The Unofficial Guide to Installing Software on the Shumatech DRO-550

Version 2.0

November 25, 2009

By R. G. Sparber with help from S. Shumate

Copyleft¹ protects this document.

Disclaimer: Use these notes at your own risk. Although the author has made every effort to produce an accurate document, he assumes no responsibility for errors.

History

Version	description	
1.0.0	Gotta start someplace	
1.0.1,.2	Minor typo and format clean up	
2.0	Change to "unofficial"	

Table of Contents

History	1
Reminder Card	3
Scope	3
What you will need	3
Prepare the DRO for Connection to the PC for the First Time	4
Preparing the PC for Connection to the DRO for the First Time	5
Installing Software on the Shumatech DRO-550	14
Prepare the DRO for the New Software	14
Downloading the New Software From the Web Site to the PC	15

1 You are free to distribute this document but not change it.

Downloading the New Software from the PC to the DRO-550	17
Acknowledgement	20

Reminder Card

Once you are familiar with the software install procedure, you might find this reminder card useful:

DRO-550 Software Installation Procedure

- 1. on DRO: remove all cables, push down button, connect power for 15 second, release button, remove power
- 2. on PC: download software, plug in DRO, open SAM-BA and use it to install software, eject DRO (see footnote on page 20)

Scope

The processor on the DRO- 550^2 is programmed via a standard USB interface. This document explains how to get the latest version online and install it into the DRO. The first section deals with the one time task of getting and installing the program that runs on the PC which loads the DRO program into the DRO. The second section, which begins on page 14, deals with the actual loading of programs into the DRO once the PC has been set up.

Yes, this document is long but that is because we have assumed that the user has minimal experience with downloading software and program files. The work goes quickly.

Note: These directions were developed on a PC running Windows XP with Service Pack 3. If you are running a different operating system and get different screens, please let me know so I can update the document.

What you will need

- 1. [] A Personal Computer able to connect to a USB cable. I am using Windows XP with Service Pack 3.
- 2. [] Access to the Internet.
- 3. [] A USB cable with a USB-B connector on the end.
- 4. [] Your DRO-550.
- 5. [] A clear head and plenty of time to carefully go through these instructions. Lacking either of these resources can cause you to quickly go astray. It is far easier to do the steps right than clean the mess up later.

² When the DRO-350 is upgraded with the lite version of the DPU-550, the resulting machine has a subset of features found in the full DPU-550 as noted in this document.

Prepare the DRO for Connection to the PC for the First Time

1. [] Disconnect all cables from the DRO.



2. [] Push down on the reset button which is located next to the USB jack. Note that no power is being applied to the DRO.



- 3. [] While holding down the button, connect power to the DRO.
- 4. [] Keep holding down the pushbutton for 15 seconds. Then you can release it and remove the power cable.
- 5. [] The DRO has now had its program memory erased and you are ready to install the new software. You may skip the procedure on page 14 since you just did it.

Preparing the PC for Connection to the DRO for the First Time

We need to do a few things on the PC before you can plug in the DRO. First, we must get a program that will be able to grab the latest version of DRO code and install it on the DRO. Second we need to let the PC "see" the DRO and understand how to talk to it.

Before you begin, close all programs on your PC except the one that access the Internet. We get the programs at

http://www.atmel.com/dyn/resources/prod_documents/Install%20AT91-ISP%20v1.12.exe

I know, that is a lot to type so I have made a shorter version. Your system *may* permit the use of this equivalent "tinyurl"

http://tinyurl.com/n93ybv

You should then see

File Dow	nload - Security Warning 🛛 🔀
Do you	want to run or save this file?
<u> </u>	Name: Install AT91-ISP v1.12.exe Type: Application, 2.94MB From: www.atmel.com <u>Bun Save Cancel</u>
۲	While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. <u>What's the risk?</u>

Click on Run.

This should cause the install program to be downloaded.

You may receive a warning like this



but just hit Run.

This should bring you to the Setup Wizard:



Click Next.

	License Agreement Please review the license terms before installing	AT91-ISP v1.1
Press Page Down to se	e the rest of the agreement.	
SOFTWARE LICENSE	AGREEMENT	^
Important- Read care	fully	
This is a legally binding subsidiaries and affilia a license to use the So peripherals ("Software	g agreement between Atmel Corporation, including its tes ("Atmel") and You ("You"). In return for acquiring oftware and related documentation and hardware s"), You agree to the following terms and conditions.	
1. Grant of License.		~

I just love these agreements. Either accept or you won't get the software you need. Tough choice: Doorstop or fully functional DRO. Let me assume you hit "I Agree".

They want to be sure you are sincere, so expect to see

AA	License Agreem	ant		
	Dieace review the	licence terms he	ore installing AT91	
	Piedse review the	license centis bei	ore installing A191	-10- 11.1.
teadme file				
*********	*****	#########	####	^
# Copyright Atmel Cor ###############	'poration (c)2008 ###################	#########	####	100
Note : AT91-ISP runs (under Windows 2000 and	1 XP and ONLY wi	th administrator pr	ivilege
AT91-ISP v1.12 includ	es:			
· SAM-BA v2.8 · SAM-PROG v2.4				
Both based on AT918	Boot_DLL 1.3.1 :			
-> AT91Boot_DLL.d			1090 G	~
you accept the terms	s of the agreement, click	I Agree to contin	ue. You must acce	pt the
greement to install AT	91-ISP v1.12.			
g				
oft Install System v2.	37			

Just hit "Next". You are in this mess way too far to back out now! (just kidding)

Note in the above screen shot that "SAM-BA" and "SAM-PROG" are mentioned. The processor used in the upgrade is of the "SAM" type. SAM stands for Smart ARM³ Micro controller . The "BA" stands for Boot Assistant. We will use the Boot Assistant to load our software into our processor inside the DRO. Be sure to always select SAM-BA and **not** SAM-PROG.

³ ARM has had a few meanings over the years. See <u>http://en.wikipedia.org/wiki/ARM_architecture</u> for details.

You will then be prompted to select the location of the folder that will hold the program.

A A	Choose Install Location
	Choose the folder in which to install AT91-ISP v1.12,
tup will install AT91-	ISP v1.12 in the following folder. To install in a different folder, click they folder. Click Next to continue.
wae and select and	and rolder, cick next to continue.
Destination Folder	
Destination Folder	ATMEL Corporation(AT91-ISP v1.12 Browse
Destination Folder	ATMEL Corporation (AT91-ISP v1.12 Browse
Destination Folder Et(Program Files)/ pace required: 27.0M pace available: 83.80	ATMEL Corporation(AT91-TSP v1.12 Browse) IB 58
Destination Folder – CAProgram Files/v vace required: 27.0M vace available: 83.80 off Install System v2	ATMEL Corporation(AT91-ISP v1.12 Browse IB 38

I strongly recommend you do not change what they suggest. Just hit "Next".

My first try at doing this install involved changing the destination folder. Things got so messed up that I had to delete all of it and start over. That does not mean that you can't figure it out, just that I didn't.

You will then be asked where you want to put the program in the Start menu.

AA	Choose Start Menu Fo	lder
	Choose a Start Menu fold	er for the AT91-ISP v1.12 shortcuts.
Select the Start Menu	folder in which you would like to	create the program's shortcuts. You
an also enter a name	to create a new rolder.	
Accessories	11919DF VI1113	
Administrative Tools		
Bonjour		
Coupons		
Cygwin Debut Video Caeturo	Cafhurra	
Debut video Capture Documents To Go Der	skton	
EPSON Scan	жор	
FairUse Wizard 2		
Garmin		
GNUARM		~
GNUARM Google Chrome		
GNUARM Google Chrome soft Tostall System v2	37	

Put it somewhere now that will make sense later. If you do not choose a folder, it will go in the Start menu next to all the other programs. That is what I did initially but later created a folder called DRO for it.

After a bit of activity, you should see

😚 AT91-ISP v1.12 Setu	p	
	Installation Complete Setup was completed successfully,	
Completed		
Show <u>d</u> etails		
Multi-Aft Teoret Contains (2) 07		
indiadus a lacal gystelli v2.gv	< Back Next >	Cancel

which tells you the programs have been installed. Hit "Next".

AT91-ISP	1.12 Setup	
11	Create shortcuts	
	SAM-BA Shortcuts	
	☑ <u>Desktop</u> ☑ Quick Launch Bar	
	SAM-PROG Shortcuts	
	♥ Desktop ♥ Quick Launch Bar	
Julisoft Install S	/stem v2.37	:> Cancel

You are being given four choices related to how you want to access the SAM-BA and SAM-PROG programs. You only need to access SAM-BA, so at least un-check the boxes related to SAM-PROG. You can have a shortcut put on your desktop and/or in your Quick Launch Bar (at the bottom of the screen) to bring up SAM-BA.

Pick what you want and then click "Next".

We are almost done. You should now see

😽 AT91-ISP v1.12 Setup	
	Completing the AT91-ISP v1.12 Setup Wizard It is strongly recommended you reboot the computer to complete the installation
	 Reboot now I want to manually reboot later
	< Back Einish Cancel

When they say "strongly recommend you reboot", obey. "Resistance is futile!" In the past I have ignored these suggestions and had other programs crash until I did as I was told.

You should have closed all other programs before starting the install so hitting "Reboot now" should not cause any trouble.

Once your PC is back up and running after the reboot, we are ready to connect the DRO to the PC via the USB cable. The first time you do this, the PC will see the DRO as new hardware and call up the Hardware Wizard. If you later plug the USB cable into a different USB port on the PC, it will probably run the Hardware Wizard again. Otherwise, the Hardware Wizard only runs once.



Connect the USB cable⁴ from the PC to the DRO's USB port. No other cables should be connected to the DRO. The USB will supply power and control.

⁴ An alternative is to use the RS232 port if it is has been connected as per the hardware install document. The communication settings are 57600 8-N-1, no flow control. The software upgrade instructions are identical to using the USB except that you select "COMx" instead of "/usb/arm0" in SAM-BA. RS232 is noticeably slower than USB. When using the RS232 port, you must power the DRO from its own plug-in power supply. The DPU-550 lite does not support this configuration.

You should see



Just click "Next".

You should then see



with the magnifying glass in the center of the window going around.

After a few seconds you will see

Found New Hardware Wiz	ard
	Completing the Found New Hardware Wizard
	The wizard has finished installing the software for:
	atm6124.Sys ATMEL AT91xxxxx Test Board
	Click Finish to close the wizard.
	< Back Finish Cancel

Click "Finish". You will see a "balloon" in the lower right corner of the screen saying that the hardware is now ready to use.

We are now ready to run "SAM-BA". Be careful to not select "SAM-PROG".

If you let the installer create a shortcut for SAM-BA, click on it. If you just put it into the program menu, then look for an entry marked "ATMEL Corporation" unless you renamed it. Follow the sub menus until you see SAM-BA. Click on it and see

🔚 SAM-BA 2.8		
Select the connection :	COM1	•
Select your board :	NO_BOARD	<u>•</u>
Connect	Ex	t

Click on the "Select the connection" menu and click on \usb\ARM0

SAM-BA 2.8	
Select the connection :	COM1
Select your board :	\usb\ARM0
	COM1
	СОМЗ
Connect	COM4
	1

Then click on "Select your board" and see

💽 SAM-BA 2.8		
Select the connection :	\usb\ARM0	•
Select your board :	NO_BOARD	-
Connect	AT91SAM7XC512-EK AT91SAM9260-EK AT91SAM9261-EK AT91SAM9263-EK	~

Click on "AT91SAM7S256-EK".

💽 SAM-BA 2.8	
Select the connection :	Nusb\ARM0
Select your board :	AT91SAM7S256-EK
Connect	Exit

Double check that you have picked the right board type and then click "Exit". This ends the one time PC set up procedure.

Installing Software on the Shumatech DRO-550

First we will prepare the DRO to accept new software. Then we will go on the Internet and get that new software. Finally, we will connect the DRO to the PC to enable the transfer.

Prepare the DRO for the New Software

1. [] Disconnect all cables from the DRO.



2. [] Push down on the reset button which is located next to the USB jack. Note that no power is being applied to the DRO.



- 3. [] While holding down the button, connect power to the DRO.
- 4. [] Keep holding down the pushbutton for at least 15 seconds. Then you can release it and

remove the power cable.

5. [] The DRO has now had its program memory erased and you are ready to install the new software.

Downloading the New Software From the Web Site to the PC

1. [] Go to <u>http://opendro.sourceforge.net/</u> and see



2. [] Click on "Download OpenDRO files". The first time you go to this site, the text will be blue. Subsequent visits will show the text in red as you see above.

3. [] Click on the file that starts with "opendro" and ends with ".bin"⁵. When I did it, I found

e Edit View Favorites Iools Help	🔍 🔻 Web Search 🔹	7 McAfee SiteAdvisor	 ▼ Bookmarks* ■ Settings ▼ Get More Add-ons ▼ 	⊇ Mail ▼ 🌑 My Yahoo! ▼ 🔛 Answers ▼ 😥 Game
Favorites & Free Hotmail & Suggested Sil Browse Files OpenDROby shumatech Summary Files Support Develop	✓ Web Search tes Prostate Car	C McAfee SiteAdvisor	▼ Pookmarks ■ Settings ▼ Settings ▼ Set More Add-ons ▼	🗟 Mail 🔹 🎯 My Yahool 🔹 🚱 Answers 🔹 😡 Game
Favorites 🙀 🔊 Free Hotmail 🏈 Suggested Sil Browse Files OpenDROby shumatech Summary Files Support Develop	es 🧧 Prostate Car	ncer Gleason Sc 🙋	Get More Add-ons •	🔊 - 🗆 🖨 y Pane y Safety y Took y 🖉
Browse Files OpenDRO by shumatech Summary Files Support Develop			h -	🔊 - 🗔 🚔 🛪 Page - Safety - Took - 🧭
OpenDRO by shumatech Summary Files Support Develop				Endo Saroch (Sop a
Summary Files Support Develop				Share >
Summary Files Support Develop				
- 122201 1212	10 100 13 12	22 33 13	NT 2 10223-110 10 10 1	10 10 10 10 10 10 10 10 10 10 10 10 10 1
penDRO is an open source project to develop	embedded softwa	re that runs on digi	al readouts (DROs) for lathes, m	ills, and other machine tools.
Browse Files for OpenDRO				
File/Folder Name	Platform	Size	Date	Notes/Subscribe
Newcost Files		2.53		
Newestrnes				
opendro-0.2.0 tar.gz	ARM	205.9 KiB	Mon Jun 29 2009 11:32	
All Files				
apendro				
G 0.2.0				
onondra 0.2.0 bia	4.04	93.4 Kip	Sup lup 29 2000 22-02	
upendro-u.z.o.bin	ARm	02.1 NB	3011 JUII 20 2003 23.02	
VDR0350-0.2.0.exe	1386	55.0 KiB	Sun Jun 28 2009 23:02	
opendro-0.2.0.tar.gz	ARM	205.9 KiB	Mon Jun 29 2009 11:32	
0.1.1				
drivers				

I clicked on opendro-0.2.0.bin. Always select the .bin file with the highest version number. For example, pick opendro-1.0.0.bin over opendro-0.2.0.bin.

4. [] You will be prompted to provide the location to save this file. Put it in some sensible place so you can find it later. You may want to write down the file name to insure that you later install the right one. Click "Save".

⁵ The DRO program is written in a high level language which is processed by a program called a compiler. It generates a file that is compatible with our processor. This file is called a "binary" hence the .bin extension. You can also see a file with "tar.gz" as the extension. This is a collection of files that make up the high level language DRO program. Advanced users can modify these files and change the behavior of the DRO. By running it through the compiler, they will generate a new .bin file.

5. [] In less than two seconds (on a cable modem) you will see

Download complete
Download Complete
opendro-0.2.0.bin from softlayer.dl.sourceforge.net
(**************************************
Downloaded: 82.0KB in 1 sec
Download to: C:\cygwin\bin\opendro-0.2.0.bin
Transfer rate: 82.0KB/Sec
Close this dialog box when download completes
<u>Open</u> Open <u>F</u> older Close
SmartScreen Filter checked this download and did not report any threats. <u>Report an unsafe download.</u>

6. [] Click on "Close". The file is now stored on your PC. You are now ready to go to the next procedure which will move the file from the PC to the DRO.

Downloading the New Software from the PC to the DRO-550

- 1. [] With the newly erased DRO in hand as produced by the procedure found on page 14, connect it to the USB cable going to the PC. No other cables should be connected.
- 2. [] Start up "SAM-BA" either by clicking on a shortcut or finding it in the menu. On the menu, look for the ATMEL Corporation entry and follow the sub menus to "SAM-BA v2.8".
- 3. [] You should now see

🔄 SAM-BA 2.8	
Select the connection :	VusbVARM0
Select your board :	AT91SAM7S256-EK 💌
Connect	Exit

if you set up the program and USB correctly. If you do not see this window, revisit the first half of this document. If you get the window but the menu items are not as shown, click each down arrow and select the correct items.

4. [] Click on "Connect".

5. [] The SAM-BA window should now come up

/

💽 SAM-BA 2.8 - АТ	91SAM7S256-EK					
File Script File L	.ink Help					
AT91SAM7S512 Mem	ory Display					
Start Address : 0x2000 Size in byte(s) : 0x100	000 Refresh	Display format Cascii C 8-b	it 🔿 16-bit 💌 32-	bit		
0x00200000	0x40480200	0x21004AB3	0xD5020403	0x40500040		^
0x00200010	0x0040E000	0x04093101	0x0C000400	0x29080C09		Ξ
0x00200020	0x4770D3F2	Ox6941491C	OxD5FC0792	0x477061C8		
0x00200030	0x49A948AA	0x3801E000	0x07D2694A	0x2800D402		
0x00200040	OxEOO5D1F9	0xD0032800	0x06006988	0x47700E00		
0v00200050	0v20014983	0v20FF7048	0v85F34770	0v2600100F		>
Download / Upload File Send File Name : Receive File Name : Address : 0x100000 Size (For Receive File) : 0x1000 Scripts Disable BrownOut Detector (GPNVM0)						
loading history file 0 events added						
(AT91-ISP v1.12) 1 9 (AT91-ISP v1.12) 1 9	6 6	s, (103, (123))			\usb\ARM0 Board : AT91S	AM7S256-EK

6. [] Click on the folder icon to the right of the "Send File Name:" small window.

7. [] Navigate to the location that holds the ".bin" file that you just downloaded. Click on it. The path to this file should appear in the small window to the left of the folder you clicked.

💽 SAM-BA 2.8 - AT	91SAM7S256-EK					
File Script File L	.ink Help					
AT91SAM7S512 Mem	ory Display					
Start Address : 0x2000	000 Befresh	Display format				
Size in byte(s) : 0x100		🗋 🔿 ascii 🔿 8-b	it 🔿 16-bit 🖲 32-	bit		
0x00200000	0x40480200	0x21004AB3	0xD5020403	0x40500040		~
0x00200010	0x0040E000	0x04093101	0x0C000400	0x29080C09		
0x00200020	0x477003F2	0x694A49AC	OxD5FC0792	0x477061C8		
0x00200030	0x49A948AA	0x3801E000	0x07D2694A	0x2800D402		
0x00200040	0×E005D4F9	0xD0032800	0x06006988	0x47700E00		
0v00200050	0v20014983	0v20FF7048	0v85F34770	0x2600100F		>
Flash SRAM						
- Download / Upload	File					
Send File Name :	C:/cygwin/bin/opend	Iro-0.2.1.bin		2	Send File	
Receive File Name :				2	Receive File	
Address :	0x100000 Size	e (For Receive File) : [0x1000 byte(s)		Compare sent file with memory	
Scripts						
Disable BrownOut D	etector (GPNVM0)	Execute	1			
,						
loading history file	0 events added	2 (71-0 4 12)				<u>^</u>
(AT91-ISP v1.12) 1 9	ay active (108.4.1 %	.37 (88.4.13)				
(AT91-ISP v1.12) 1 9	6					
					\usb\ARM0 Board : AT91S	AM7S256-EK 🔍

- 8. [] Click on "Send File".
- 9. [] You will see



10. [] Click "Yes".

11. [] Then you will see



- 12. [] Click on "No".
- 13. [] In a blink of an eye, the file has been loaded into the DRO.
- 14. [] If you like, click on "Compare sent file with memory" to verify that the file arrived safely.



Click "OK". If you get a warning message saying the file and Memory area content do not match, try doing the download to the DRO again.

- 15. [] Close the program by selecting "File" found in the upper left corner of the window and then click "Quit".
- 16. [] You can now "eject"⁶ the DRO from the PC. In the lower right hand corner of the monitor's screen, you will find a small icon that looks like a green arrow pointing to the left over a gray plate. Move your cursor over it and you should see a square yellow tag that says "Safely Remove Hardware". Left click on the icon and you should see "Safely remove ATMELAT91xxxxTest Board". Left click on this text and the software should come back with a message saying it is now safe to unplug the device.
- 17. [] Disconnect the DRO from the USB cable.
- 18. **Congratulations!** You can now bring your updated DRO back into your shop and reconnect all cables.

Acknowledgement

I would like to thank Larry Gill for reviewing this document. I could not ask for a better friend.

⁶ This tells the PC that you want to pull the cable so it should stop talking with the DRO. Failure to do this step can cause damage to both SAM-BA and the program you just loaded into the DRO.