manager to manage and renumber COM ports
- Always uninstall Prolific devices and drivers
- Always change the FTDI Default Options
- Consider labeling COM ports using Registry Editor
- Try CW, FSK and PTT via serial port pins
- Use DTR for CW/FSK, RTS for PTT
- Understand serial port conflicts and sharing
- Label your USB Audio CODEC devices



# References

- <http://www.qrz.com/db/n6tv> - Links to this and other presentations
- [https://www.nirsoft.net/utils/usb\\_devices\\_view.html](https://www.nirsoft.net/utils/usb_devices_view.html) - USB Device
- <https://docs.microsoft.com/en-us/sysinternals/downloads/process-explorer> - Windows Process Explorer
- <https://bit.ly/S-BOX> - The “Serial Box” by N6TV
- [n6tv@arri.net](mailto:n6tv@arri.net)

# Questions?

