

## **TECHNICAL NOTES**



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Article applies to - iKonvert, GPS160 and ST-NMEA Converter

## ISSUE: Updating Firmware on STM32 based Products

Some Digital Yacht products feature an STM32 microprocessor that can be firmware updated, by running a simple STM32 Flash Loader program on any Windows PC, which can be downloaded from here...

https://digitalyachtamerica.com/download/stump-updater-program/

If you have a USB version, of one of these products, then you can update the firmware through the USB connection, if you have an ISO/NMEA0183 version then you will need one of Digital Yacht's USB to NMEA Adaptor cables or similar 3<sup>rd</sup> party cable.

## **Update Procedure:**

To update the firmware, first remove power from the product to be updated. Next gain access to the PCB and locate the Boot Mode "Jumper" that is located on each of the products as shown below...







NOTE – Jumper is on underside of GPS160 PCB

Move the "Jumper" from the **Normal** to the **Flash** position, as shown.

When the product next powers up, the STM32 microprocessor will be in a special boot loader mode where it is ready to receive the firmware update.

Now connect the product to the Windows PC. If it is a USB product, simply plug the USB cable in to the PC, but if the product is an ISO/NMEA0183 version, then you will need to connect it to a Digital Yacht USB to NMEA Adaptor cable as shown below.



The diagram shown is for at ST-NMEA Converter but the wire colour connections are the same for iKonvert and GPS160.



Plug the USB connector in to the Windows PC and as long as the PC is connected to the internet or it already has the USB driver loaded, it should allocate a COM port to the USB connection.

To check what COM port it has been allocated, go to the Windows Device Manager and in the **Ports (COM & LPT)** section, you should see an entry "USB Serial Port (COMx)", as shown below...



Apply power to the product, please note that no LEDs will illuminate in this Boot Loader mode, and run the STM Flash Loader Tool, which should see the window shown in Figure 1.

Now select the COM Port number that the USB cable has been given by Windows, select 38400 baud (most reliable) and ensure that Parity is set to "Even". Once happy with the settings, click the "Next" button

🧼 Flash Load	er Demonst	rator		_		$\times$
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Select the con connection. Common for Out UART Port Name Baud Rate Data Bits	mmunication all families COM25 38400 8	port and set	Parity Echo Timeout	Even Disabl	it to open	
	<u>B</u> ack	<u>N</u> ext		<u>C</u> ancel		lose
		Figu	re 1			

If the program can successfully communicate with the microprocessor, then you will see the window shown in Figure 2, with a "green traffic light" icon shown.



Figure 2

If you get an error message saying that the target could not be reached, close the program, unplug the USB cable, power off the Digital Yacht device, ensure the jumper is definitely set to the "Flash" position, plug the USB cable back in and power back on the Digital Yacht product.

Once communication is established and you have the "green traffic light", click the "Next2 button and you should see the screen in Figure 3.

🧼 Flash Loa	Flash Loader Demonstrator				$\times$		
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Please, sele	ct your device in the	target list					
Target	STM32F1_XL-den	isity_1024K		-			
PID (h)	0430						
BID (h)	2.1						
Version	30						
version	10.0						
Flash mappir	lg		1	1-1-			
Name	Start address	End address	Size		4^		
Nage0	0x 8000000	0x 80007FF	0x800 (2K)	별별			
Nage1	0x 8000800	0x 8000FFF	0x800 (2K)				
🛛 👒 Page2	0x 8001000	0x 80017FF	0x800 (2K)	66			
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🛛 🦠 Page4	0x 8002000	0x 80027FF	0x800 (2K)	88			
🔷 💊 Page5	0x 8002800	0x 8002FFF	0x800 (2K)	88			
💊 Page6	0x 8003000	0x 80037FF	0x800 (2K)	66			
💊 Page7	0x 8003800	0x 8003FFF	0x800 (2K)	66			
🔷 🦠 Page8	0x 8004000	0x 80047FF	0x800 (2K)	66			
🛛 🦠 Page9	0x 8004800	0x 8004FFF	0x800 (2K)	88			
🛛 🦠 Page10	0x 8005000	0x 80057FF	0x800 (2K)	66			
💊 Page11	0x 8005800	0x 8005FFF	0x800 (2K)	66	× .		
Legend :	🕒 Prote	cted	UnProtected				
	Back	Next	<u>C</u> ancel		ise		

Figure 3

This screen is purely informative, showing the microprocessor device type and the memory pages that will be programmed, so just click the "Next" button and the screen in Figure 4 will be displayed.

🧼 Flash Loader Demonstrator		_		×		
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© AI	C Selection					
Download to device Download from file						
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@ (h) 8000000						
Optimize (Remove some FFs) Verify after download						
Apply option bytes						
O Upload from device						
C Enable/Disable Flash protection						
DISABLE V	RITE PROTECT	TION _	-			
C Edit option bytes						
<u>B</u> ack	<b>xt</b> <u>C</u> a	ancel		lose		

Select the "Download to Device" option and then select "Global Erase" which will clear all existing settings. Then click on the square button with the three dots ... in it and browse to and select the latest firmware update BIN file. It is important that you have unzipped the update firmware file and you must remember to select BIN as the file type in the browse window – see Figure 5.

🧼 Open		×
← → ヾ ↑ 🕹 › Th	PC > Downloads ~ Ö	,○ Search Downloads
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🗊 3D Objects	> Today (1)	
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Documents	STM32F103-iKonvert NavLink2 v2 22.bin	27/04/2020 10:10 BIN File
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File <u>n</u>	me: STM32F103-iKonvert_NavLink2_v2_22.bin	Bin Files (*.bin) ~   Qpen Cancel

Figure 5

Once the correct firmware update file is selected click the "Open" button and you will be returned to the screen in Figure 4, which the file name in the "Doenload from file" box.

Now click the "Next" button and the programming will start. A status bar will show progress (Figure 6) and once complete the bar will turn green if everything was successful (Figure 7).

I Flash Loader Demonstrator - X	🧼 Flash Loader Demonstrator — 🗆 🗙			
life.augmented	life.augmented			
Target STM32F1_XL-density_1024K Map file STM32F1_XL-density_1024K.STmap	Target STM32F1_×L-density_1024K Map file STM32F1_×L-density_1024K.STmap			
Operation DOWNLOAD File name C:\Users\Paul\Downloads\STM32F103-iKonvert_NavLink2_\	Operation DOWNLOAD File name C:\Users\Paul\Downloads\STM32F103-iKonvert_NavLink2_\			
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Downloading data 16% Download operation finished successfully				
<u>B</u> ack <u>N</u> ext <u>C</u> ancel <u>C</u> lose	Back Next Cancel			
Figure 6	Figure 7			

As soon as the programming is successfully finished, you can click the "Close" button, remove power from the Digital Yacht product, unplug the USB cable and re-assemble the unit.

**IMPORTANT** – don't forget to replace the "Flashing Jumper" back to the "Normal" position, before reassembling the product.

## Additional Note for iKonvert:

The iKonvert has a number of settings stored in the flash memory that are overwritten during the "Global Erase" of the firmware update procedure. The most important one is the serial number which needs to be unique. After a firmware update on an iKonvert, please run the iKonvert Command Reference App, which will automatically detect that the iKonvert has no serial number and give you the option of setting the serial number and version of the iKonvert (ISO or USB).

Ensure the STM Flash Loader tool is closed and run the iKonvert Command Reference App...

iKonvert Command Reference App v1.30 by Digital Yacht	_	×
Connection Tools Generator Help		
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Connec Initialize the Gateway 230400		

Now click the second button/icon from the left to initialise the gateway...

iKonvert Command Reference App v1.30 by Digital Yacht	_	$\times$
Connection Tools Generator Help		
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🔳 iKonvert 🛛 🗙		
Programming iKonvert Serial Number		
Choose Device Type:		
ISO USB		

Select the relevant device type for the iKonvert you are using but clicking the "ISO" of "USB" button...

📧 iKonvert Command Refer	ence App v1.30 by Digital Yacht	t –	_		×
Connection Tools Genera	ator Help				
🚳 🗞 🔌 (	0000	S 1	SEND		
Connected to COM25 : Connected to COM25 : \$PDGY,TEXT,Digital_Y ode:15 \$PDGY,000000,,,,, \$PDGY,000000,,,,, \$PDGY,000000,,,,, \$PDGY,000000,,,,, \$PDGY,000000,,,,, \$PDGY,000000,,,,, \$PDGY,000000,,,,,	230400 230400 Tacht_iKonvert_v2_22_d Image: iKonvert Serial Number Programm AB-280420-063771,USB	#AB-2	8042	0-6377	1_M
Bus Load: , Devices Online: , Up	otime: sec, Address: , Rejected	TX PGN	l's:		

Now your iKonvert has been fully updated and re-configured and is ready to be used.