Digi-SFT Quick Start Guide

Welcome to Digi-SFT!

This tutorial provides a very simple and quick introduction to the Digi-SFT workflow by walking you through the creation and operation of a simple set of Modbus points. Once you are done with this tutorial, you will have a general knowledge of how to monitor and control your system through the Digi-SFT application.

This tutorial takes less than 30 minutes to complete.

You can always refer to the *Digi-SFT User's Guide*, distributed with the software, which provides comprehensive tutorials that highlight a wider range of features and programming techniques for a variety of daily needs.

As you may have noticed, the Digi-SFT system is Client/Server architected, so for information about constructing the server side of this system, please refer to these documents:

- 1. DSFT10-2141-0001 Server Install Instructions V1.10
- 2. DSFT10-2141-0004 SBM Install Instructions V1.00

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To complete this tutorial, you need the following software and resources on your PC.

Software or Resource	Version Required	
Digi-SFT client software	version 7.3.0	
Java Runtime Environment (JRE)	version 8 update>=111	
Internet access		
)



Download and install Digi-SFT

Go to http://digi-sft.bes-tech.net/ and follow instructions to install the current version of Digi-SFT

Login and view data

- 1. Run Digi-SFT, and input your username and default password assigned for you.
- 2. Click "LOGIN"

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🐓 Portfolio Login		
Digi-SFT	● Login ○ Admin	
Username uengineer Password	✓ remember Me ✓ save Password LO <u>G</u> IN	
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- 3. Background should turn white if login was successful
- 4. Choose Forms->Grid Display



5. Double click on any graphic object and you should see the graph window opened up.

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6. Right click on number box and select Trend plot



View and edit point definition

1. In Grid Display, "All Object Type" from right top, and check only "AI/AO/DI/DO", click "Select"



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Object Acronym	Cmd/SP/I	FB/MV/Ou	State/Ver	Status	Loc	Check All Clear All
MAOFFICE.RTU1.ZONE1.RMT		70.9 DEG		NORMAL		Please select
MAOFFICE.RTU1.ZONE2.RMT		65.6 DEG		NORMAL		EVI AL
OMAOFFICE.RTU1.ZONE3.RMT		72.9 DEG		NORMAL		₽ AI
MAOFFICE.RTU1.ZONE4.RMT		71.1 DEG		NORMAL		₩ AO
OMAOFFICE.RTU1.ZONE5.RMT		71.9 DEG		NORMAL		
MAOFFICE.RTU1.ZONE6.RMT	· ·	71.6 DEG		NORMAL		EDI
OMAOFFICE.RTU1.ZONE7.RMT		72.2 DEG		NORMAL		₩ DO
MAOFFICE.RTU1.ZONE1.DMP	40 %OPEN	40 %OPEN		NORMAL	NO	
MAOFFICE.RTU1.ZONE2.DMP	100 %OP	100 %OP		NORMAL	NO	
MAOFFICE.RTU1.ZONE3.DMP	20 %OPEN	20 %OPEN		NORMAL	NO	СВ
MAOFFICE.RTU1.ZONE4.DMP	20 %OPEN	20 %OPEN		NORMAL	NO	HW
OMAOFFICE.RTU1.ZONE5.DMP	20 %OPEN	20 %OPEN		NORMAL	NO	
OMAOFFICE.RTU1.ZONE6.DMP	20 %OPEN	20 %OPEN		NORMAL	NO	GRAPHIC
MAOFFICE.RTU1.ZONE7.DMP	20 %OPEN	20 %OPEN		NORMAL	NO	GENERIC SCHEDULE
OMAOFFICE.RTU1.CTRL.G	ON	ON		NORMAL	NO	
MAOFFICE RTU1.CTRL.W1	OFF	OFF		NORMAL	NO	ALARM_SCHEDULE
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2. From any from the filtered result set, right click on any and choose "View/Edit Object Definition"

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Session Forms Window	
DMAOFFICE.RTU1.ZONE3.RMT Object Definition	
Main Modbus Notes	
Acronym Type Building System Object OMAOFFICE RTU1 ZONE3	
Description 2nd floor open office	
Host Field Computer Host Controller OMAOFFICE HW.FIELD.COMP. OMAOFFICE HW.VIRTUAL.CO. Display Engrat Display Engrat	
DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I DISPLAY_ALL I D	
Trend Enable Trend Frequency (min) Trend Purge Interval (days) Image: Description of the state of the s	
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Created 2016-10-11 15:43:13 by BESTECH.ADMIN.FENG.HUANG (101) Modified 2016-10-11 15:43:13 by Object.Not.in.Profiles (0)	
<u>Save</u> <u>Cancel</u>	
Profiles Updated at: 12/06/16 01:43 PM, 6 minutes ago Logged in as: v	engineer @ Bes-Tech

- 3. This example is an AI point in Digi-IOS, let's go through 1st tab we have here:
 - a. *Acronym*: these 4 fields combined is a unique identifier in the system, each field is 15 character max length.
 - b. *Host hardware*: I/O points are managed in each Field Computer (Digi-SFM), so here we must choose a Field Computer in Host Field Computer drop box. Leave the Host Controller selection as default.
 - c. *Display*: Display priority has 3 options: ALL < Normal < Critical, this allows you to filter rows in Grid Display. Display sequence is a 0-10 number. Among all points sharing same "Building" and "System" acronyms, the points with smaller display sequence comes first.
 - d. Engineering Units and scaling:



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In AI type, the value read from slave devices will be scaled from [Input@Base, Input@Range] to [Eng. Unit Base, Eng. Unit Base], then multiplied by Gain Correction¹ and finally added with Offset Correction. This yields the Feedback Value.

In AO type, the Command Value will be multiplied by Gain Correction and then added with Offset Correction, and this yields the Feedback Value. Command Value scaled from [Eng. Unit Base, Eng. Unit Range] to [Output @ Base, Output @ Range], and this is the real value sending out. The Eng. Unit @ 0% and Eng. Unit @ 100% are used when writing a value in its percentage when you don't really care the actual number, and scaling can be done here by these 2 factors.

- 4. Now click on "Modbus" tab,
 - a. Device address : the slave address (first byte) in Modbus protocol, in decimal
 - b. Register number: the register number (4th, and 5th bytes), in hexadecimal.
 - c. Function code: 2nd type. For analog, options are Input Register and Holding Register
 - d. Type: target type to parse raw data bytes

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Session Forms Window	
See OMAOFFICE.RTU1.ZONE3.RMT Object Definition	
Main Modbus Notes	
Device address 1	
Analog	
Register number 102	
Function code Input Register(0x04)	
Type IEEE 754 Float	
Save Cancel	
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 In Grid display, you can right click on I/O points and select "Create New Object" or "Create Similar Object" to create new points.

¹ If you don't need this number, put 1.0 here. Default 0.0 will be treated as 1.0 as well.



Control points

- 1. You can control a point by set command value to it, and the Field Computer will take care of Modbus communication.
- 2. From Grid display, double click on a Analog Output point, in this example, it's a Digi-IOS's AO as Damper position.

Session Forms Window								
omaoffice.RTU4.ZONE1.DMP Field Information ロビ 図	-							
Command Value 40 %OPEN 40 %								
Object Lock Value Mormal O Medium O High O Lock out								
User Key Value Normal O Medium O High O Lock out								
Current Static Definition Values Eng. Unit Base 0 Eng. Unit Range 100 Eng. Unit @ 0% 0 Eng. Unit @ 100% 100 Volts @ Base 10000 Volts @ Range 20000 Gain Correction Offset Correction 0	=							
Save Static Definition ValuesTo DB								
Current Status STATUS_NORMAL Command Status STATUS_NORMAL Report								
Last Written By OMAOFFICE RTU4 ZONE Z1_CNTRL Last Written Date 2016-12-06 Last Written Time 14:33:48 Last Written Attributes <u>View</u> <u>Set Refresh Cancel</u>								
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- You can see here the current command value is 40, and slave device applied it so the feedback value is also 40.
- 4. AO can be written by either a User or a CB. The "Last Written By" item shows the subject who recently wrote to it. In this example it's a CB. If a CB is routinely writing to AO, then user will need to set the "Object Lock Value" higher than Normal, because a CB by default holds Normal key, and when AO's Lock Value is higher than CB's Key Value, writing will not take effect. This gives user right to override points.

View and edit control blocks

- A Control Block (CB) in Digi-SFT is a piece of program. User writes code in distributed control language (DCL), to control I/O points. In this section, we'll demonstrate how to create and code a CB, and then compile and run it. Our goal here is to let Digi-IOS²'s BO0 flashes through a simple CB.
- 2. In Grid Display, create a DO object with:

² This example requires using a Digi-IOS 1014/1018



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Save

Cancel

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IGI.SFT.10	14.BO0 Obje	ct Definition		🛛 🖬 🛂 Object Definition	[
in Mod	bus Notes	3		Main Modbus Notes	
ronym uilding Gl	System SFT	SubSystem Object 1014 BO0	Type Do	Device address 2	
scription				Register number 0 Function code Coil(0x01)	
st Field C	omputer DG.PHASE1	Host Contro	ller ST.CONTROLLER	Offset	
splay Prio SPLAY_A	ority LL	Display Sequence	e Display Format		
end Enat	ble Tren	d Frequency (min) Tre	nd Purge Interval (d	(5)	
ck Value	LK_NORM	IAL 🔻			
g. Unit @	0 OPEN	💌 Eng. Unit @	1 CLOSED	-	

3. Click Save Button. And double click on BO0, click on each of the 2 options of the Command Value, observe that Digi-IOS's BO0 LED flashes³ on and off.

Cancel

Save

4. Create a CBK object with information:

Acronym Building System SubSy DIGI SFT 1014 Description Host Field Computer SYSTEM.BLDG.PHASE1.FIEL Display Priority D DISPLAY_ALL ₹ 3	System	Object CTRL_BOO It Controller SI.SFT.TEST.C Sequence	Type CB CONTROLLER Display Format	•
Host Field Computer SYSTEM.BLDG.PHASE1.FIEL Display Priority D DISPLAY_ALL	Hos DIG Display S 3	t Controller GI.SFT.TEST.C Sequence	CONTROLLER Display Format	•
Display Priority D DISPLAY_ALL)isplay S 3	Sequence	Display Format	
			0	-
	iency (m	30	urge mervar (u	ays
Lock Value LK_NORMAL Input Eng. Unit % Powerup State STATE_ACTI Is Library CBK	 Key Out 	r Value Iput Eng. Unit	K_NORMAL	
View/Ed	dit Sourc	ce Code		
Created Modified				

- Click Save button, and then locate the newly created CBK object and right click, choose "Edit Control Block/Schedule".
- 6. In the blank text area, right click, and choose "Insert CB Code Skeleton".

³ In Digi-IOS, LED for each BO will be ON when its relay is energized and closed.



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7. Type ⁴in the following source code in to the skeleton: D0 bo0 = [DIGI.SFT.1014.B00];

```
activate(){} // End activate
resume(){} // End resume
main()
     while(1){
            if(bo0.getValue()==OPEN){
                  bo0.setCommand(CLOSED);
            }else{
                  bo0.setCommand(OPEN);
            }
            delay(3);
      }
```

```
} // End main
```

{

deactivate(){} // End deactivate shutdown(){} // End shutdown

- 8. The code here is quit straight forward. It first declares a reference to the BO0 object, then in the main function, while loops forever for setting the opposite command to the BO0 object, in every 3 seconds.
- 9. After typing, choose File > Compile and Save, then close the editor. Observe that Digi-IOS 1014's BO0 Led is flashing in every 3 seconds.
- 10. To stop the CBK, double click on it in Grid Display and from the State options, choose Deactivate.

⁴ Most of the methods names can be inserted from right click pop up menu.



Input Value 1267650 %	Output Value 12676 %					
State						
 Resume Activate Restart Deactivate Shutdown Stop 						
Object Lock Value	○ Medium ○ High ○ Lock out					
User Key Value						
Normal	○ Medium ○ High ○ Lock out					
Object Key Value Normal Normal	 ○ Medium ○ High ○ Lock out ○ Medium ○ High ○ Lock out 					
Normal Object Key Value Normal Outrent Status	 Medium O High O Lock out Medium O High O Lock out STATUS_NORMAL					
Normal Object Key Value Normal Current Status Command Status Report	O Medium					
Normal Object Key Value Normal Current Status Command Status Report Last Written By Last Written Date Last Written Time Last Written Attributes	Medium					

11. You can refer to Digi-SFT User Manual for DCL specification and usage.

Edit your account profile

 In Grid display, use the DB-USER-DISPLAY_ALL grid option combination to filter out your user account object.

<u>File Columns</u>				Views - Grid Opti	ons			
Building	System SubSyste	m Object	Search Refresh	Field	DISPLAY_ALI	Type		
Type	Building BUILTIN E	System ENGINEER	Sub-System USER	Object ENGINEER	Disp Seq C 0 102.0.	bject ID D		
							0	
				1				
2016-12-09 10:09:	22 AM Friday Nun	nber of Rows retur	med = 1	Enable	Auto Refres <u>h</u>	Close	\square	
2016-12-09 10:09:	22 AM Friday Nun	nber of Rows retur	med = 1	Enable	Auto Refres <u>h</u>	Close		



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<u>Session</u> <u>Forms</u> <u>W</u> indow	
8 BUILTIN.ENGINEER.USER.ENGINEER Object Definition	
Main Notes*	
Acronym Type Building System SubSystem Object BUILTN ENGINEER USER ENGINEER	
Description a built in engineer level account	
Host Field Computer Host Controller	
BESTECH DIGISET MAIN SER.	
Display Priority Display Sequence Display Format DISPLAY_ALL • 0 •	
UserName uengineer	
Password	
Re-Type Password	
User Timeout (minutes) 1440	
Group Engineer 🔽	
First Name User	
Last Name Engineer	
Work Phone 555-5555	
Home Phone	
E-Mail	
Created 2016-10-20 15:49:59 by BESTECH.ADMIN.FENG.HUANG (101) Modified 2016-11-03 10:16:44 by BESTECH.ADMIN.FENG.HUANG (101)	
<u>Save</u> <u>Cancel</u>	
Profiles Updated at: 12/09/16 10:08 AM, 4 minutes ago	Logged in as: uengineer @ Bes-Tech

- 3. From this information window, you can modify your password, first/last name, phone and email⁵. Normally you should not modify text fields other than these.
- 4. The "User Timeout" attribute is the number of minutes before server terminates your current session if no communication has been initiated since previous one.
- 5. Greyed out fields are managed by Bes-Tech admin, and are read-only to normal users.

⁵ The phone and email here is only for profile purpose, and is not used when system sending alarm notifications.

