Dan Ambrose d/b/a EnecsysParts.com 12614 Bradford Woods Saint Louis, Missouri, USA, 63127 Facetime: dambrose @ amcominc.net Email: support@enecsysparts.com OCTOBER 11, 2018 - EBL OVER THE AIR EM250 FIRMWARE UPDATE INSTRUCTIONS

Introduction - Enecsys generation 1 one inverter(s) were manufactured with Telegesis ETRX2 zigbee modules. A low power 2.4GHz ISM band transceiver based on the Ember EM250 single chip ZigBee/IEEE802.15.4 solution. By 2012 Enecsys had abanonded this hardware without mature software. By Jan 2016 Enecsys went out of business. Enecsys made 240, 360 and 480 watt variants that look like this.



Technical Background - The *Telegeses* ETRX2HR-PA is Zigbee WIFI radio unit has a 128k of program flash space and runs with the Ember ZNet5.0.1 stack. Software is developed in the C language using the xIDE compiler which creates "EBL" firmware files. There is an EBL (Ember Bootloader) in this chip that can be flash updated OTA (over the air). Each radio unit has a unique 64 bit



MAC address. (The inverter serial no is the lower 32 bits.) The EBL is a 802.15.4 based, single-hop MAC layer RF protocol (ember AN760). The IGS windows app has an EM250 engineering console that creates a virtual an OTA bridge (via the USB gateway) which reliably flash updates the targets OTA. This is the USB gateway.





IGS EM250 OTA EBL FIRMWARE UPDATE STEPS

Open the EM250 engineering console. From main menu go to TOOLS | EM250 Engineering Console. Click **OTA EM250 Bootloader** tab.

1) Click "Set the OTA EM250 EBL firmware file" Type C:\IGS and press enter. Look for Firmware folder and double click it. Look for the firmware file em250-inverter.ebl and double click it. You should be back at the OTA bootloader tab screen. Screen must say "You have chosen this file for em250 OTA inverter firmware:" ... File (em250-inverter.ebl)



2) Click the **Set MAC** button to choose/set the OTA target inverter. EM250 ETRX Node List dialog box appears. The list is sorted by serial number which is the lower 32 bits of the 64 bit MAC address. Choose the EM250 target by double clicking. You should be back at the OTA bootloader screen and the desired MAC address and serial number should appear in bottom left corner. (*In the alternative you can manually type the 16 digit MAC address in the field on right side of Set MAC button*).



3) Click the **QUERY VERSION** button. This will query and unlock the target. QUERY firmware version

****** EM250 FIRMWARE VERSION 1.59 ********* Serial no. 2050014163 has em250 firmware Ver 1.59 ********** EM250 FIRMWARE VERSION 1.59 ********

When you see the above banner continue to next step.

4) Click Start - EM250 OTA Bootloader button. The bootload start process will run for 10 seconds. Its like a starter on a 1970s car in very cold weather. It turns over slow. Sometimes it starts up right away. If everything works you should see obvious activity with a bar graph appearing and progressing to 100% within 4 minutes.

🙂 EM250 Gateway Enginerring Console		
USB Bootloader USB Settings OTA EM250 Bootloade	OTA EM250 Settings	v1.54 CN:11 01h 03m 43s
Receive ACK Block:1030 of 150 Sending OTA Block:1031 of 150	1 (68%) RSI:51 (2m 11s) 1 (68%)	Clear Screen
Receive ACK Block:1031 of 150 Sending OTA Block:1032 of 150	1 (68%) RSI:51 (2m 11s) 1 (68%)	Query Brod
Receive ACK Block:1032 of 150 Sending OTA Block:1033 of 150	1 (68%) RSI:51 (2m 12s) 1 (68%)	Query EUI
Sending OTA Block:1033 of 150 Sending OTA Block:1034 of 150	I (68%) RSI:5I (2m 128) I (68%) I (68%) DSI:51 (2m 12c)	
Sending OTA Block:1035 of 150 Receive ACK Block:1035 of 150	(68%) RSI:46 (2m 12s) 1 (68%) RSI:46 (2m 12s)	
Sending OTA Block:1036 of 150 Receive ACK Block:1036 of 150	1 (68%) 1 (69%) RSI:46 (2m 12s)	
Sending OTA Block:1037 of 150 Receive ACK Block:1037 of 150 Sending OTA Block:1038 of 150	1 (69%) 1 (69%) RSI:46 (2m 12s) 1 (69%)	
Receive ACK Block:1038 of 150	1 (69%) RSI:46 (2m 12s)	
EM250 v1.59 00d 02h 31m 48s RSS	0 65382 PIC24 v0.0 00d 00h 00m 00s V	Vdt:9058s
2m 12s 69% NAK:11,132 BLK:103	18,14 BID:1038,14	Show Tools
Set OTA EM250 EBL firmware file C:\\GS	Firmware 2018-10-10\em250-inverter.ebl	
Stop - Cancel OTA Boot Loader	IDERY VERSION Autoru	n ^{Iode} JU
	Log-ver	bose
Set MAC 34c69a007a30bbd3	2050014163 Debug OK	Cancel signal strength

The closer you are the faster it runs. If it doesn't start or quits click Stop. Wait a few seconds then click start again. It should continue to 100% and look like this.

BM250 Gateway Enginerring Console			
USB Bootloader USB Settings OTA EM250 Bootloader O	TA EM250 Settings	<u>v1.54</u>	CN:11 01h 06m 36s
Receive ACK Block:1501 of 1501 (Receive ACK EOT: SN:2050014163 T	100%) RSI:52 (3m 10s) Total Blocks:1501		Clear Screen Erase Log
OTA BOOTLOAD SUCCESS ON 10/16/18 EM250 SN:2050014163 MAC:34c69a0 Zigbee EM250 firmware updated. (3 14:37:48 Verificati 107a30bbd3 target th 3m 10s) OK and p	on from OTA at all blocks rec assed checksum	Query Brod Query EUI
QUERY firmware version ••••••••••••••••••••••••••••••••••••	ION 1.59 ********** firmware Ver 1.59 ION 1.59 *********	Click QUERY VERSION to verify firmware version target is running	
EM260 v1.59 00d 00h 01m 51s RSSI 0 Stat 01h EM260 EM EM Remember Mar. CNGSErr	3538: PIC24 v0.0	00d 00h 00m 00s Wdt:110s	Show Tools
Stop - Cancel OTA Boot Loader QUE Start - EM250 OTA Boot Loader FACTORY	RY VERSION	 ✓ Auto run ✓ Turbo-Mode ✓ Log-verbose	
Set MAC 34c69a007a30bbd3 20	050014163 Debu	g OK Cano	e

When it finishes you will get a verification banner which says:

5) Click the **QUERY VERSION** button. This will query the target to confirm the new firmware version.

************ EM250 FIRMWARE VERSION 1.59 ********* Serial no. 2050014163 has em250 firmware Ver 1.59

*********** EM250 FIRMWARE VERSION 1.59 *********

When you see the above banner you are finished and well done !!!!

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