

Industri<mark>al Automation</mark>

TBEN EtherNet/IP[™] LX Series Configuration Guide

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About this Guide

This guide will show the user how to set-up TURCK's TBEN-LX stations, explain LED diagnostics, explain IP addressing, configure the device using an EDS file, configure the device as a "Generic Device", and will also address DLR and QC start-up. TBEN-LX indicates a generic name where:

TBEN-L1 – Stands for devices with 5 pin power connector TBEN-L4 – Stands for devices with 4 pin power connector TBEN-LG – Is a 4 pin power connector with a 0-15 number scheme on the I/O



TBEN-Lx Modules Introduction

The TBEN-Lx series are multiprotocol communication adapters which support multiple Ethernet standards: Modbus TCP/IP, EtherNet/IP and PROFINET. The factory default, "out of the box" setting, is that all Ethernet protocols are enabled. After power up, a multiprotocol station is listening on all necessary ports to detect on which kind of network it is used. The "Active Fieldbus Protocol" is defined as the first protocol to do one of the following actions:

- Modbus TCP -Write to output register range.
- EtherNet/IP -Establish Class 1 Exclusive Owner connection to device. •
- PROFINET RT -Connect request. •

This "Configuration Guide" describes features and configuration procedure of the TBEN-LX series blocks. This guide uses the TBEN-LX-8DIP-8DOP in an EtherNet/IP environment to display all the features.

TBEN-LX Modules

Part Number	Inp	out de	scripti	on		Outpu	t desc	ription	1		Ef	therne	et	
	Number of in- puts	Input type	Inputs per con- nector	PNP / NPN type	Number of out- puts	Output type	outputs per con- nector	Maximum out- put load	Short circuit protection	Ethernet ports	Configuration Assembly	DLR	QC	ACD
TBEN-LX-16DIP	16	25	2	PNP					✓ ^{#2}	2	~	~	>	~
TBEN-LX-16DOP					16	2G	2	1A ^{#1}	<	2	<	~	<	~
TBEN-LX-16DXP	16	2X	2	PNP	16	2X	2	1A	~	2	~	~	~	~
TBEN-LX-8DIP-8DOP	8	25	2	PNP	8	2G	2	1A	~	2	~	~	~	~

Abbreviations:

- L1 (5 pin power connector), L4 (4 pin power connector), LG (4 pin power con-LX : nector with 0-15 numbering scheme)
- 2S: Two PnP inputs per connector
- 2X: Dual combined input/output per connector, PNP / 1A
- 2G: Two outputs per connector, 1A each
- #1: 2A output when single output per connector is used
- #2: Inputs protected per connector; outputs individually
- DLR Device Level Ring
- QC Quick Connect: QC time 100msec
- ACD Address Conflict Detection and resolution



Connection Diagrams

Device Type	Ethernet M12, d-coded	IN M12, a-coded	Power (7/8")
TBEN-L1-16DIP	$4 \bigcirc 3 2 4 \bigcirc 3 2 3 2 3$	3BU - 3BU - 000 -	Voltage supply 7/8" $4 \xrightarrow{3}{2} \xrightarrow{2}{2} \xrightarrow{V1}{(-)} \xrightarrow{2}{3} \xrightarrow{3}{0} \xrightarrow{4}{5} \xrightarrow{5} \xrightarrow{1}{1} \xrightarrow{4}{4} \xrightarrow{V1}{(+)} \xrightarrow{1}{1} \xrightarrow{5} \xrightarrow{5} \xrightarrow{V2}{(+)} \xrightarrow{X1} X2$
TBEN-L4-16DIP / TBEN-LG-16DIP	P1 P2 1 = TD+ 1 = RD+ 2 = RD+ 2 = TD+ 3 = TD- 3 = RD- 4 = RD- 4 = TD- (see "Note 1")	C1 C8 1 = VAUX1 (+) 2 = Second input 3 = V1 (-) 4 = First input 5 = FE	$\begin{array}{c} - & - & - (\\ 1 & 3 & 2 = 24 \text{ VDC V2} \\ 2 & 4 & 3 = \text{GND V1} \\ 4 & = \text{GND V2} \end{array}$

The LEDs notation:

The notation of the channel LEDs (LD12 ... LD84) are linked to the appropriate channel (CH) and are coded as LDxy, where:

"x" represents the connector number (x=1 means Connector C1)

"y" represents the signal pin number (y=4 means signal pin number 4)

Example:

LD34 = Connector C3, signal pin number 4; Channel CH3/4

Device Type	Ethernet M12_d-coded	IN M12 a-coded	Out M12 a-coded	Power (7/8")
TBEN-L1-8DIP-8DOP	-(4 4 3 -(1 1	380	181-2, d 00000	Voltage supply 7/8" - $ -$
TBEN-L4-8DIP-8DOP / TBEN-LG-8DIP-8DOP	$\begin{array}{ccc} & 4 & & & 2 \\ & & & & 2 \\ & & & & & 2 \\ & & & & & 1 \\ & & & & & 1 \\ & & & & & 1 \\ & & & & & 1 \\ & & & & & & 1 \\ & & & & & & 1 \\ & & & & & & & 1 \\ & & & & & & & 1 \\ & & & & & & & & 1 \\ & & & & & & & & 1 \\ & & & & & & & & 1 \\ & & & & & & & & & 1 \\ & & & & & & & & & & 1 \\ & & & & & & & & & & & 1 \\ & & & & & & & & & & & & 1 \\ & & & & & & & & & & & & & \\ & & & &$	C1 C4 1 = VAUX1 (+) 2 = Second input 3 = V1 (-) 4 = First input 5 = FE	C5 C8 1 = VAUX2 (+) 2 = Second output 3 = V2 (-) 4 = First output 5 = FE	$\begin{array}{c} - & - & - \\ 1 \underbrace{3}_{2} \underbrace{3}_{2} \underbrace{2}_{2} \underbrace{24 \text{ VDC } \text{ V2}}_{4} \underbrace{3}_{3} \underbrace{6}_{0} \underbrace{0}_{2} \\ 3 \underbrace{3}_{4} \underbrace{6}_{ND} \text{ V1}}_{4} \underbrace{4}_{0} \underbrace{0}_{2} \underbrace{0}_{2} \\ \text{X1} & \text{X2} \end{array}$
TBEN-L1-16DOP			5FE 4BK J 5 FE 4BK J 5 5 5 1BN + 2 WH J 3 BU -	Voltage supply 7/8" $4 \underbrace{\overset{3}{\underbrace{0}}_{5}^{2} \overset{1}{\underbrace{0}}_{5}^{2} \underbrace{\overset{1}{\underbrace{0}}_{2} \overset{2}{\underbrace{0}}_{5}^{2} \underbrace{\overset{1}{\underbrace{0}}_{5}}_{5} \underbrace{\overset{2}{\underbrace{0}}_{5} \overset{6}{\underbrace{0}}_{5}^{4}}_{5} \underbrace{\overset{2}{\underbrace{0}}_{5} \overset{6}{\underbrace{0}}_{5}^{4}}_{5} \underbrace{\overset{2}{\underbrace{0}}_{5} \overset{6}{\underbrace{0}}_{5}^{4}}_{X1} X2$
TBEN-L4-16DOP / TBEN-LG-16DOP	4 0 2 3 P1 P2 1 = TD+ 1 = RD+ 2 = RD+ 2 = TD+ 3 = TD- 3 = RD- 4 = RD- 4 = TD- (see "Note 1")		C1 C8 1 = VAUX2 (+) 2 = Second output 3 = V2 (-) 4 = First output 5 = FE	$\begin{array}{c} - & - & - \\ 1 \underbrace{3}_{2} \underbrace{3}_{2} \underbrace{2}_{2} \underbrace{24 \text{ VDC V2}}_{2} \underbrace{3}_{0} \underbrace{6}_{0} \underbrace{1}_{2} \\ 3 \underbrace{- \text{ GND V1}}_{4} \underbrace{4}_{0} \underbrace{9}_{0} \underbrace{2}_{2} \\ \text{X1} & \text{X2} \end{array}$

Note:

VAUX1 = V1 - 0.2 VDC (voltage drop over protective circuit) VAUX2 = V2 - 0.2 VDC (voltage drop over protective circuit)



Device Type	Ethernet M12, d-coded	IN M12, a-coded	Out M12, a-coded	Power (7/8")
TBEN-L1-16DXP	$4 \bigcirc 3 2 4 \bigcirc 3 2 3 2 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3$	3BU - 3BU - 5 PE 4 BK J + 4 BK	5FE 4BK J 2 WH J 3 BU	Voltage supply 7/8" - $ -$
TBEN-L4-16DXP / TBEN-LG-16DXP	P1 P2 1 = TD+ 1 = RD+ 2 = RD+ 2 = TD+ 3 = TD- 3 = RD- 4 = RD- 4 = TD- (see "Note 1")	C1 C8 1 = VAUX1 (+) 2 = Second input 3 = V1 (-) 4 = First input 5 = FE DXP allows for any combination of IO per single connector	C1 C8 1 = VAUX2 (+) 2 = Second output 3 = V2 (-) 4 = First output 5 = FE	$\begin{array}{c} - & - & -\zeta \\ 1 & 3 & 2 & 24 \text{ VDC } V2 \\ 2 & 4 & 3 & 3 & 0 \\ 4 & 3 & 0 & 0 \\ 4 & 0 & 0 & 0 \\ 1 & 0 & 0$

Note 1:

The pin-out of P1 and P2 are "crossed over". P1 has a "NIC-Type" connection and P2 has a "Switch-Type" connection. The TBEN devices without fast start-up are configured with Auto-MDIX enabled. In that case the switch detects the cabling type itself.

With the crossed connection of P2 it is possible to connect multiple devices in a row without Auto-MDIX with 1:1 EtherNet cables. This ensures that the switch could establish a link quickly for fast start-up devices.

LED Diagnostics

The notation of the channel LEDs (LD12 ... LD84) are linked to the appropriate channel (CH) and are coded in the following way:

LDxy:	"X"	represents the connector number
		(x=1 means Connector C1)
	"У"	represents the signal pin number of the appropriate connector (y=4 means signal pin number 4)
Example:		
LD34	Conne	ector C3, signal pin number 4; Channel CH3/4



TBEN EtherNet/IP[™] Configuration Guide





Ethernet Ports and Device Fault LEDs

LED	Status	Description				
LD_	LD_P1 and LD_P2 (same functionality for all device types)					
	off	No connection.				
LD_P1 , LD_P2	green on	Link 100MBit. The LED flashes during data transfer.				
(yellow / green)	yellow on	Link 10MBit. The LED flashes during data transfer.				
	yellow on / green on	no valid state				
	LD_BUS (same fund	ctionality for all device types)				
	off	No supply voltage				
	green on	Logic connection to master established				
LD_BUS	green blinking	Ready for operation				
(red / green)	red on	IP address conflict or restore mode (0 / 900 switch position),				
	red flashing	Blink / Wink command (e.g. from the IO assistant, supervisor tools, etc.)				
	alternating red on / green on	Auto-Negotiation and/or DHCP/BOOTP waiting for IP address assignment				
	LD_ERR (same functionality for all device types)					
	off	not powered				
LD_ERR	green on	no diagnosis				
(red / green)	red on	diagnosis				
	red on / green on	no valid state				

Power LED

LED	Status	Description					
LD-	LD-PWR (device types only supplied by power supply V1) TBEN-LX-16DIP						
LD_PWR	off	V1 : undervoltage or missing power					
(green)	on	V1 :power present					
LD_PWR (device types powered by V1 and V2) TBEN-LX-8DIP-8DOP TBEN-LX-16DOP TBEN-LX-16DXP							
	off	V1: undervoltage mode or missing power					
LD_PWR	green on	V1 and V2: power present					
(red / green)	red on	V2: undervoltage mode or missing power					
	red on / green on	no valid state					

IO LEDs TBEN-LX-16DIP

LED	Status	Description				
Channel LEDs: LD12 LD84 (Channel CH12 Channel CH84) TBEN-LX-16DIP						
	off	Status = 0: Input signal inactive				
LD12LD82 LD14LD84 (red / green)	green on	Status = 1: Input signal active and auxiliary supply of the appropriate channel is normal				
	red flashing	Overload of the auxiliary supply of a channel of the appropriate connector and input signal not active. LDx2 and LDx4 flashing if an overload condition happens at connector x.				
	green on / red flash- ing	Input signal active (voltage from outside, not from aux supply) and auxiliary supply of the appropriate channel not ok. (This is the case with the standard input circuit. This functionality can vary with the input circuit.)				

IO LEDs TBEN-LX-8DIP-8DOP

LED	Status	Description			
Channel LEDs: LD12 LD84 (Channel CH12 Channel CH84) TBEN-LX-8DIP-8DOP INPUTS					
	off	Status = 0: Input signal inactive			
	green on	Status = 1: Input signal active and auxiliary supply of the appropriate channel o.k.			
LD12, LD14, LD22, LD24, LD32, LD34, LD42, LD44,	red flashing	Overload of the auxiliary supply of a channel of the appropriate connector and input signal not active. LDx2 and LDx4 flashing if an overload condition happens at connector x.			
(red / green)	green on / red flashing	Input signal active (voltage from outside, not from aux supply) and auxiliary supply of the appropriate channel not ok. (This is the case with the standard input circuit. This functionality can vary with the in- put circuit.)			
	TBEN-LX-8	DIP-8DOP OUTPUTS			
	off	Status = 0: Output signal inactive, no actuator over- load and aux supply ok.			
	green on	Status = 1: Output signal active, no actuator over- load condition and aux supply ok.			
LD52, LD54, LD62, LD64, LD72, LD74, LD82, LD84,	red flashing	Overload of the auxiliary supply of the appropriate connector and output not active. LDx2 and LDx4 are flashing if an aux supply overload condition hap- pens at connector x.			
(red / green)	red on	Actuator-overload condition of the appropriate chan- nel.			
	green on / red on	The output is not active and the output is supplied from outside. This mode is used for testing purposes only. A diagnosis is not generated.			
	green on / red flashing	Output signal active and no actuator overload con- dition happened. vaux2 of the corresponding con- nector is in overload condition. LDx2 and LDx4 are flashing if an overload condition happens at con- nector x.			



IO LEDs TBEN-LX-16DOP

LED	Status	Description				
Chann	Channel LEDs: LD12 LD84 (Channel CH12 Channel CH84) TBEN-L1-16DOP					
	off	Status = 0: Output signal inactive, no actuator overload condition and aux supply ok.				
	green on	Status = 1: Output signal active, no actuator overload condition and aux supply ok.				
LD12 LD82, LD14 LD84,	red flashing	Overload of the auxiliary supply of the appropriate connector and output not active. LDx2 and LDx4 are flashing if an aux supply overload condition happens at connector x.				
(red / green)	red on	Actuator over load condition of the appropriate channel.				
	green on / red on	The output is not active and the output is supplied from outside. This mode is used for testing purposes only. A diagnosis is not generated.				
	green on / red flashing	Output signal active and no actuator overload condition happened. V _{Aux2} of the corresponding connector is in overload condition.				
		LDx2 and LDx4 are flashing if an overload condition happens at connector x.				

IO LEDs TBEN-LX-16DXP

LED	Status	Description
Chann	el LEDs: LD12 LD	084 (Channel CH12 Channel CH84)
		EN-LI-IODAP
		Status = 0: Input signal inactive
	off	AND Output signal inactive
		AND No actuator overload condition
		and aux supply ok.
LD12 LD82,		Status = 1: Input signal active and auxiliary supply of the appropriate channel o.k.
LD14 LD84	green on	OR
(red / green)		Output signal active, no actuator Over load condition and aux supply ok.
	red flashing	Overload of the auxiliary supply of a channel of the appropriate connector. LDx2 and LDx4 are blinking if an overload condition happens at connector x.
	red on	Actuator overload condition of the appropriate channel.
	green on / red flashing	Input signal active or output active and auxiliary supply of the appropriate channel not ok. (This is the case with the standard input circuit. This functionality can vary with the input circuit.). This behaviour differs from the DOP functionality because the input functionality cannot be deactivated on a DXP device.



IO and Diagnostic Data Format

Abbreviations:

Inputs
Outputs
Force mode active
I/O configuration error
Communication lost on the internal bus
V1 too low
V2 too low
Summarized diagnostic of the device
Summarized diagnostic of the I/Os
Error Code bit x in error-code bit area
Short circuit recovery mode of outputs 116
Auxiliary supply error on connector 18
Short circuit output 116
Inverted inputs 116

TBEN-LX-16DIP

TBEN-L1-16DIP																	
Туре	Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
- 11 -	Nr	15	14	13	12	11	10	9	8	/	6	5	4	3	2	1	U
						Output	t (scann	er -> s	tation)								
GW																	
Command	1																
Word																	
						Input	(station	-> sca	nner)								
GW																	=
Status	1		FCE			CFG	COM	V1									in in
Word(*)																	0 >
Input	2	116	115	114	113	112	112	110	19	18	17	16	15	14	13	12	11
Diagnostic				FC													FM
Word 1 (*)	3			5													0
										~	~	10	10	+		~	_
Diagnostic										l ×	×	×	×	×	×	×	×
Word 2 (*)	4									⊢ 2	⊢ 2	⊦₽	⊢ 2	⊦₽	누구	⊢ ⊋	노공
										⊡ >	<u> </u>	ΞS	<u> </u>	ΞS	⊡ >	<u> </u>	E S



TBEN-LX-8DIP-8DOP

TBEN-L1-8DIP-8DOP																	
Туре	Word Nr	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit O
Output (scanner -> station)																	
GW Command Word	1																
Output	2									08	07	06	05	04	03	02	01
Input (station -> scanner)																	
GW Status Word(*)	1		FCE			CFG	CO M	V1		V2							Diag Warn
Input	2									18	17	16	15	14	13	12	11
Diagnostic Word 1 (*)	3			EC 5													EM 0
Diagnostic Word 2 (*)	4	Err Out8	Err Out7	Err Out6	Err Out5	Err Out4	Err Out3	Err Out2	Err Out1	Err VAUX8	Err VAUX 7	Err VAUX6	Err VAUX5	Err VAUX 4	Err VAUX 3	Err VAUX 2	Err VAUX 1

TBEN-LX-16DOP

	TBEN-L1-16DOP																
Туре	Word Nr	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit O
Output (scanner -> station)																	
GW Command Word	1																
Output	2	016	015	014	013	012	011	010	09	08	07	06	05	04	03	02	01
Input (station -	> scanner)															
GW Status Word(*)	1		FCE			CFG	CO M	V1		V2							Diag Wann
Diagnostic Word 1 (*)	2			EC 5													EM 0
Diagnostic Word 2 (*)	3	Err Out8	Err Out7	Err Outt6	Err Out5	Err Out4	Err Out3	Err Out2	Err Out:1	Err VAUX8	Err VAUX 7	Err VAUX6	Err VAUXS	Err VAUX 4	Err VAUX 3	Err VAUX 2	Err VAUX1
Diagnostic Word 3 (*)	4									Err Out16	Err Out15	Err Out14	Err Out13	Err Out12	Err Out11	Err Out10	Err Ouf9



TBEN-LX-16DXP

						TB	EN-L	.1-16[DXP								
Туре	Word	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
	INF	15	14	15	12	11	10	9	8	· /	0	5	4	5	2	1	U
Output (scanner -> station)																	
GW																	
Command	1																
Word																	
Output	2	016	015	014	013	012	011	010	09	08	07	06	05	04	03	02	01
Input (station -	> scanner))															
GW Status Word(*)	1		FCE			CFG	CO M	V1		V2							Diag Warn
Input	2	116	115	114	113	112	111	110	19	18	17	16	15	14	13	12	11
Diagnostic Word 1 (*)	3			EC 5													EM 0
Diagnostic Word 2 (*)	4	Err Out8	Err Out7	Err Outt6	Err OutS	Err Out4	Err Out3	Err Out2	Err Out1	Err VAUX8	Err VAUX 7	Err VAUX6	Err VAUXS	Err VAUX 4	Err VAUX 3	Err VAUX 2	Err VAUX 1
Diagnostic Word 3 (*)	5									Err Out16	Err Out15	Err Out14	Err Out13	Err Out12	Err Out11	Err Out10	Err Ouf9

IP Address Setup

The general procedure for IP address setup is:

- Set rotary switches to desired position
- Cycle (reset) power to the station
- Run IP address utility to assign IP address
- Set address switches to rotary mode or PGM mode
- Cycle power to the station

When address switches are in rotary mode, the last octet may be dialed in 1-254 range.

Default IP Address

When rotary switches are set to 0, the default IP address is:

- IP-address 192.168.1.254
- Subnet mask 255.255.255.0
- Default gateway 192.168.1.1

To reset IP address to the default, set address switches to 0 and cycle device power. Upon reset, set rotary switches to one of the modes as described hereafter.

Address Switches

TBEN devices have three rotary switches marked as follows:

x100	sets the last digit of IP address to a 100's value
	a statik a la st digit of ID a debasa ta a 40 ² a velva

- x10 sets the last digit of IP address to a 10's value
- x1 sets the last digit of IP address to a 1's value

Switch position determines either address or device mode of operation as follows:



When using the static rotary mode, the last octet of the module's IP address can be set via the rotary coding-switches on the module.

Address range is 1 to 254. Addresses 0 and 255 are reserved and cannot be used. Following example shows the last octet set to of address xx.xxx.xxx.**173**



BOOTP/DHCP Mode (300/400)

The device obtains IP address from the BOOTP or DHCP servers when address switches are set to 300 (BOOTP) or 400 (DHCP) position. The IP address, as well as the subnet mask assigned to the station, is stored in the device's EEPROM. When the station is subsequently switched to rotary or PGM mode and its power reset, the IP address is read from the EEPROM.

5	BOOTP/DHCP Server 2.3					
File	e Tools Help					
EF	Request History					
	Clear History Add to Relatio	n List				
	(hr:min:sec) Type Ethern	iet Address (MAC)	IP Address	Hostname		
	16:00:12 DHCP 00:17: 16:00:07 DHCP 00:07: 16:00:07 DHCP 00:07:	08:61:44:10 46:FF:20:07 46:FF:20:07	192.168.1.125			
	16.00.07 DHCF 00.07.	40.FF.20.07				
		New Entry			×	
					_	
F	Relation List	Ethernet Address (MA	C: 00:07:46:FF:	20:07	_ =	
	New Delete Enable BOOT	IP Addre	ss: 192 .168	. 1 . 1	25	
	Ethernet Address (MAC) T	Hostnar	me:	Enhore the		
	00:07:46:FF:20:07 D) Descripti	on:	Enter the	e IP address ro	r the device to be
			ок (Cancel	1	
	i anti co					Entries
l	Inable to service DHCP request fro	m 00:17:08:61:44:10.				1 of 256
L						

PGM-DHCP Mode (600)

When the rotary switches are set to 600 it enables PGM–DHCP mode of operation. This mode is the out-of-the-box mode and provides the customer with powerful and convenient IP address setup. Procedure is the identical to DHCP mode. When finished, **click on** "*Disable* **BOOTP/DHCP**" *button.* Leave address switches in 96 position and cycle power. The IP address is read from the EEPROM memory.

Server 2.3	_ 🗆 ×
File Tools Help	
- Benuest History	
Clear History Add to Delation List	
Add to Helation List	
(hr.min:sec) Type Ethernet Address (MAC) IP Address Hostname	▲
16:24:25 DHCP 00:50:56:84:32:EC	
16:24:24 DHCP 00:07:46:FF:20:07 192.168.1.125	
16:24:24 DHCP 00:07:46:FF:20:07	
16:24:21 DHCP 00:07:46:FF:20:07	
16:24:20 DHCP 00:1C:25:72:85:30	
16:24:18 DHCP 00:07:46:FF:20:07 16:24:14 DHCP 00:07:46:FF:20:07	
10.24.14 DHCF 00.07.46.FF.20.07	<u> </u>
Delation Link	
Helation List	
New Delete Enable BOOTP Enable DHCP Disable BOOTP/DHCP	
Ethemet Address (MAL) Type IP Address Hostname Description	
00:07:46:FF:20:07 DHCP 192:168.1.125	
	Entire
Status	Entries
[Disable DHCP] Command successful	1 of 256

PGM Mode (500)

When the rotary switches are set to 500 (PGM mode), the device will use either the factory default IP address on the first power-up or maintain current IP address whatever it is. Device IP address may be also changed, when in PGM mode, with software tools like:

- Device WEB server
- TURCK IP address tool
- IOAssistant configuration tool



PGM (500) and Web Server

- Read current IP address of the device (e.g. 192.168.1.20)
- Set rotary switches to 500 and cycle device power
- Enter device current IP address into web browser
- When device web server starts, enter "password" into "Login" field and press Login

Thernet Statistics	×	
← → C ⋒ 🗋 192	.168.1.20/eth_stats.html	2. Enter ☆ =
🗀 Imported From IE 🛛 🖓 TUR	CK USA - Capac 🤷 MSNBC 🛛 🚷 Goog	le "password" and
TBEN-L1-8DIP-8DOP Embedded Website of TBEN	Block I/O Module	Login Automation
Ethernet Statistics >		
Home Station Diagnostics Ethernet Statistics Links	Ethernet Port 1 Status Setup Mode	Autonegotiate
	Link State	Connected
	Autonegotiation Status	Success
	Link speed	100
	Link Duplex	Full-Duplex

- Select "Network Configuration" at the left column
- Enter new IP address e.g. 192.168.1.125 and press "Submit"

T Network Configuration ×				×
← → C ♠ 🗋 192.168.1	20/network_config.html		5	≡
🗀 Imported From IE 🛛 TURCK USA	- Capac и MSNBC 🚦 Google			
TBEN-L1-8DIP-8DOP Embedded Website of TBEN Block I	/O Module		TURCI	ĸ
	admin-u	ser@192.168.1.51 [Logout]	Industrial Automation	
Network Configuration >				
Home Network Configuration Station Diagnostics Ethernet Statistics Links Change Admin Password 8DIP-8DOP Parameters	Network SettingsChanging the IP address willEthernet Port 1 setupEthernet Port 2 setupIP AddressNetmaskDefault GatewayMAC AddressLLDP MAC Address 1LLDP MAC Address 2SubmitReset	not take affect until the device is Autonegotiate ▼ Autonegotiate ▼ 192.168.1.125 255.255.255.0 192.168.1.1 00:07:46:ff:20:07 00:07:46:ff:20:08 00:07:46:ff:20:09	rebooted.]]	



- Leave rotary switches in 500,
- Cycle device power and restart Web page at IP 192.168.1.125

- Home	×		
← → C ff 🗋 192	168.1.125/home.html		5
🔛 Apps 🗀 Imported From I	E 🖵 TURCK USA - Capac 🥠 N	MSNBC <mark>8</mark> Google 💷 News	
TBEN-L1-8DIP-8DOP Embedded Website of TBEN E	Block I/O Module		TURCK
	Pa	assword [Login]	Industrial Automation
Home >			
Station Diagnostics	Station Information		
Ethernet Statistics Links	Туре	TBEN-L1-8DIP-8DOP	
	Identification Number	6814006	
	Firmware Revision	V3.0.1.0	
	Bootloader Revision	V8.0.0.0	
	EtherNet/IP Revision	V2.5.3.0	
	PROFINET Revision	V1.2.1.0	
	Modbus TCP Revision	V1.3.0.0	
	Rotary Switch Mode	PGM	
	PROFINET Station Nan	ne	
	Network Settings		
	Ethernet Port 1 setup	Autonegotiate	
	Ethernet Port 2 setup	Autonegotiate	
	IP Address	192.168.1.125	
	Netmask	255.255.255.0	
	Default Gateway	192.168.1.1	
	MAC Address	00:07:46:ff:20:07	
	LLDP MAC Address 1	00:07:46:ff:20:08	
	LLDP MAC Address 2	00:07:46:ff:20:09	
	EtherNet/IP Status		
	Network topology	Linear	
	DLR State	Normal	
	QuickConnect	Disabled	
	DBOETNET Status		
	Network topology	Linoar	
	FastStartUn	Displied	
I	raststartop	DISADIEO	



PGM (500) and TURCK IP address tool

Start the IP address tool and press search:

	Turck IP Address Tool,	Vers. 1.3					×
Search			0) 💻 💿 🔛			TURCK
	Change Res	et Winl	k	Close			Industrial Automation
No	Ethernet address	IP address	Netmask	Gateway	Mode	Device	Version
1	00:07:46:FF:20:07	192.168.1.125	255.255.255.0	192.168.1.1	PGM		1.0.0.0
Fou	ind 1 Device.						

Highlight device, press "Change" button and enter new IP address; press "Write to device".

Turck IP Address Tool, Vers. 1.3				
Search	Change Device IP proper) 🧰 💿 🔛	1	TURCK
Change Reset	IP Properties			Industrial Automation
No Ethernet address IP addres	Ethemet address	IP address	Device	Version
1 00:07:46:FF:20:07 192.168.	00:07:46:FF:20:07	192.168.1.133		1.0.0.0
	Netmask 255.255.255.0	Gateway 192.168.1.1		
	Cancel	Write to device		
Found I Device.				

Press search and verify address:

	Т	rck IP Address Tool, V	Vers. 1.3	-				×
Search					TURCK			
[Change Reset Wink			ĸ	Close			Industrial Automation
N	ю	Ethernet address	IP address	Netmask	Gateway	Mode	Device	Version
1		00:07:46:FF:20:07	192.168.1.133	255.255.255.0	192.168.1.1	PGM		1.0.0.0



PGM (500) and IOAssistant

Turck BL Service TCP-IP.PW3 - PACTware	Calcor Marco - Temple	
File Edit View Project Device Extras Window Help	1	
Project Project Project Address ↓ Device type (DTM) HOST PC → TCP/IP ↓ DEVICE Ethernet ↓ DEVICE Ethernet	TCP/IP Busaddress management Device type BL Service Ethernet Description BL Service over ethernet communication DTM Image: Ima	Industrial Automation ddress management
	TURCK LAN - 82573LM Gigable (192/168.1.51/255.255.255.255.0) Device type Online ID IP address Netmask Gateway * TBENAL + 60IP 600P 1510028 192.168.1.125 255.255.00 192.168.1.1 * Planned devices	Ethernet address Mode 00:07:46:FF:20:07 PGM , short name

RESTORE Mode (0)

The RESTORE mode is a special mode which restores the IP address to the factory default values. Station responds to PING command, but it does not operate when switches are set to 0. Set all three rotary switches to 0 and cycle the power to the station. It instantaneously restores IP address, Mask and Gateway as follows:

- IP address: 192.168.1.254
- Mask: 255.255.255.0
- Gateway: 192.168.1.1

Set rotary switches to any position as following shown and cycle device power:



F_Reset (900)

The factory reset (900) is a special mode which restores the IP address to 192.168.1.254 and clears all previously assigned values to the parameter of the gateway and IO modules. Set rotary switches to 900 and cycle the power to the station. Wait for a moment, set rotary switches as previously described and cycle device power again.



TBEN EtherNet/IP Configuration

Following section provides information how to configure the TBEN product line with Rockwell Automation Logix controllers (mainly ControlLogix, GuardLogix, CompactLogix controllers). Third party devices may be configured using two different configuration methods which depend on a controller revision:

- Device configuration using EDS file (Electronic Data Sheet): It is only supported by the Logix controllers, firmware revision 20.00.00 and above. It requires that device EDS file (EDS profile) include configuration assembly data
- Device configuration using Ethernet Generic profile: It is supported by all Logix controllers and all devices.

TBEN Configuration Using EDS Files

The EDS file which supports configuration assembly may be imported into RSLogix5000 project. The Logix Designer creates device profile based on EDS and saves device configuration in the project. The controller pushes configuration data to the device whenever connection between them is established.

The TBEN-LX device configuration procedure includes following steps:

- Configure EtherNet/IP User Interface •
- Create RSLogix5000 project •
- Install Device EDS File(s)
- TBEN General Configuration
- TBEN Connection Configuration
- Module Definition Data Format
- Communication RPI, Multicast / Unicast
- TBEN Input, Output and Configuration Data Tags



Configure EtherNet/IP User Interface

Configure user interface to the ControlLogix platform using RSLinx communication software. Add new EtherNet/IP driver that is used to establish connection between programing PC and the Logix controller:

🗞 RSLinx Classic Professional	_ _ ×		
File Edit View Communications Station DDE/OPC Security Window Help			
🖻 🚠 🎜 💼 🙋 😢			
Configure Drivers	? X		
Available Driver Types: EtherNet/IP Driver Add New	Close Help		
Configured Drivers: Name and Description Status AP. VPP.1 PUNNING Purprise Configure			
Add New RSLinx Classic Driver	Startup		
Choose a name for the new driver. OK	Start		
AB_ETHIP-1	Stop		
	Delete		

Select designated driver and click apply:

Configure driver: AB_ETHIP-1	? ×
EtherNet/IP Settings	
Browse Local Subnet O Browse Remote Subnet	
Description	IP Address
Windows Default	
ASIX AX88772 USB2.0 to Fast Ethernet Adapter	192.168.1.48
Microsoft Virtual WiFi Miniport Adapter #2	unknown
Microsoft Virtual WiFi Miniport Adapter	unknown

Create RSLogix5000 Project

Following example is valid if the revision of the controller is 20 or above. Open new RSlogix5000 project and configure your PLC or use an existing project.

👸 RSLogix 5000 - CLX63 [1756-L63 20.11]						
File Edit View Search Logic Communications Tools Window Help						
Bypass_Offdelay Select a Language Select a Language.						
Offline Image: RUN No Forces Image: RUN No Forces Image: RUN Image: RUN Image:						
Controller Organizer	🙀 Controller Properties - CLX63					
Controller CLX63 Tasks MainTask MainTask MainTask Motion Groups Add-On Instructions Data Types Add-On-Defined Strings Add-On-Defined Module-Defined Module-Defined Module-Defined Module-Defined Trends U Configuration D 1756-L63 CLX63 D 1756-L63 CLX63 D 1756-D81 CLX63 D 1756-D81 CLX63 D 12756-DNB DNET B 21 J756-DNB DNET B 21 J756-DNB DNET B 21 J756-DNB DNET	Advanced SFC Execution File Redundancy Nonvolatile Memory Memory Security General Setal Pot System Protocol User Protocol Major Faults Minor Faults Date/Time Vendor: Allen-Bradley Type: 1756-L63 ControlLogix5563 Controller Change Controller Revision: 20.11 Name: CLX63 Description: EIP device configuration Chassis Type: 1756-A10 10-Slot ControlLogix Chassis Slot: 0 OK Cancel Apply Help					
Ready						



Install EDS File(s)

Tools > EDS Hardware	Installation	Tool
----------------------	--------------	------

🔐 RSLogix 5000 - CLX63 [1756-L63 20.11]					
File Edit View Search Logic Communications	Tools Window Help				
🗎 🗃 🖨 👹 🗟 👘 💼 🗠 🖙 🖼 Bypass_C	o Options V C Select a Language V Select a Language				
Offline □ ↓ □ RUN No Forces ► □ □ OK	Documentation Languages				
No Edits	Import (L)- Export (L)-				
Controller Organizer - 4 ×	EDS Hardware Installation Tool				
Controller Organizer	Series EDS Hardware Installation Tool Motion > Custom Tools Custom Tools CogtrolFLASH Tag Data Monitor Tool Tag Upload Download Tool Cusju5000 Clock Update Tool Logix5000 Task Monitor DeviceNet Tag Generator PoeticeNet Tag Generator Compare Tool				

Follow the wizard instructions





Register single file or directory of EDS files and follow registration dialog:

Rockwell Automation's EDS	Wizard]
Registration Electronic Data Sheet Automation application	file(s) will be added to your system for use in Rockwell s.	
C Register a single file		
Register a directory of I	EDS files 🔲 Look in subfolders	
In folder:		
C:\Users\bbegic\Docume	nts\Z_Config Files EIP Multiprotocol\TBEN Browse	
• If there is an ico then this image w	Browse for Folder	

Following files are registered

Rockwell Automation's EDS Wizard	— X—
Final Task Summary This is a review of the task you want to com	plete.
You would like to register the following TBEN-L1-16DIP TBEN-L1-16DOP TBEN-L1-16DXP TBEN-L1-8DIP-8DOP	g 4 devices
	< Back Next > Cancel

Create new TBEN Module

To configure new TBEN device in RSLogix5000, use File menu:

File > New Component > Module

👸 R	🔀 RSLogix 5000 - CLX63 [1756-L63 20.11]				
File	Edit View Search Logic Communications	Tools	Wi	Window Help	
Ē	<u>N</u> ew Ct	rl+N	Г	🗸 🚑 🕰 🚺 💽 📝 🕾 🔍 🛇 Select a Language	
2	Open Ct	rl+0	Path	th: AB ETHIP:1\192168163\Backplane\0*	
	Close				
	Save Ct	rl+S	FI	I ├── └── ┤	
	Save <u>A</u> s		\ F	Favorites 🖌 Add-On 👗 Alarms 👗 Bit 👗 Timer/Counter 👗 Input/Output 👗 Compare 👗	
	Ne <u>w</u> Component	Þ	6.	Add-On Instruction	
	Import Component	•	<mark>_</mark> ₽₽	Data Type	
	Compact		IJ	<u>M</u> odule	
	<u></u> p		_	<u>P</u> rogram	
	Page Set <u>u</u> p			<u>R</u> outine	
	<u>G</u> enerate Report		_	<u>S</u> tring Type	
	<u>P</u> rint	•	2	<u>م</u> <u>I</u> ag Ctrl+W	
	Print Op <u>t</u> ions		S	Tas <u>k</u>	
	1 CLX63.ACD		₫.] Tre <u>n</u> d	
	2 CLX62V20_TBEN_QC_Eds_noxdp.ACD				
	3 C:\Users\\CLX62V20_TBEN_QC_Eds_R2.ACD				
	4 C:\Users\\2013\TBEN\TBEN_Conn.ACD				
	5 C:\Users\\CLX62V20_TBEN_DLR_1.ACD				
	<u>6</u> TBEN_Conn.ACD				
	7 C:\Users\\TBEN\CLX62V20_TBEN_DLR.ACD				
	8 C:\Users\\CLX62V20_TBEN_DLR_CELL1.ACD				
	Exit				

Or right-click at "Ethernet" and select "New module"

	n ne, 1 .63 C :N2T	756-A10 LX63 R EIP	
	٦	New Module	
		Discover Modules	
	ß	Paste	Ctrl+V
		Print	•

New device may be located in the "Select Module Type" by scrolling:

Select Modu	ule Type								
Catalog	Module Discovery Favori	tes							
Enter	r Search Text for Module Ty	/pe	Clea	ir Fi	ilters	3		Hide Filters	*
	Module Typ	e Category Filters		<u> </u>	1	Modu	ile Type Vendor Filte	ers	*
	Communication				1	Allen-Bradley			E
V	Communications Adapter				V	Advanced Micro Co	ontrols Inc. (AMCI)		
V	Controller				V	Cognex Corporation	1		
V	Digital		-	-	V	Endress+Hauser			-
•			P.		٠.		111		P.
Cata	alog Number	Description				Vendor	Category		
	0005_007B_0030	SP600				Reliance Electric	DPI to EtherNet/I	P	
(0005_007B_0038	SP600 ER 400V				Reliance Electric	DPI to EtherNet/I	P	
(0005_007B_0039	SP600 ER 200V				Reliance Electric	DPI to EtherNet/I	P	
	0005_007B_003A	SP600 ER 600V				Reliance Electric	DPI to EtherNet/I	P	
	0005_007B_0060	Liquiflo 2.0				Reliance Electric	DPI to EtherNet/I	P	/
(0005_007F_0027	MD60				Reliance Electric	MDI to EtherNet/I	Р 🥖	
(0005_007F_0028	MD65				Reliance Electric	MDI to EtherNet/I	Р 🥖	
(002F_000C_000B	CJ1W-EIP21				Omron Corporation	Communications A	dapter	
	1305-ACDrive-EN1	AC Drive via 1203-EN1				Allen-Bradley	Drive	-5	
	1336E-IMPACTDrive-EN1	AC Drive via 1203-EN1				Allen-Bradley	Drive	oll to find	
	1336F-PLUSIIDrive-EN1	AC Drive via 1203-EN1				Allen-Bradley	Drive	device	
	1336R-REGENBrake-EN1	Brake via 1203-EN1				Allen-Bradley	Drive		
	1336S-PLUSDriveLG-EN1	007-600 HP Code AC Dri	ive via	12	0	Allen-Bradley	Drive		-
•			1	11	-		-		P
267 c	of 267 Module Types Found	i						Add to Favo	orites
👿 Cle	ose on Create						Create	Close	Help

By searching specific name:

Module Type alog Module Discovery F	avorites Searc	ch			
TBEN		Clear F	ilters	Hide Fi	lters 🛠
Module	e Type Category Filters	*		Module Type Vendor Filters	
Communication Communications Ada Controller	pter		Advanced M Allen-Bradl Cognex Co	Micro Controls Inc. (AMCI) ey rporation	
Digital	m	+	Endress+Ha	auser III	•
Catalog Number	Description		Vendor	Category	
6814005 6814006 6814007 6814009	TBEN-L1-16DIP TBEN-L1-8DIP-8DOP TBEN-L1-16DOP TBEN-L1-16DOP		Turck Turck Turck	Communications Adapter Communications Adapter Communications Adapter	

Or by filtering the "Module Type Vendor Filters" to search specific products, as follows:

TURCK • 3000 Campus Drive • Minneapolis, MN 55441-2656 33 Phone: 763.553.7300 • Toll Free: 800.544.7769 • Fax: 763.553.0708 • www.turck.us

Catalog Module Discovery	Favorites	Che	eck TURCK	
Enter Search Text for Mo	cule Type	lear Filters		Hide Filters 🛠
Mod	le Type Category Filters		Module Type Vend	lor Filters
		D Dade Hannifi	n Comportion	
Communication	anter	Rannoa Flad	ri Corporation	
Controller	aprei	Interaction Sch	ulo	E
Digital		Turck		
<		<		•
	Description	Select device	Vendor	Category ^
6811490	BLCEN-8M12LT-8DI-N-8DI-I		Turck	Communications /
6814005	TBEN-L1-16DIP		Turck	Communications /
6814006	TBEN-L1-8DIP-8DOP	1	Turck	Communications A
6814007	TBEN-L1-16DOP		Turck	Communications /
6814008	TBEN-L1-16DXP		Turck	Communications /
6825420	FGEN-XSG16-4001		Turck	Communications /
6825421	FGEN-XSG16-5001		Turck	Communications /
6825423	FGEN-IM16-4001		Turck	Communications /
6825424	FGEN-IOM88-5001		Turck	Communications / =
6825426	FGEN-OM16-4001		Turck	Communications /
6825427	FGEN-IM16-5001		Turck	Communications /
6825429	FGEN-IOM88-4001		Turck	Communications /
6825430	FGEN-OM16-5001		Turck	Communications / 🚽
of 266 Module Types	Found	Click to crea	ate	Add to Favorites

If device name does not appear in the list of registered device, either device EDS file is not installed or installation failed. Enter required data into the "**New Module**" general page:

- Name (tag name) and description
- IP address
- Click "Change" to open Module Definition page

N	New Module	
G	eneral [*] Conne	ection Module Info Internet Protocol Port Configuration
·	Туре:	6814006 TBEN-L1-8DIP-8DOP
v	Vendor:	
F	Parent:	EIP Enter IAG name Enter IP address
1	Name:	TBEN_8in8out Ethernet Address
1	Description:	Enter device description or comments: TBEN-L1-8DIP-8DOP FW V3.01.0 EIP V2.5.0.0 MAC 00:07:46:ff:20:07
	⊂ Module Definit	ition
	Revision: Electronic Key Connections:	2.5 aving: Compatible Module Exclusive Owner Click to select connection and assembly data type. TURCK devices support INT data format
		Change
Sta	itus: Creating	OK Cancel Help

Configure Connection Parameters

The connection parameters may be selected when a Module Definition page is opened. It is used to select connection type and IO data format.

Module Definition Data Format

TBEN supports INTEGER data format only. It is important to edit and change data format used by RSLogix5000 to match INTEGER. A failure to do so may case erroneous IO data or inoperable IO data update. Use "Change" button to:

- Change data format to INTEGER
- Review connection type

TBEN supports following connections:

- Exclusive Owner
- Input-Only connection
- Listen-Only connection

Note:

Exclusive Owner connection is the preferred, default, connection type use by the device. Input-Only and Listen-Only connections are used to configure the device with multiple PLC's and they do not support configuration assemblies.

The "Module Definition" page provides following setup options:

Module Definition		×		🔳 Mo	odule Definitio	n*			_ >
Revision: 2	- 5			Revis	sion:	2	•	5 🌲	
Electronic Keying: Compati	ible Module	•		Elect	ronic Keying:	Compa	itible Mod	ule	
Connections:				Conn	ections:				
Name	Size			N	lame			Size	
Exclusive Owner	Input: 8	SINT			volucius Owner		Input:	8	SINT
	Output: 4				Aciusive Owner		Output:	4	
Exclusive Owner Input Only Connection Listen Only Connection									SINT INT DINT
									REAL
			Must u	se INT ormat	data				
ОК	Cancel	Help	and		<u>ОК</u>		Canc	el	Help

Follow dialog to complete setup.

Communication RPI, Multicast / Unicast

The "Connection" tab is used for selecting:

- RPI (Requested Packet Rate) is a scheduled interval when a Target (TBEN) and Origin (controller) transmit data. The connection timeout may occur after 4xRPI time, when either Target or Origin stops sending data.
- Unicast:
 - Used for point-to-point communication (TCP, UDP)
 - Both Producer /Consumer use IP address classes A, B, or C for data exchange
 - No need to process and reject multicast packets
 - Reduces burden on all EIP participants
- Multicast :
 - Used for one-to-many communications (UDP)
 - Multicast allows for multiple consumers. However, a single consumer is also supported
 - With multiple consumers, Multicast is more timely efficient than Unicast
 - Uses IP address class D (Multicast addresses, e.g. 239.192.1.2)



Multicast is used by device

Follow the dialog to complete device configuration.



TBEN Input, Output and Configuration Data Tags

The new device, after being configured, is added to the Controller Organizer and associated input, output and configuration tags are created at the Controller Tags level.



Input data tag content:

Device "Connection Faulted" flag is attached to the input data by the controller.

Ø	Controller Tags - CLX63(controller)									
S	icope: 🛐 CLX63 🛛 👻 S	how: All	Tags		▼ Enter Name Filter					
	Name	그룹 스	Data Type	Alias For	Description					
			_0030:681400							
	- TBEN_8in8out:I		_0030:681400		Input (produced) data					
	-TBEN_8in8out:I.Connection	BOOL		Controller provided info						
	- TBEN_8in8out:I.Data		INT[4]		Input (produced) data					
	+ TBEN_8in8out:1.Data[0]		INT	NT Device status word						
	+-TBEN_8in8out:I.Data[1]	INT		Input data						
	🛨 - TBEN_8in8out:I.Data[2]	INT		Diagnostic data						
TBEN_8in8out:I.Data[3]			INT		Diagnostic data					
	TBEN_8in8out:0	_0030:681400								

Output data tag content:

ø	Controller Tags - CLX63(controller)										
	Scope: 🛐 CLX63 🔹 Show: All T				Tags	ags 🔹 🔽					
	Name 🗔 🛆			Data Type	Alias For	Description					
	+-TE	3EN_8in8out:C				_0030:681400					
	+-TE	3EN_8in8out:1				_0030:681400 Input (prod			ced) data		
	- TBEN_8in8out:0				_0030:681400 Output (C			sumed) data			
	- TBEN_8in8out:0.Data				INT[2] Output			put (Consumed) data			
	TBEN_8in8out:0.Data[0]				INT Device co			ce control word			
	+-TBEN_8in8out:0.Data[1]				INT		Output da	ita			

Configuration data tag content:



TBEN EtherNet/IP[™] Configuration Guide

Controller Tags - CLX63(controller)				
Scope: 🛐 CLX63 🔹 Show: All Tags				▼ Enter Name Filter
Name EB A	Valu	Style	Data Ty	Description
E-TBEN_8in8out:C	{		_0030:	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch1	0	Decimal	BOOL	1 = Disables auto-recovery of outputs
TBEN_8in8out:C.Disable_Auto_Recovery_Ch2	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch3	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch4	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch5	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch6	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch7	0	Decimal	BOOL	Configuration data
TBEN_8in8out:C.Disable_Auto_Recovery_Ch8	0	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch1	1	Decimal	BOOL	1 = Inverts input signal
- TBEN_8in8out:C.Input_Inversion_Ch2	1	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch3	1	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch4	1	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch5	0	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch6	0	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch7	0	Decimal	BOOL	Configuration data
- TBEN_8in8out:C.Input_Inversion_Ch8	0	Decimal	BOOL	Stretch input signal
⊞- TBEN_8in8out:C.Pulse_Stretching_Ch1	10	Decimal	SINT	Configuration data
E TBEN_8in8out:C.Pulse_Stretching_Ch2	20	Decimal	SINT	Configuration data
⊞ - TBEN_8in8out:C.Pulse_Stretching_Ch3	50	Decimal	SINT	Configuration data
⊞ - TBEN_8in8out:C.Pulse_Stretching_Ch4	100	Decimal	SINT	Configuration data
E - TBEN_8in8out:C.Pulse_Stretching_Ch5	127	Decimal	SINT	Configuration data
TBEN_8in8out:C.Pulse_Stretching_Ch6	0	Decimal	SINT	Configuration data
TBEN_8in8out:C.Pulse_Stretching_Ch7	0	Decimal	SINT	Configuration data
	0	Decimal	SINT	Configuration data
TBEN_8in8out:C.Quick_Connect_0	0	Decimal	BOOL	1 = Enables QuickConnect

The device configuration data comes from the EDS file and consist of parameters that are read / write enabled. The controller must be in the program mode (off-line) to accept configuration modifications. The configuration changes must be downloaded to the controller and take effect on the next startup. Make sure to save any program changes.



TBEN-LX Configuration Parameters

Item	Parameter name	Description							
TBEN-LX-series: Digital Inputs									
<i>Pulse_stretching</i> Trigger to an internal TOF timer, (available for input channels only)	lStx	It is an input signal OFF timer. The time base is 10ms. For example a value of 10 means 100ms. Pulse stretching range [0- 127]. The default value is 0 [Pulse stretching is dis- abled].							
Input_Inversion	lnv.lx	Inversion of input signal. A 0 means that an activated input (green LED on) is transmitted as a logical 1 in the process data. A 1 means that an activated input (green LED on) is transmitted as a logical 0 in the process data. The default value of the bit is 0.							

TBEN-LX-series: Digital Outputs						
<i>Disable_Auto_Recovery</i> Recovery mode of the out- puts in case of short circuit	SROx	The corresponding parameter bits are named "SROx". If the bit is zero the output is in "Au- tomatic recovery mode" and the Output is di- rectly set again after the overload condition is gone. If the SROx Bit is set to one the Output is in "Controlled recovery mode". In this mode the PLC must switch the output off and on again to set the output. The default value of the bit is 0.				
Output_Enable	Out Enable x	Only available on DXP devices. 0 = output driver is not be enabled. 1 = output driver is enabled The default value of the bit is 1.				



TBEN-LX Profile Info

The device property is a subject to change. It also provides path to check installed EDS file: right-click on the device and select *"Properties"*:



Click on marked icon and follow instructions:

I Module Properties:	EN2TR (6814006 2.5)			
General Connection	n Module Info Interr	net Protocol Port Configuration		
Click the icor select	n and	About RSLogix 5000 Module Profile	Info X	
Tomo.		6814006 TBEN-L1-8DIP-8DOP		
Description: TB	3EN-L1-8DIP-8DOP √ 2.11.4.0	Core: RSLogix 5000 Module Profile Core Software Version Installed:	8.01.2627.0	125
EII ID M/	P 2.5.0.0 6814006 AC 00:07:46:ff:20:07	Module Vendor: Turck		
Module Definition		EDS File: Revision: Creation Date:	2.3	
Revision:	2.5	Creation Time:	5:03:31 PM	
Connections:	Exclusive Owner	Modification Date: Modification Time:	8/16/2013 1:44:05 PM	
View of	device profile and talled EDS file	View ED DK	IS File	
Status: Offline		ОК	Cancel A	pply Help

TBEN Configured as Ethernet Generic Device

Earlier versions of RSlogix5000 Programming Software and Logix controllers, revision 19 or less do not support EDS files. In such case, TBEN may be configured using Ethernet Generic profile. It generally creates input, output and configuration tags, once the device is configured. Configuration data support a single parameter. The device is implicitly configured using one of the following connections: Exclusive Owner, Input-Only or Listen-Only connection.

The TBEN device configuration procedure includes following steps:

- Create RSLogix5000 project •
- Add new device using Ethernet Generic device profile
- Configure connection data •
- Review Input, Output and Configuration Data Tags •

- - × RSLogix 5000 - CLX63_V19 [1756-L63 19.11]* File Edit View Search Logic Communications Tools Window Help 📋 🚅 📕 🎒 🐰 🖻 💼 🗠 🖙 🖬 Bypass_Offdelay - 🏴 🕰 强 📭 📝 🕾 🔍 🔍 S Select a Language.. **.** 🛛 🗸 🔲 RUN Offline Path: <none> ▼ 品 BAT 🔲 ОК No Forces ا 🗆 🔒 ۰. No Edits Favorites Add-On A Alarms A Bit A Timer/Counter A Ing 0.0 Redundancy Controller Organizer **-** ₽ X 🔞 Controller Properties - CLX63_V19 • X Advanced SFC Execution File Redundancy Nonvolatile Memory 🛓 🖂 Tasks Memory age General Serial Port System Protocol User Protocol Major Faults Minor Faults Date/Time 🛓 🤯 MainTask 🗄 🕞 MainProgram Vendor: Allen-Bradley ... Unscheduled Programs / Phases 1756-L63 ControlLogix5563 Controller Hotion Groups Type: Change Controller... Ungrouped Axes Revision: 19.11 Add-On Instructions 🚊 📇 Data Types CLX63_V19 Name: 🔤 🙀 User-Defined Configuration method supported by RSLogix5000 upto 🛓 🙀 Strings Description: revision 19.xx.xx 🖳 🙀 Add-On-Defined 🗄 🙀 Predefined 🛄 🙀 Module-Defined Chassis Type: 1756-A10 10-Slot ControlLogix Chassis 🗀 Trends 0 * Slot: = 1756 Backplane, 1756-A10 ---- 🔁 [0] 1756-L63 CLX63_V19 🗄 🖷 🖞 [1] 1756-EN2TR EIP 品 Ethernet Create Output Unlatch instruction

Create a New RSLogix5000 Project



Add New Device

Right-click on the Ethernet to add new module:

¢	Controller Organizer		→ ₽ X	
Sta	👳 🗀 Controller CLX63			
루	🗄 🗀 Tasks			
age	🗄 🗀 Motion Groups			
	🔲 🧰 Add-On Instructi	ons		
	🗄 🗀 Data Types			
	Trends			
	🛓 🔄 I/O Configuration	n		
	🚊 📾 1756 Backplar	ne, 17	56-A10	
	🔁 [0] 1756-L	63 CL	X63	
	📄 🔋 [1] 1756-Е	N2TR	EIP	
	븝…器 <mark>Ethern</mark>		New Markets	
	🖞 17:	D	New Module	
	関 681		Discover Modules	
		ß	Paste	Ctrl+V
			Print	•

Select "ETHERNET-MODULE" and click "OK":

	Sele	ect Module			x
Γ	Modu	le	Description	Vendor	
L		ETHERNET-BRIDGE	Generic EtherNet/IP CIP Bridge	Allen-Bradley	<u> </u>
L		ETHERNET-MODULE	Generic Ethernet Module	Allen-Bradley	
		EtherNet/IP	SoftLogix5800 EtherNet/IP	Allen-Bradley	
		In-Sight 1700 Series	Vision System	Connex Corporation	

New device configuration page looks as follows:

Type: Vendor: Parenti	ETHERNET-MODULE Go Allen-Bradley	eneric Ethernet	Module			
Mamo:			Connection Par	ameters		
Description:				Assembly Instance:	Size:	
			Input:		125	
		*	Output:		124	
Comm Forma	t: Data - DINT	-	Configuration:		0	🚔 (8-bit)
Address / H	lost Name					
IP Addr	888:		Status Input:			
🔘 Host Na	ame:		Status Output	:		

Configure New Device

TURCK devices are configured using Explicit Owner, Input-Only and Listen-Only connections.

Exclusive Owner Connection

The controller, who is "Exclusive Owner" of the device, is the only PLC able to control device outputs. The device may communicate with multiple PLC's and provide input or explicit data. The "Exclusive Owner" connection is implicitly used when following parameters are entered:

New Module						×		
Type: Vendor: Parent: Name:	ETHERNET-MODULE Generic Ethernet Module Allen-Bradley EIP TREM PDIP PDOP							
Description:	TBEN-L1-8DIP-8DOP Exclusive owver connection EIP V2.5.0.0.	*	Input: Output:	Assembly Instance: 103 104	Size: 4 2	(16-bit)		
Comm Format Address / H	Data - INT ost Name	-	Configuration:	106	0	(8-bit)		
IP Addre IP Addre IP Addre	me:	125	Status Input: Status Output:			-		

The device is implicitly configured with the controller using "Exclusive Owner" connection. It is default connection and only one that supports configuration assembly data.

Table 2.1 contains assembly instance and data size information for the TBEN-LX product family. The configuration assembly data is pushed to the device during the communication startup (a Forward Open request).

Exclusive Owner connection	Input as- sembly instance	Input size	Output assembly instance	Output size	Configuration assembly in- stance	Configuration size
TBEN-LX-16DIP	103	4	104	1	106	0
TBEN-LX-16DOP	103	4	104	2	106	0
TBEN-LX-16DXP	103	5	104	2	106	0
TBEN-LX-8DIP-DOP	103	4	104	2	106	0

Table 2.1 – Exclusive Owner configuration data

Configure connection data according to the project requirements:

Module Properties Report: EN2TR (ETHERNET-MODULE 1.1)	×
General Connection* Module Info	
Requested Packet Interval (RPI): 10.0 ms (1.0 - 3200.0 ms)	
Major Fault On Controller If Connection Fails While in Run Mode	
✓ Use Unicast Connection over EtherNet/IP	



Input-Only Connection

Input-Only connection is used to configure TBEN when:

- It is already configured with another PLC as Exclusive Owner, and you are configuring device with the second PLC to receive input data only. In such case, the device is configured with the same RPI and Multicast transmission with both PLCs.
- PLCs may reside on different subnets, VLANs, when infrastructure is available.

Enter following data and click OK:

- Name
- CommFormat field : Input Data INT
- IP address

General* Connection Module Info							
Type: ETHERNET-MODULE Generic Ethernet Module							
Vendor: Allen-Bradley							
Parent: EIP							
Name:	TBEN_8in8out	Connection Pa	rameters				
Description:			Assembly Instance:	Size:			
Description.	EIP V2.5.0.0	nput:	103	4	膏 (16-bit)		
		Output:	254		_		
Comm Format:	Input Data - INT	Configuration	r 106	0	(8-bit)		
Address / Ho	ost Name	coningulation					
IP Addres	ss: 192 . 168 . 1 . 125	Status Input:			_		
Host Name: Status Output:							

The device is implicitly configured with the controller using "Input-Only" connection. Table 2.2 contains assembly instance and data size information for the TBEN-LX product family.

Exclusive Owner connection	Input as- sembly instance	Input size	Output assembly instance	Output size	Configuration assembly in- stance	Configuration size
TBEN-LX-16DIP	103	4	254	n/a	106	0
TBEN-LX-16DOP	103	4	254	n/a	106	0
TBEN-LX-16DXP	103	5	254	n/a	106	0
TBEN-LX-8DIP-DOP	103	4	254	n/a	106	0

Table 2.2 – Input-Only configuration data

Note: If multiple connections to the device are used, then use the same RPI and Multicast

Module Properties Report: EN2TR (ETHERNET-MODULE 1.1)					
General Connection* Module Info					
Requested Packet Interval (RPI): 10.0 ms (1.0 - 3200.0 ms) Inhibit Module Major Fault On Controller If Connection Fails While in Run Mode					

Listen-Only Connection Configuration

Listen-Only connection is used to configure a device when:

- It is configured with multiple PLCs (max three) where only one is Exclusive Owner
- Other PLCs get input data only. They drop connection if exclusive owner is closed
- PLCs have to be set to the same RPI and must use MULTICAST messaging. PLCs may reside on different subnets, VLANs, when infrastructure is available.

Enter following data and click OK:

- Name
- CommFormat field : Input Data INT
- IP address

Module Properties Report: EIP (ETHERNET-MODULE 1.1)							
General* Connection Module Info							
Type:	ETHERNET-MODULE Generic Ethernet Module						
Vendor:	Allen-Bradley						
Parent:	EIP						
Name:	TBEN 8in8out	- Connection Para	ameters				
Description:			Assembly Instance:	Size:			
	EIP V2.5.0.0	Input:	103	4 🚔 (16-bit)			
	T	Output:	255				
Comm Format:	Input Data - INT 🔹	Configuration	106	0 🔄 (8-bit)			
Address / H	ost Name	een nigenedeen n		(
IP Addre	ss: 192 . 168 . 1 . 125	Status Input:					
🔘 Host Nar	me:	Status Output:					
Status: Offline	ОК	Cancel	Apply	, Help			

The device is implicitly configured with the controller using "Input-Only" connection. Table 2.3 contains assembly instance and data size information for the TBEN-LX product family

Exclusive Owner connection	Input as- sembly instance	Input size	Output assembly instance	Output size	Configuration assembly in- stance	Configuration size
TBEN-LX-16DIP	103	4	255	n/a	106	0
TBEN-LX-16DOP	103	4	255	n/a	106	0
TBEN-LX-16DXP	103	5	255	n/a	106	0
TBEN-LX-8DIP-DOP	103	4	255	n/a	106	0

Table 2.3 – Listen-Only configuration data

Note: If multiple connections to the device are used, then use the same RPI and Multicast.



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Module Properties Report: EN2TR (ETHERNET-MODULE 1.1)	×
General Connection* Module Info	
Requested Packet Interval (RPI): 10.0 ms (1.0 - 3200.0 ms) Inhibit Module Major Fault On Controller If Connection Fails While in Run Mode	

Configuration Assembly Data Structure

The device Configuration data resides in a PLC. PLC pushes configuration to the device during the Forward Open request. That occurs every time when the device is connected, or power reset or replaced with the same model. The Configuration assembly maintains consistency of the device configuration for as long as a control system stays the same.

The structure of the configuration data is different for each TBEN-LX device, as follows:

TBEN-LX-8DIP-8DOP											
	Bit7	Blt6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0			
Byte0											
Byte1											
Byte2											
Byte3											
Byte4	Reserved	Reserved									
Byte5											
Byte6											
Byte7											
Byte8											
Byte9	Reserved							QC			
Byte10	INV 8	INV 7	INV 6	INV 5	INV 4	INV 3	INV 2	INV 1			
Byte11	SRO 8	SRO 7	SRO 6	SRO 5	SRO 4	SRO 3	SRO 2	SRO 1			
Byte12											
Byte13	Reserved										
Byte14											
Byte15	ISt1										
Byte16	ISt2										
Byte17	ISt3										
Byte18	ISt4										
Byte19	ISt5										
Byte20	ISt6										
Byte21	ISt7										
Byte22	ISt8										
Byte23-45	Reserved										

Table 2.4 – TBEN-LX-8DIP-8DOP configuration data

Abbreviations:

- QC Quick Connect
- INVx Input Inversion
- SROx Output Short Recovery
- IStx Input pulse stretching
- OE Output enable

			TBEN-I	_X-16DIP				
	Bit7	Blt6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0								
Byte1								
Byte2								
Byte3								
Byte4	Reserved							
Byte5								
Byte6								
Byte7								
Byte8								
Byte9	Reserved							QC
Byte10	Reserved							
Byte11		1	1	1	1	1	1	
Byte12	INV 8	INV 7	INV 6	INV 5	INV 4	INV 3	INV 2	INV 1
Byte13	INV 16	INV 15	INV 14	INV 13	INV 12	INV 11	INV 10	INV 9
Byte14	Reserved							
Byte15	ISt1							
Byte16	ISt2							
Byte17	ISt3							
Byte18	ISt4							
Byte19	ISt5							
Byte20	ISt6							
Byte21	ISt7							
Byte22	ISt8							
Byte23	ISt9							
Byte24	ISt10							
Byte25	ISt11							
Byte26	ISt12							
Byte27	ISt13							
Byte28	ISt14							
Byte29	ISt15							
Byte30	ISt16							
Byte31-45	Reserved							



TBEN-LX-16	DXP			-	-	-	-				
	Bit7	Blt6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0			
Byte0											
Byte1											
Byte2											
Byte3											
Byte4	Reserved										
Byte5											
Byte6											
Byte7											
Byte8											
Byte9	Reserved							QC			
Byte10	Reserved										
Byte11											
Byte12	INV 8	INV 7	INV 6	INV 5	INV 4	INV 3	INV 2	INV 1			
Byte13	INV 16	INV 15	INV 14	INV 13	INV 12	INV 11	INV 10	INV 9			
Byte14	SRO 8	SRO 7	SRO 6	SRO 5	SRO 4	SRO 3	SRO 2	SRO 1			
Byte15	SRO 16	SRO 15	SRO 14	SRO 13	SRO 12	SRO 11	SRO10	SRO 9			
Byte16	OE 8	OE 7	OE 6	OE 5	OE 4	OE 3	OE 2	OE 1			
Byte17	OE 16 OE 15 OE 14 OE 13 OE 12 OE 11 OE 10										
Byte18	Reserved										
Byte19	ISt1										
Byte20	ISt2										
Byte21	ISt3										
Byte22	ISt4										
Byte23	ISt5										
Byte24	ISt6										
Byte25	ISt7										
Byte26	ISt8										
Byte27	ISt9										
Byte28	ISt10										
Byte29	ISt11										
Byte30	ISt12										
Byte31	ISt13										
Byte32	ISt14										
Byte33	ISt15										
Byte34	ISt16										
Byte35-45	Reserved										

Table 2.6 – TBEN-LX-16DXP configuration data



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TBEN-LX-16	DOP										
	Bit7	Blt6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0			
Byte0											
Byte1											
Byte2											
Byte3											
Byte4	Reserved										
Byte5											
Byte6											
Byte7											
Byte8											
Byte9	Reserved							QC			
Byte10	SRO 8	SRO 7	SRO 6	SRO 5	SRO 4	SRO 3	SRO 2	SRO 1			
Byte11	SRO 16	SRO 15	SRO 14	SRO 13	SRO 12	SRO 11	SRO10	SRO 9			
Byte12	Reserved										
Byte13	Reserved	Neselveu									
Byte14-45	Reserved										

Table 2.7 – TBEN-LX-16DOP configuration data

TBEN and DLR Network

A Device Level Ring (DLR) network is the EtherNet/IP network capable of fast recovery and uninterrupted service in case of a single break point in network topology. It consists of a ring supervisor and ring nodes connected in closed loop, i.e. ring topology. The ring supervisor maintains DLR protocol, performs fast fault detection and reconfiguration of the network architecture into a linear in less than 3msec for 50 node network.

A DLR device must have embedded switching technology and support for DLR protocol. The device is configured as previously described: using EDS file or as Ethernet Generic device. External switches are not required. Following image illustrates a simple ring network:



TBEN-LX DLR Features

TBEN-LX series is designed to meet DLR network requirements including:

- Compliance with the DLR and QoS Object Specification, Volume 2: EtherNet/IP Adaptation of CIP, Chapter 5: Object library, Edition 1.10
- Integrated embedded switching technology that supports two external and an internal Ethernet ports with following features:
 - Auto-negotiation, with 10/100Mbps, full/half duplex
 - Forced setting of speed/duplex
 - Turn off flow control on ring ports;
 - Auto MDIX (medium dependent interface crossover), in both auto-negotiate and forced speed/duplex modes.
- Fault detection in the ring topology on either Ethernet ports to the left or right of the breaking point and error reporting to the supervisor



TBEN and QC Startup

The Quick Connect (QC) provides high device availability during startup of EtherNet/IP network. Typical application where it is implemented is a frequent robot tool exchange along assembly lines in the automotive industry, Figure 1.



Figure 1: Tool exchange

When new tool is engaged and locked into the robot arm, it generates a high lock signal to the Logix controller which starts the QC allocation sequence. The QC sequence has to be complete in less than 350msec. The QC is supported by Logix controllers revision 20.00.00 and above.

The Quick Connect Sequence

Following sequence of events describe Quick Connect application:

- The Logix controller inhibits current QC modules and turns power OFF
- The robot arm physically disengages a tool
- The robot arm physically attaches a new tool that has one or more QC modules mounted on the tool
- The robot acknowledges successful attachment of a tool with appropriate lock signal
- The Logix controller turns power ON to the QC modules when lock signal is received
- The Logix controller waits for QC devices to complete self powerup initialization before it uninhibits device
- The robot is ready for operation when connections with device are established



Ethernet Port Setup

When QC is enabled, Ethernet ports are set as follows:

Ports	Autonegotiate	Mode	Force speed/duplex	Speed	Duplex
Eth1	Disabled	MDI	Enabled	100	Full
Eth2	Disabled	MDIX	Enabled	100	Full

Enable QC

If TBEN is configured using EDS file, set QC parameter to 1 •

TBEN_IOM88:C.Pulse_Stretching_Ch8	0	Decimal	SINT
TBEN_IOM88:C.Quick_Connect_0	1	Decimal	BOOL
E - TBEN_IOM88:I	{}		_0030:681400

If TBEN is configured as Ethernet Generic module, set "... C:Data[9]:= 1"

Controller Tags - CLX63_V19(controller)								
Scope: 🛐 CLX63_V19 🗸 Show: All 1	ags		 Enter Name Filter 	•				
Name 🔚 🛆	Data Type	Alias For	Description					
E TBEN_8DIP_8DOP:C.Data	SINT[400]		Configuration data					
TBEN_8DIP_8DOP:C.Data[0]	SINT		Reserved	ĮĘ				
TBEN_8DIP_8DOP:C.Data[1]	SINT		Reserved Source: (Tag) <tben_8dip_8dop:c></tben_8dip_8dop:c>	e i				
TBEN_8DIP_8DOP:C.Data[2]	SINT		Reserved	S S				
TBEN_8DIP_8DOP:C.Data[3]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[4]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[5]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[6]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[7]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[8]	SINT		Reserved					
TBEN_8DIP_8DOP:C.Data[9]	SINT		1 = QC enabled					

- Download configuration to the PLC and connect the gateway •
- QC mode will be executed during the next gateway power-up and subsequent power • cycles

Disable QC

- If TBEN is configured using EDS file, reset QC parameter to 0, or
- Clear QC flag of the configuration assembly "... C:Data[9]:= 0"
- Download configuration to the PLC and connect the gateway
- Standard mode is executed on the next and subsequent power cycles of the gateway

Reset to Factory Default

An alternative way to reset QC port setup is to reset device to factory default:

- Set the rotary switches to 900 and cycle power to the module
- Set the rotary switches to 100 and cycle power to the module
- The module is reset to factory default settings and
 - IP address 192.168.1.100
 - Mask 255.255.255.0
 - Gateway 192.168.1.1 -

QC Startup Time

The startup time is 100msec.