

FnIO AT2–Series:

CC-Link Adapter

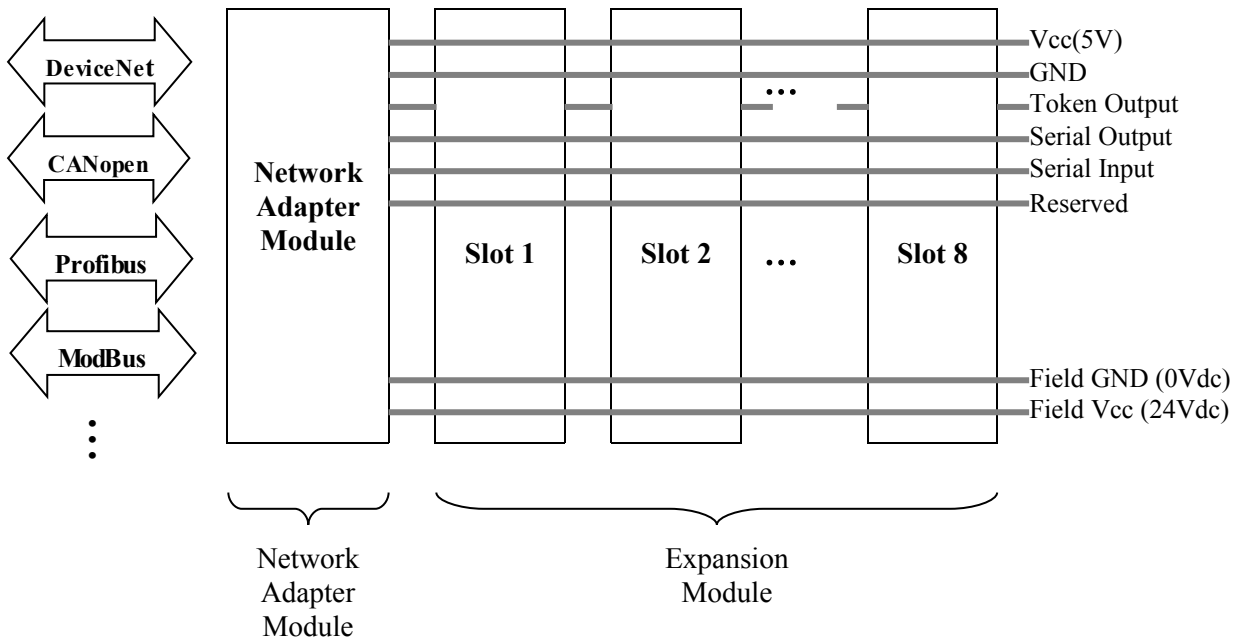
DOCUMENT CHANGE SUMMARY				
REV.	PAGES	REMARKS	DATE	Editor
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1. FNBUS OVERVIEW

1.1. FnBus System



Network Adapter Module

The Network Adapter Module forms the link between the fieldbus and the field devices with the Expansion Modules. The connection to different fieldbus systems can be established by each of the corresponding Network Adapter Module, e.g. for SynqNet, PROFIBUS, CANopen, DeviceNet, Ethernet/IP, CC-Link, MODBUS/Serial, MODBUS/TCP etc.

Expansion Module

The Expansion Modules are supported a variety of input and output field devices. There are digital and analog input/output modules and special function modules.

Two types of FnBus Message

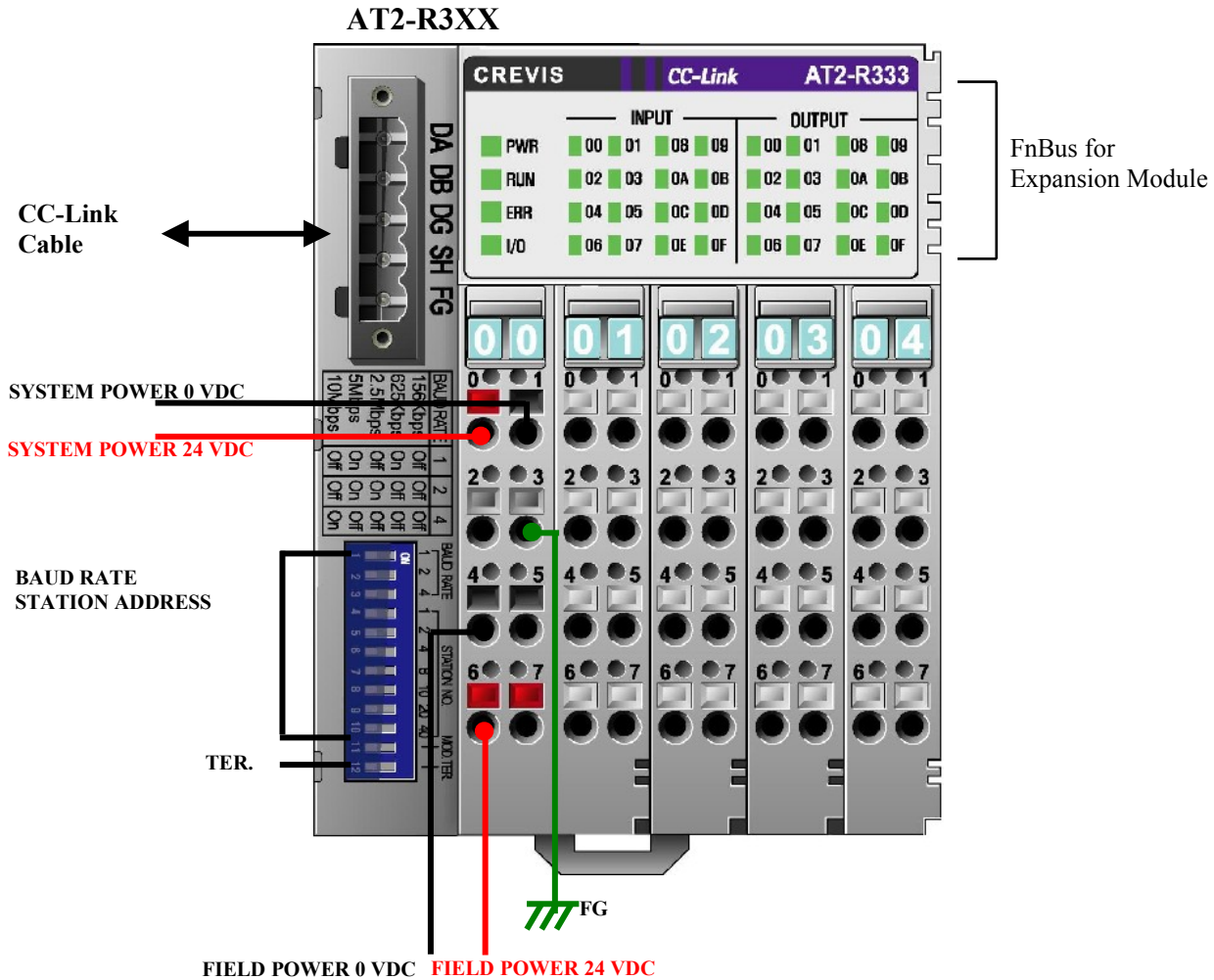
- Service Messaging
- I/O Messaging

1.2. FnBus Pin Description

No.	Name	Description
1	Vcc	System supply voltage (5V dc).
2	GND	System Ground.
3	Token Output	Token output port of Processor module.
4	Serial Output	Transmitter output port of Processor module.
5	Serial Input	Receiver input port of Processor module.
6	Reserved	Reserved
7	Field GND	Field Ground.
8	Field Vcc	Field supply voltage (24Vdc).

2. CC-LINK ADAPTER MODULE

2.1. Shape of RTB modules



■ Module List

Catalog Number	Description	Input, Output Size (Byte)
AT2-R311	RTB, CC-Link Sink Input 32	In:4
AT2-R312	RTB, CC-Link Source Input 32	In:4
AT2-R321	RTB, CC-Link Sink Output 32	Out:4
AT2-R322	RTB, CC-Link Source Output 32	Out:4
AT2-R333	RTB, CC-Link Sink Input 16/Source Output 16	In:2, Out:2
AT2-R334	RTB, CC-Link Source Input 16/Sink Output 16	In:2, Out:2
AT2-R325	RTB, CC-Link Relay 16(4pt/1Com)	Out:2
AT2-R336	RTB, CC-Link Sink Input 16/Relay 8(4pt/1Com)	In:2, Out:1
AT2-R337	RTB, CC-Link Source Input 16/Relay 8(4pt/1Com)	In:2, Out:1
AT2-R338	RTB, CC-Link Source Input 16/Sink Output 16	In:2, Out:2
AT2-R339	RTB, ProfiBus Sink Input 16/Sink Output 16	In:2, Out:2

AT2-R355	RTB, CC-Link Relay 16(1pt/1Com)	Out:2
AT2-R356	RTB, CC-Link Sink Input 16/Relay 8(1pt/1Com)	In:2, Out:1
AT2-R357	RTB, CC-Link Source Input 16/Relay 8(1pt/1Com)	In:2, Out:1

2.2. Specification

2.2.1. Network (CC-Link) Specification

■ Specification

Interface Specification, AT2-R3XX (CC-Link Adapter)	
Protocol Version	Version 1
Station type	Remote Device Station
Max. Nodes	42 Nodes /Max
Max. Expansion Module	8 Expansion slots
I/O Data Size	System area : 16 point RX / RY: 112 points (4 Stations occupied) RWr/RWw : 16 Words (4 Stations occupied)
Indicators	4 LEDs 1 Green Power Status(PWR) 1 Green Run/Stop Status(RUN) 1 Red L Error Status(ERR) 1 Green/Red Expansion I/O Module Status (I/O)
Communication Rate	156/625/2500/5000/10000 Kbps
Module Location	Starter module - left side of FnIO system
General Specification	
System Power	Supply Voltage: 24Vdc nominal Voltage Range: 19.2~28.8Vdc Protection: Output Current Limits(Min. 1.5A) Reverse Polarity Protection
System Power Dissipation	Max. 145mA@24Vdc
System Power Current for Expansion Module	Max. 400mA@5Vdc
Isolation	System Power to internal logic : Non-Isolation Internal logic to I/O driver : Isolation
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 11~28.8Vdc
Field Power Current	Max. 6A@24Vdc
Weight	Max. 340g
Module Size	83mm x 99mm x 70mm

2.2.2. I/O Specification

■ Digital Input, AT2-R311,R312,R333,R334,R336,R337,R338

Interface Specification	
Number of Input	AT2-R311 : 32pt, Sink Type (GND Common internally shorted) AT2-R312 : 32pt, Source Type (24V Power internally shorted) AT2-R333,R338 : 16pt, Sink Type. AT2-R334 : 16pt, Source Type.
Indicates	1 LED/1pt
Input Voltage	Nominal 24Vdc, 11~28.8Vdc
Max. OFF-State Voltage	5Vdc
Min. ON-State Voltage	9Vdc
Input Signal Delay	< 0.5msec
Input Impedance	About 5.4Kohm

■ Digital Output, AT2-R321,R322,R333,R334

Interface Specification	
Number of Output	AT2-R321 : 32pt, Source Type (24V Power internally shorted, like to TR's PNP) AT2-R322 : 32pt, Sink Type (GND Common internally shorted, like to TR's NPN) AT2-R333,R339 : 16pt, Source Type. AT2-R334 : 16pt, Sink Type.
Indicates	1 LED/1pt
Output Load Current	Max. 0.5A/1pt, 8A/All
Output Voltage	Nominal 24Vdc, 11~28.8Vdc available
Drop Voltage (ON-state)	Max. 0.3Vdc
Leakage Current(OFF-state)	Max. 50uA
Output Signal Delay	< 0.3msec
Protection	Short protection, Over Temperature protection, Over Current Limit

■ Relay Output, AT2-R355,R356,R357

Interface Specification	
Number of Output	AT2-R355 : 16pt / AT2-R356 : 8pt / AT2-R357 : 8pt
Indicates	1 LED/1pt
Relay Type	Form Am Normally Open (N.O.) Single Pole, Single Throw (SPST)
Output Rating	2A@5~28.8Vdc 0.8A@48Vdc 0.5A@110Vdc 2A@250Vac
Minimum Load	100uA, 100mVdc per Point
Max. On-state Voltage Drop	0.5V@2.0A , Resistive Load, 24Vdc
Output Delay Time	On to Off : Max 10ms, Off to On : 10ms
Initial Contact Resistance	30mΩ
Expected Contact Life	300K Cycles Resistive, 100K Cycles Inductive
Common Type	1 Point / 1COM (Single Common)
Isolation	I/O to Logic : Relay Coil/Contact Isolation 1250Vrms tested

■ Relay Output, AT2-R325,R336,R337

Interface Specification	
Number of Output	AT2-R325 : 16pt / AT2-R336 : 8pt / AT2-R337 : 8pt
Indicates	1 LED/1pt
Relay Type	Form Am Normally Open (N.O.) Single Pole, Single Throw (SPST)
Output Rating	2A@5~28.8Vdc 0.8A@48Vdc 0.5A@110Vdc 2A@250Vac
Minimum Load	100uA, 100mVdc per Point
Max. On-state Voltage Drop	0.5V@2.0A , Resistive Load, 24Vdc
Output Delay Time	On to Off : Max 10ms, Off to On : 10ms
Initial Contact Resistance	30mΩ
Expected Contact Life	300K Cycles Resistive, 100K Cycles Inductive
Common Type	4 Point / 1COM (Single Common)
Isolation	I/O to Logic : Relay Coil/Contact Isolation 1250Vrms tested

2.3. LED Indicator

2.3.1. PWR Status LED (PWR)

State	LED is:	To indicate:
No Power	Off	No power is supplied to the unit.
Device Operational	Green	The unit is operating in normal condition.
Device in Standby	Flashing Green	The EEPROM parameter is not initialized yet. Serial Number is zero value (0x00000000)
Minor Fault	Flashing Red	The unit has occurred recoverable fault in self-testing. - EEPROM checksum fault
Unrecoverable Fault	Red	The unit has occurred unrecoverable fault in self-testing. - Firmware fault

2.3.2. RUN Status LED (RUN)

State	LED is :	To indicate :
Not Powered	Off	Device may not be powered or is resetting Hardware.
Not On-Line		Device is not on-line.
Connection- Timeout		Timeout
On-Line, Connection	Green On	Device is receive both refresh and polling signals or just the refresh signal normally, after participating in the network.

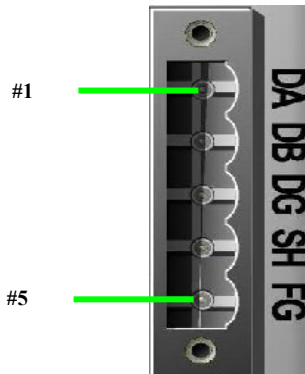
2.3.3. ERROR Status LED (ERR)

State	LED is :	To indicate :
Fail	On	CRC Error
Switch Setting Error	On	Invalid Station Number
Communication Error	On	Baud rate switch setting error during cancellation of reset (5 or greater)
Setting Change	Blink	The switch setting has been changed from the setting at the rest cancellation. (blinks for 0.4 sec.)
Device Operational	Off	Normal Communication Resetting Hardware

2.3.4. Expansion I/O Status LED (I/O)

State	LED is :	To indicate :
Not Powered No Expansion Module	Off	Device has no expansion module or may not be powered
Fn-Bus On-line, Do not Exchanging I/O	Flashing Green	Fn-Bus is on-line but does not exchanging I/O data (Passed the expansion module configuration).
Fn-Bus Connection, Run Exchanging IO	Green	Exchanging I/O data
FnBus connection fault during exchanging IO	Flashing Red	One or more expansion module occurred in fault state. - changed expansion module configuration. - Fn-Bus communication failure.
Expansion Configuration Failed	Red	Failed to initialize expansion module - detected invalid expansion module ID. - overflowed Input/Output Size - too many expansion module - initial protocol failure

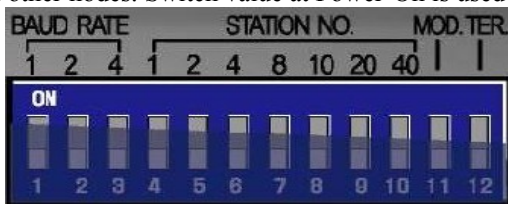
2.4. Adapter Electrical Interface



Pin#	Signal Name	Color	Description
1	DA	BLUE	
2	DB	WHITE	
3	DG	YELLOW	
4	SLD	-	
5	FG	BROWN	

2.5. DIP Switch Setting

Each CC-Link Adapter must have an unique Node Station Address (from 0 to 42) so that it can be addressed independently from other nodes. Switch value at Power-On is used to setup Module's CC-Link Communication.



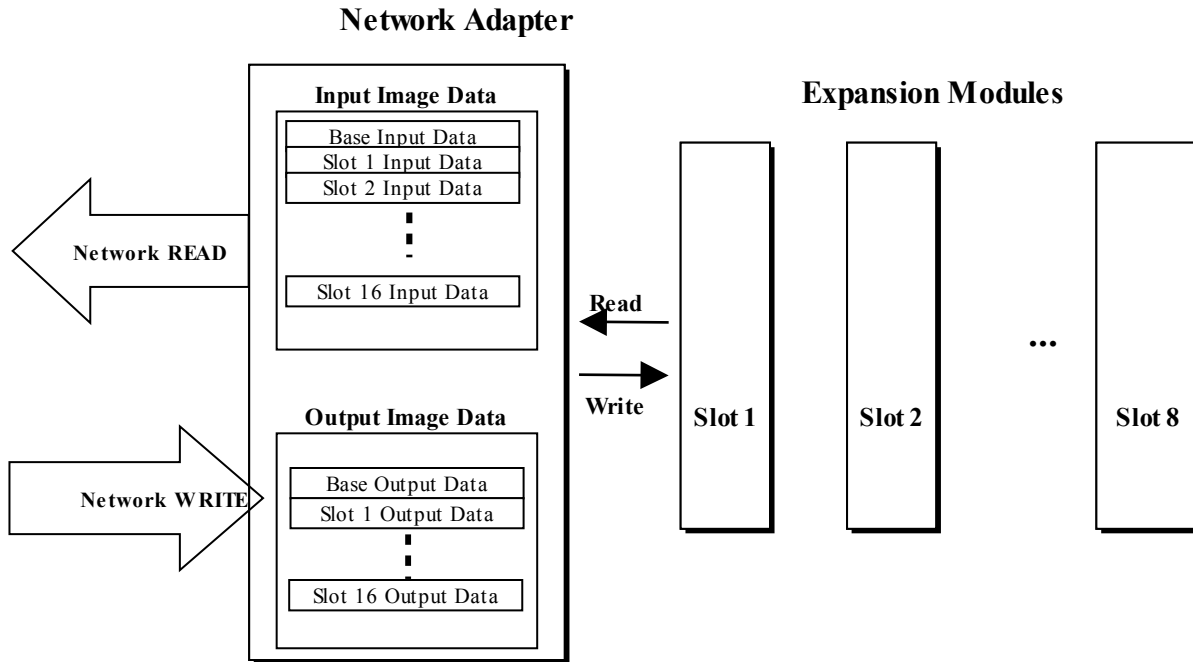
* When the terminal resistor (TER) is ON, do not connect any additional TER outside.

Item	Item Description	DIP Switch Pole#									
		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Station Number	ex) ID = 0				OFF	OFF	OFF	OFF	OFF	OFF	OFF
	ex) ID = 1				ON	OFF	OFF	OFF	OFF	OFF	OFF
	ex) ID = 10				OFF	OFF	OFF	OFF	ON	OFF	OFF
	ex) ID = 63				ON	ON	OFF	OFF	OFF	ON	ON
Baudrate	Auto Addressing										
	156Kbps	OFF	OFF	OFF							
	625Kbps	ON	OFF	OFF							
	2.5 Mbps	OFF	ON	OFF							
	5 Mbps	ON	ON	OFF							
	10 Mbps	OFF	OFF	ON							
	Fixed Addressing										
	156Kbps	ON	OFF	ON							
625Kbps	OFF	ON	ON								
2.5 Mbps	ON	ON	ON								

Item	Item Description		#1	~	#10	#11	#12
		No System Area use				ON	
TER.	Terminal Setting	No Setting					OFF
		Setting to Terminal					ON

2.6. I/O Process Image Map

An expansion module may have 3 types of data as I/O data, configuration parameter and memory register. The data exchange between network adapter and expansion modules is done via an I/O process image data by FnBus protocol. The following figure shows the data flow of process image between network adapter and expansion modules.



2.6.1. Remote Input Area

Address	Setting	Size	Signal Name
RXm0~RXmF	Occupying 1 Station	2Byte	Discrete Input
RX(m+1)0~RX(m+1)F	Occupying 2 Station	6Byte	
RX(m+2)0~RX(m+2)F	Occupying 2 Station		
RX(m+3)0~RX(m+3)F	Occupying 3 Station	10Byte	
RX(m+4)0~RX(m+4)F	Occupying 3 Station		
RX(m+5)0~RX(m+5)F	Occupying 4 Station	14Byte	
RX(m+6)0~RX(m+6)F	Occupying 4 Station		
RX(m+n)0~RX(m+n)F	n=1,3,5,7 (1,2,3,4 Station)	2Byte	System Area

M : Register number that was introduced by head station number.

N: Final register number for occupied number

1 station : 16 Point (n=1)

2 station : 48 Point (n=3)

3 station : 80 Point (n=5)

4 station : 112 point (n=7)

* When Mode Switch is ON, the IO size will be increased 2 bytes more respectively

2.6.2. Remote Output Area

Address	Setting	Size	Signal Name
RYm0~RYmF	Occupying 1 Station	2Byte	Discrete Output
RY(m+1)0~RY(m+1)F	Occupying 2 Station	6Byte	
RY(m+2)0~RY(m+2)F	Occupying 2 Station		
RY(m+3)0~RY(m+3)F	Occupying 3 Station	10Byte	
RY(m+4)0~RY(m+4)F	Occupying 3 Station		
RY(m+5)0~RY(m+5)F	Occupying 4 Station	14Byte	
RY(m+6)0~RY(m+6)F	Occupying 4 Station		
RY(m+n)0~RY(m+n)F	n=1,3,5,7 (1,2,3,4 Station)	2Byte	System area

2.6.3. RWr/RWw Area

Address	Setting	Size	Signal name	Address	Setting	Size	Signal name
RWrm0	1 Station	4Word	Analog Input	RWwm0	1 Station	4Word	Analog Output
...				...			
RWrm3				RWwm3			
RWrm4	2 Station	8Word		RWwm4	2 Station	8Word	
...				...			
RWrm7				RWwm7			
RWrm8	3 Station	12Word		RWwm8	3 Station	12Word	
...				...			
RWrm11				RWwm11			
RWrm12	4 Station	16Word		RWwm12	4 Station	16Word	
...				...			
RWrm15				RWwm15			
...				...			
RWrm127				RWwm127			

2.6.4. System Area

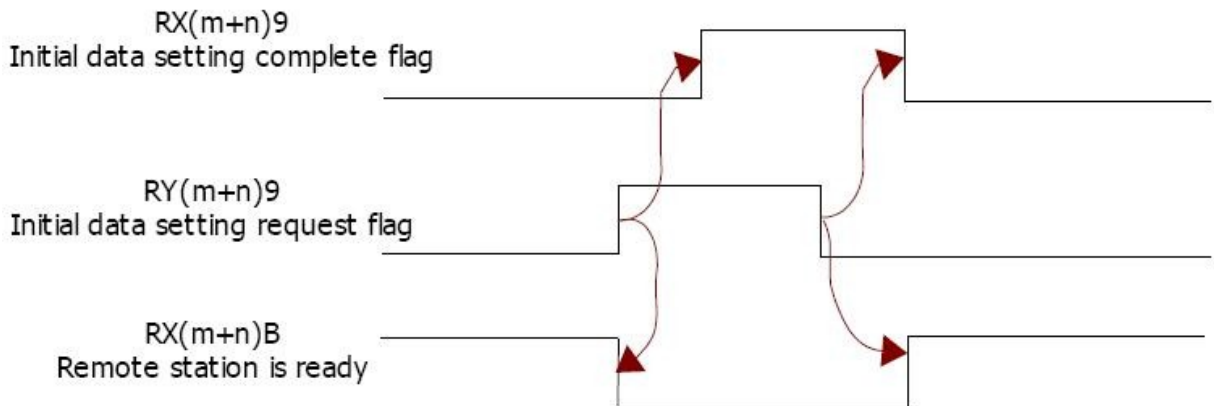
Link Name	Signal name	Link Name	Signal name
RX(m+n)0	Reaction on Network Error	RY(m+n)0	Reaction on Network Error
RX(m+n)1	Reaction on Network Error	RY(m+n)1	Reaction on Network Error
RX(m+n)2	Reserved	RY(m+n)2	Reserved
RX(m+n)3	Reserved	RY(m+n)3	Reserved
RX(m+n)4	Reserved	RY(m+n)4	Reserved
RX(m+n)5	Reserved	RY(m+n)5	Reserved
RX(m+n)6	Msg service ready	RY(m+n)6	Msg service start request
RX(m+n)7	Msg response completed	RY(m+n)7	Msg request
RX(m+n)8	Reserved	RY(m+n)8	Reserved
RX(m+n)9	Initial data setting completion	RY(m+n)9	Initial data setting request
RX(m+n)A	Error status flag	RY(m+n)A	Reserved
RX(m+n)B	Remote station is ready	RY(m+n)B	Reserved
RX(m+n)C	Reserved	RY(m+n)C	Reserved
RX(m+n)D	Reserved	RY(m+n)D	Reserved
RX(m+n)E	Defined by OS	RY(m+n)E	Defined by OS
RX(m+n)F	Defined by OS	RY(m+n)F	Defined by OS

* Option : When MOD Switch value is '0', the system area is available.

◆ Reaction on Network Error

RY(m+n)1	RY(m+n)0	Description
0	0	Hold last value
0	1	Clear outputs to zero (default)
1	0	Stop the FnBus - Each expansion module reacts according to its parameter - Internal I/O clears
1	1	Not used (internally switched to 10)

- ◆ RX(m+n)9/RY(m+n)9 : Initial data setting completion/request flag
This is used if there is a request from the user sequence for initial setting on the AT2 station.
Note : Linked with RX(m+n)B (Slave station ready)



◆ **Message service**

- RWw[0] Low Service code
 - ✓ 2 : Read Parameter
 - ✓ 3 : Write Parameter
 - ✓ 4 : Read Memory
 - ✓ 5 : Write Memory
- RWw[0] High Slot number
- RWw[1] Low Offset low
- RWw[1] High Offset high
- RWw[2] Low User data length
- RWw[2] High User data[0]
- RWw[3] Low User data[1]
- RWW[3] HIGH USER DATA[2]