

How to configure a PROFIBUS network with NetTool for PROFIBUS







Document history

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1.00	2005-04-14	Created	Patrik Lansdorf
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More information about the network and products

The latest manuals, GSD file and HyperTerminal settings can be found on the HMS homepage: <u>www.anybus.com</u>

The Profibus user organisation has a homepage on the Internet: www.profibus.com



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1 Applicable Anybus products

Description	Name / Type
Anybus-M Master	PROFIBUS Master
Anybus X-gateway	PROFIBUS Master
Anybus-PCI Master	PROFIBUS Master

2 Requirements

Description	Name / Type
Siemens ET 200S	Modular I/O unit
Anybus X-gateway Profibus master-EIP slave	AB7800
Anybus Communicator for Profibus	AB7000
GSD file for the Siemens ET 200S module	siem80f3.gsd
Profibus standard cable	n.a.
Profibus D-SUB contacts	n.a.
Power supply 24VDC	n.a.
PC with NetTool for Profibus	1.9.1.4 or later
Null modem cable (Supplied with the Anybus X- gateway)	n.a.
Configuration cable for Anybus Communicator	017620
Anybus Configuration Manager – Communicator RS232/422/485 (previously ABC Config Tool)	2.14 or later

Note: The gsd file for Anybus Communicator is included in the NetTool for Profibus.



3 Solution overview

Below you find an overview of the system configuration that is described in this document.

Other nodes may be attached to the network, but are not necessary. Since this application note is for NetTool for Profibus, only the Profibus configuration will be explained.



Figure 1 Hardware connection overview



4 Hardware Settings

In this particularly case we are using an X-gateway PROFIBUS-DP Master together with an Anybus PROFIBUS Communicator.

4.1 Slave settings

The address setting is done with the two rotary switches on the Anybus Communicator module and on the Siemens ET 200S on a dip switch.

The address is set to #2 for the Anybus Communicator and to #3 for the Siemens ET 200S in this example.

4.2 Hardware configuration

In order to configure the bus it is necessary to set up the master hardware first. In this example we are using an Anybus X-gateway with Profibus master.

4.2.1 Configuring the master module

Start by creating a new configuration. Drag and drop the Anybus-M DPV to the new configuration.

🏶 Anybus NetTool for Profibus - Untitled					
Project View Profibus Online Option Tools Windows Help					
D 🚔 🖬 🖾 📥 🖉					
<	Busview	13		(y	
	Bus addr	Туре	Name	Vendor	Comment
	1	Master	AnyBus-M DPV	HMS Industrial Networks	a Ramanananananananananan
	2				

Figure 2 Install the Anybus-M DPV

Double click on the Anybus-M DPV and select the desired settings.



(1) AnyBus-		8 Master properties	- AnyBus-M DPV
Anyb	us	Common Group proper	ties Profibus Bus parameter
		Profibus interfaces	
		Address:	0 2 3 4 5 6 7
		Baud rate:	187.5 kBit/sec 500 kBit/sec 1500 kBit/sec
		Profile:	Single master Multi master Standard
Bus addr	Туре		User defined
0	Master		
2	Master		
3			
4		10. 	
5			
6		ОК	Cancel Help
7	5		

Figure 3 Master properties



4.2.2 Adding the Anybus Communicator

Next drag and drop the Anybus-C PDP to the configuration. (Drop it on the line next to the master)



Figure 4 Install the Anybus-C PDP

Double click on the Anybus-C PDP and select the desired settings. (Primarily Profibus address)

	Common Parar	meter assignment	GS* file: HMS_1803 g
ve: (;	Vendor Family path: Model name: Slave name	HMS Industrial Netw General ANYBUS-C PDP ANYBUS-C PDP	Profibus address
	Comment:		

Figure 5 Anybus-C PDP properties



Configure the amount of I/O data for the Anybus Communicator Profibus. Be sure to use the same amount of I/O as used in the configuration made in the ACM - Communicator RS232/42/485 (ABC Config Tool).

🍪 Anybus NetTool for Profibus - Untitled						
Project View Profibus Online Option Tools Wind	ows Help					
D 🗃 🖬 🎒 🖪 📥 🚿						
	Busvie		Device path: Prolibus DPVGenero	IVHMS Industrial Network:		
- NPUT: 2 Byte (1 word)	Slot	CFG data	Order number/ designation	Input address	Output address	~
POIT: 4 Byte (2 word) POIT: 8 Byte (4 word)	1	0x53	INPUT: 8 Byte (4 word)	07		
M INPUT: 16 Byte (8 word)	2	0x63	OUTPUT: 8 Byte (4 word)		07	
- 🕅 INPUT: 32 Byte (16 word)	3					
R INPUT: 64 Byte (32 word)	5					1
INPUT: 128 Byte (64 word) OUTPUT: 1 Byte	6 7					
- MOUTPUT: 2 Byte (1 word)	8					
- 🕅 OUTPUT: 4 Byte (2 word)	9					
OUTPUT: 8 Byte (4 word)	10					
- 🗑 OUTPUT: 16 Byte (8 word)	12					
OUTPUT: 32 Byte (16 word)	13					
OUTPUT: 64 Byte (32 word) OUTPUT: 128 Byte (64 word)	14 15					
AnyBus-IC PDP	10					×
						4

Figure 6 Anybus-C PDP I/O data

It is possible to change Input and Output addresses, by double clicking on the different slots.

It is necessary to import the file siem80f3.gsd to the NetTool in order to include the Siemens ET 200S as a slave in the network. The GSD files for the Anybus modules are already included in NetTool for Profibus.

roject View Option	Tools Help	
) 😅 🔳 🖨 🖪	GSD viewer	
	Install new GS*-file	<<
	r.	
 	r s	
Profibus DP → (※) Profibus Maste → (※) Profibus Maste	r	
Profibus DP	r	

Figure 7 Install a new GSD file



4.2.3 Adding the ABB ET 200S

Next drag and drop the Siemens ET 200S to the configuration.



Figure 8 Install the Siemens ET 200S

Double click on the ET 200S and select the desired settings. (Primarily Profibus address)

	meter assignment	GS* file:	siem80f3.g:
Module		Profibus address	
Vendor	SIEMENS	Profibus address 0	
Family path:	1/0	Activate Slave	
Model name:	ET 200S (IM151-BASIC)	Watchdog 🗹	
Slave name	ET 200S (IM151-BASIC)	Maximum baud rate: 12000 kBit/sec	
	[Sync / freeze property	
			o assignment
		16	
Comment:			



Configure the amount of I/O data and type of power supply for the Siemens ET 200S.

🛞 Anybus NetTool for Profibus - App note co	nfig				_ 8 ×
Project View Profibus Online Option Tools	<u>W</u> indows <u>H</u> elp				
D 🖻 🖬 🖨 🖪 🍐 🖄 🖉					
~~	🛞 Busview 1				
Percentane 012 Image: Constraint of the con	(1) AryBus- (2) AryBus- (3) ET 200	3			
🖗 6ES7 132-4BB30-0AB0 : 🕅 6ES7 132-4BB30-0AB0*	Slave: (3) ET 200S (IM151-BASIC)	Device path: Profibus DP\I/O\SIEME	NS\ET 200S (IM151-	BASIC)	
	Slot CFG data	Order number/ designation	Input address	Output address	
	1 0x00	6ES7 138-4CA00-0AA0 PM-E DC24V	V-18		
	2 0x10	6ES7131-4BD00-0AA0 4DI DC24V	8		
	3 0x20	6ES7 132-4BB30-0AB0 2D0 DC24V		8	
6ES7 132-4HB00-0AB0*	4 0x20	6ES7132-4BB30-0AB0 2D0 DC24V		9	
- 🖻 6ES7 132-4HB10-0AB0	5				

Figure 10 Siemens ET 200S power supply and I/O



4.2.4 Configuring the Transport Path

At this point the configuration of the network is completed and ready for download to the master. To do this the Transport Path has to be configured.

Note: To be able to download the configuration using the X-gateway it is necessary to change the operation mode to Stop. Open the configuration menu and select 9 Change operation mode. Set the operation mode to stop.

🗞 USB - HyperTerminal	
<u>Ele Edit View Call Transfer Help</u>	
D 🗳 🐵 🍒 🗈 🎦 🖆	
Change operation mode PROFIBUS Master (Upper) Operation mode (+/-):	 Stop_

Figure 1 Changing the operation mode to Stop.

There are several ways to download the configuration.

Serial driver: Using the serial port on the Anybus-M the serial driver can be used. The X-gateway can also be configured using the serial driver if connected to the master interface configuration port.

Ethernet driver: In the case with the Anybus X-gateway with Ethernet interface the Ethernet driver can be used.

PCI driver: For the Anybus PCI also the PCI driver can be used.

4.2.5 Serial connection

Transport Paths		
Parallel Serial		
Path Name com3	Provider Anvbus COM-port Transport Provider	Path ID
N-d-ABA-		
<u>Create</u> Co <u>n</u> figure *	OeleteOk	Cancel

Figure 2 Configuring the Serial Transport path.

Open the Serial tab and click on create. Select the COM-port path as shown below.

Please select a transport provider	X
<u>Parallel</u> <u>S</u> erial	
Name	Version
COM-Port Transport Provider	1.1.1.1
	Ok Cancel

Figure 3 Selecting the COM-port Transport Provider.



In the following dialogue window enter the desired name of the Transport Path and select the COM-port. After configuring these settings the slot in the Anybus X-gateway has to be selected. The upper slot is where the power connection is located.

🕊 Gateway Se	etti 🔳 🗖 🔀
Slot:	Upper 🗸
Timeout (Sec):	E
🗸 ок	🗶 Cancel

Figure 4 Configuring the Slot and Timeout time.

4.2.6 Ethernet connection

If using the Ethernet connection to configure the gateway use the Parallel Transport Path instead.

Note: To be able to use the Ethernet Transport Path the following is required:

- Install NetTool Profibus version 3.1.1.1 or later on the PC
- Install Anybus Ethernet Transport Provider version 2.1.0.0 or later on the PC
- Make sure that the X-gateway firmware version is 3.02.3 or later

Step 1: In NetTool Profibus – select Online -> Driver Selection.



Figure 5 Opening the Configure Driver menu.

Step 2: Select Parallel and press the "Create button in the "Transport Paths" dialog.

Transport Paths		×
Parallel Serial		
Path Name	Provider DLL	Path ID
😨 Create 🛛 🗳 Configure 🗸 🖓 Delete	✓ <u>0</u> k	🗙 Abort

Figure 6 Creating a new Transport Path.



Step 3: Select the "Ethernet Transport Provider" and press OK. Then give the path a good name, e.g. My Ethernet transport path and press OK again.

Please select a transport provider Parallel Serial		×
Name	DLL	
PCI Transport Provider	HMSTPPCI.DLL	
Ethernet Transport Provider	HMSTPETN.DLL	
<u>,</u>		
	🖌 Ok	X Abort

Figure 7 Selecting the Ethernet Transport Provider.

Path name	×
Please supply a name for the new path:	
My ethernet transport path	
OK Cancel	

Figure 8 Naming the new Transport Path.

Step 4: If the IP-address of the gateway is in the same subnet-range as your PC, the gateway will automatically appear in the list shown in the "Ethernet Configuration" dialog. Mark the ABX-ETH and press ok. If nothing is shown in the list, proceed to Step 5.

Ethernet Configuration	×
Remote Hosts Advanced	
ABX-HEI [10.10.12.154]	
	,a
🗙 Cancel 🛛 🗸 OK	

Figure 9 Browsing the IP-address of the connected gateway.



Step 5:

Use the Anybus IPconfig utility to identify or edit the IP address of the X-gateway. Clicking on the button

will start Anybus IPconfig tool.

¢	Anybus IPco	onfi	g							<u>- </u>
	IP	Δ	SN	GW	DHCP	Version	Туре		MAC	
	10.10.12.154		255.255.255.0	10.10.12.254	On	1.30.1	ABS-EIP		00-30-11-02	-3E-45
								Scar	n	Exit

Figure 10 Scanning the network for Anybus modules.

The Anybus module will appear in the list and the IP settings can be modified by double-clicking the desired IP-address in the list.

🛞 Configure: 00-3	0-11-02-3E-45	×
Ethernet configural	tion	
IP address:	10 . 10 . 12 . 154	DHCP
Subnet mask:	255 . 255 . 255 . 0	© On © Off
Default gateway:	10 . 10 . 12 . 254	
Primary DNS:	10 . 10 . 12 . 36	
Secondary DNS:	10 . 10 . 12 . 12	
Hostname:		
Password:		Change password
New password:		
		Set Cancel

Figure 11 Configuring the IP-address.

Click SET to apply the settings. Note that a valid IP-address setting is within the same subnet range as the PC you are using. If your PC has the address 192.168.0.24 and the subnet mask is 255.255.255.0 then the gateway needs to use any free address within 192.168.0.X.



Step 6: The X-gateway with it's IP address should appear automatically under the "Remote Hosts" tab, if the IP settings were made correctly.

Ethernet Confi	guration 🛛 🛛 🛛
Remote Hosts	Advanced
	EI [10.10.12.154] X-ETH[ABX]
	🐴 🏖 🐁
	🗶 Cancel 🛛 🗸 OK

Figure 12 Browsing the connected gateway.

A network scan can also be forced by entering the X-gateway IP address and pressing the button

"Query Host". Clicking on the button 🞯 will refresh the list under Remote Hosts.



4.2.7 PCI driver

When using the Anybus PCI also the PCI driver can be used. Select the Anybus PCI Transport Provider or click on create to make a new Transport Path. Make sure to select the PCI Transport Path if creating a new.

Transport Paths	×	
<u>P</u> arallel <u>S</u> erial		
Path Name Profibus PCI Anybus X-gateway	Provider Path IC Anybus PCI Transport Provider 1 Anybus Ethernet Transport Provide 3	
<u>C</u> reate Co <u>n</u> figure •	Delete Ok Cancel	

Figure 11 Transport Path selection window



5 Automatic Network Scan

NetTool can automatically scan the PROFIBUS network and gather information about the connected slaves. The user can then select which slaves to adopt to a new bus configuration to be downloaded to the master. This is a quick way to get a network up and running. However, one shall be aware that it is not guaranteed that a slave will enter Data exchange since the User parameter data might mismatch.

The network scan is started either from the Online menu or from the right-click menu for the master icon in the bus configuration window. A master must be added to the bus configuration window to be able to use the network scan function. It is also possible to scan the network with slaves present in the current bus configuration.

(1) Anybus					
(T) Any	Delete				
	Delete				
	Object propert	ties			
	Open GS*-file				
	Scan network.	Contraction and the second			
-					
Bus addr	Tune	Name	Vendor	Comment	
Bus addr	Туре	Name	Vendor	Comment	
and the second second second second				Comment	
)	Type Master	Name Anybus-M DPV1	Vendor HMS Industrial Networks	Comment	
) 2				Comment	
) 1 2 3 4				Comment	
) 2 3 4				Comment	
) 2 3				Comment	

Figure 12 Scan network option in bus configuration window

The network scan can be started from the right-click menu for the master icon.



Figure 13 Scan network option in Online menu



The network scan can be started from the Online menu.

If the master does not have a valid database downloaded, when the scan is initiated, NetTool will download the master bus parameters (baudrate etc.) given that the user has agreed to the download.

Question	n 🔣
?	In order to scan the network the master bus parameters must be downloaded. Do you want to download and start the network scan?

Figure 14 Configuration download acceptance window

If the master already has a valid database downloaded when the network scan is initiated, the master will use the current bus parameter settings. The download will then be skipped. To get the best scan result, make sure the scan master has the same node address as the master in the bus configuration.

If the master already has a valid database downloaded when the network scan is initiated, the master will use the current bus parameter settings. The download will then be skipped. To get the best scan result, make sure the scan master has the same node address as the master in the bus configuration.

5.1 Network Scan Window

When the network scan is completed, a window with all devices found on the network will appear (both slaves and masters). Information extracted from existing GSD-files will be displayed.



elect	Device status	Address	Ident no	Model name	Vendor	Module	GSD-file	
X	Master not in this bus configuration	0		Unknown	Unknown	-	No GSD found	18
×	Master in this bus configuration	1	0x18F0	Anybus-M DPV1	HMS Industrial Networks	•	HMS_18F0.gsd	
\checkmark	Slave not in this bus configuration	2	0x05D3	1794-APB/B	Allen Bradley	1794-APB/B Status	A_B_05D3.gsd	
						1794-0A16 / Auto format		
						1794-IA16 / Auto format		
						Flex I/O empty slot/Auto format		
						Flex I/O empty slot/Auto format		
						Flex I/O empty slot/Auto format		
						Flex I/O empty slot/Auto format		
						Flex I/O empty slot/Auto format		
-						Flex I/O empty slot/Auto format		
	Slave not in this bus configuration	3	0x1001	Anybus-64 I/O PDP	HMS Industrial Networks	ABIO-64 DP-V0	HMS_1001.GSD	
	Slave not in this bus configuration	15	0x1810	Anybus-IC PDP	HMS Industrial Networks	IN/OUT: 2 Byte (1 word)	hms_1810.gsd	
		-			-			-

Figure 15 Network Scan Window layout

Select column

Selected slaves will be added to the bus configuration when the button "Adopt selected slaves" is clicked. Most detected devices will be marked as selected by default, except for the following situations:

- \cdot Slave is already present in the current bus configuration.
- · Slave is locked by another master.
- · Slave has address 126 (see description about "Set Slave Address" below).
- · All master devices.
- No matching configuration identifier bytes found in the GSD-file.

Symbol description

■=Slave/Master is already present in the current bus configuration, and will not be affected when adopting slaves.

■=Slave/Master is not possible to adopt (slave locked by another master, GSD-file missing, slave has address 126 etc.)



 \blacksquare =Slave is selected for adoption and will be added to the bus configuration when the "Adopt selected slaves" button is clicked.

□=Slave is not selected for adoption and will not be added to the bus configuration when the "Adopt selected slaves" button is clicked.

Device status column

This column indicates the status of the detected devices.

• "Slave not in this bus configuration" - No slave with this address exists in the current bus configuration.

 \cdot "Slave in this bus configuration" - Slave identical (Ident number and Identifier bytes matches) to a slave in the current bus configuration.

• "Slave in this bus configuration but differs" - Slave has different Ident number compared to the one in the configuration.

 \cdot "Slave locked by another master" - Slave is controlled by another master and cannot be added to the bus configuration. Locking master address is displayed within brackets.

 \cdot "Master not in this bus configuration" - No master with this address exists in the current bus configuration.

"Master in this bus configuration" - Master identical (Ident number matches) to the one in the current bus configuration.

Address column

In this column the node address of the detected devices is displayed.

Special node address 126 is displayed in red.

If a slave with node address 126 is detected during the network scan the address must be changed by NetTool before it is possible to add the slave to the bus configuration. The address change dialogue is displayed by selecting the address cell and clicking on the "Set Slave Address" button.

Ident no column

The PROFIBUS identification number is displayed in this column.

Model name column

The model name extracted from the GSD-file is displayed in this column. If no matching GSD-file is found, "Unknown" is displayed.

Vendor column

The manufacturer of the device extracted from the GSD-file is displayed in this column. If no matching GSD-file is found, "Unknown" is displayed.

Module column

www.anybus.com



This column shows the module name, extracted from the GSD-file, which matches the identifier bytes reported from the slave. If no matching GSD-file is found, the identifier bytes are displayed and it will not be possible to adopt the slave. If more than one module in the GSD-file matches the identifier bytes, the first matching module is displayed. A drop-down list contains all other matching modules. If the default module is not correct, the user must manually select the correct module in the drop-down list before adopting the slave.

GSD-file column

This column shows the name of the GSD-file that matches the Ident number of the device. If there are more than one file with the same Ident number in the device catalogue, the first matching GSD-file is displayed. A drop-down list contains all other matching GSD-files. If the default GSD-file is not correct, the user must manually select the correct GSD-file in the drop-down list before adopting the slave. If no matching GSD-files are found, a GSD-file can be manually selected by clicking on the "No GSD found" text in the GSD-cell.

Select all button

This button selects all slaves that are possible to select in the Select column.

Deselect all button

This button deselects all slaves that are possible to deselect in the Select column.

Rescan button

Clicking this button will trigger a new network scan. The function key F5 has the same functionality as the rescan button.

Set Slave Address button

For slaves supporting the "Set Slave Address" service, select the address cell for the slave and click this button to open the address change dialogue.

Adopt selected slaves button

Clicking this button will add all selected slaves to the current bus configuration.



6 Gateway configuration

After the Profibus-DPV1 Master and the Profibus network has been configured in NetTool for Profibus and downloaded, the gateway itself has to be configured. Use the HyperTerminal on the PC and connect a null modem cable between the com port and the gateway's config port. Use the following settings.

COM1 Properties	? 🗙
Port Settings	
	_
Bits per second: 57600	
Data bits: 8	
Parity: None	
Stop bits: 1	
Elow control: None	
Restore Defaults	
	oly

Figure 13 Configuring the connection in the HyperTerminal.

The following menu will appear.

🗞 USB - HyperTerminal
<u>Eile E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ransfer <u>H</u> elp
D 🖻 🍘 🐉 🗈 🎦 📽
Anybus X-gateway main menu 1 - Show gateway system information 2 - Show fieldbus system information 3 - Show gateway system configuration 4 - Show fieldbus system configuration 5 - Operating status information 6 - Change configuration 7 - Configuration upload/download 8 - Restart Gateway 9 - Change operation mode A - Administration mode

Figure 16 Anybus X-gateway Main menu

Choosing 6 from the main menu will access the configuration of the gateway.

Note: The default setting in the X-gateway is that it will reboot every time the on-line connection over Ethernet is broken. This setting can be changed in the X-gateway configuration interface. Use a null-modem cable and connect the X-gateway config port to the PC. Start a Hyper Terminal session using the settings 57600 Bites per second, 8 Data bits, None Parity, 1 Stop bit and None Flow Control. Connect to the Xgateway and enter the configuration interface. Press 6 to enter the "Change configuration" dialog. Click enter until you get to the "Reboot after disconnection" parameter and then change this setting to



"Disabled". Press Enter and answer Yes to the following questions. The gateway will now continue to run without interruption after an online session in NetTool Profibus.

🦚 USB - H	yperTerm	inal					
Eile Edit		Transfer <u>H</u> elp					
PROFIL Offlin Contro Live Ethern Input	ne optio ol / Sta list (+/ net IP + I/O dat	er (Upper) n (+/-): tus word (-):	+/-): /EB \$1ave () /tes):	Clear Disabled Disabled Lower) 20 20	-		
Contro	ol /ˈSta	n (+/-): tus word (s Mode (+/		Clear Disabled Enabled	_		
Gatew	ay confi	guration					
Reboo	t after	disconnect	ion (+/-):	Enabled	-		
Connected 0	1:17:38	ANSIW	57600 8-N-1	SCROLL CAPS NU	M Capture	Print echo	

Figure 14 The X-gateway configuration.



7 Testing

Connect the units that should be part of the Profibus network and power up.

When clicking on the on Monitor/modify button, there should be a green frame around the slaves, as shown in the picture below, to indicate that there is communication established with all slaves. **Note:** The Anybus communicator has to have a configuration that corresponds with the NetTool configuration of the Anybus communicator, i.e. the I/O sizes have to match.

	<
	(1) AnyBus- (1) AnyBus-
4∨ 4∨	(2) ANYBUS- (3) ET 2005
24V 24V 24V 24V 24V	

Figure 17 Online

It is also possible to double click on the master, to ensure that the slaves are ok. See picture below.

Address	Туре	Name	Ident-No.	Input bytes	Output bytes	Status	
1	Master	AnyBus-M DPV	0x18F0	1	1		1
2	Slave	ANYBUS-C PDF	0x1803	8	8	OK	
3	Slave	ET 200S (IM151	0x80F3	1	2	OK	
							- 2
							-
				24	24	21	- 4
				N	7. E	1	8
							-
			C				- 10
							1
	-						-
							-2
					0		-
			2			1	- 10
	1			1		1	_

Figure 18 Online master properties



Selecting Monitor/Modify I/O, will give possibility to monitor Inputs and modify Outputs. See picture below.

nput/Output Dutput		Length	Format	Value	A 19
Juipui	0	1	Hex	0xAC	
Dutput	1	1	Hex	0xDC	
nput	2	1	Hex	0x0C	
nput	3	1	Hex	0x0D	
		-			
			_		
		-			
	<u>- 12</u>				
		1			
	-				
				6	
	32				
	-	-			
		1			
			- 11	1	

Figure 19 Monitor/Modfy I/O