Realtime High performance PLC solution based on STM32MP135

Nxtrol Technology

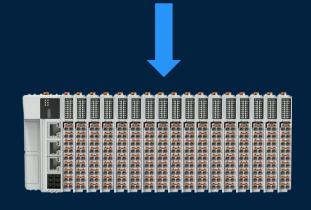


Introduction



Henry Bao, Nxtrol technology Co-founder and General Manager, who served as the technical leader of the China branch of a well-known German IEC61131-3 PLC software solution company from 2010 to 2019. Specialized in IEC61131-3 standard PLC-related software and hardware technologies, with nearly 15 years of technical expertise in PLC core platform technology, as well as fieldbus, communication protocols, motion control, and other related technologies.

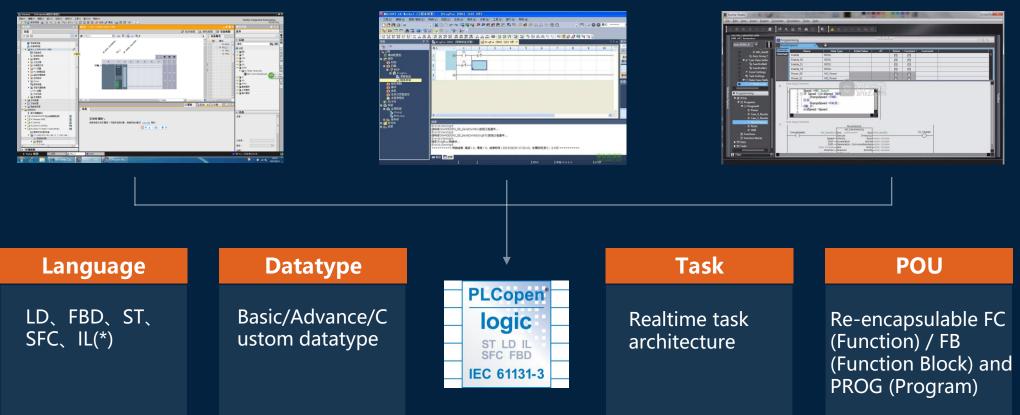




Specialized in PLC software and hardware technology solutions

PLC market and Technological system(2023)

Siemens(40%)

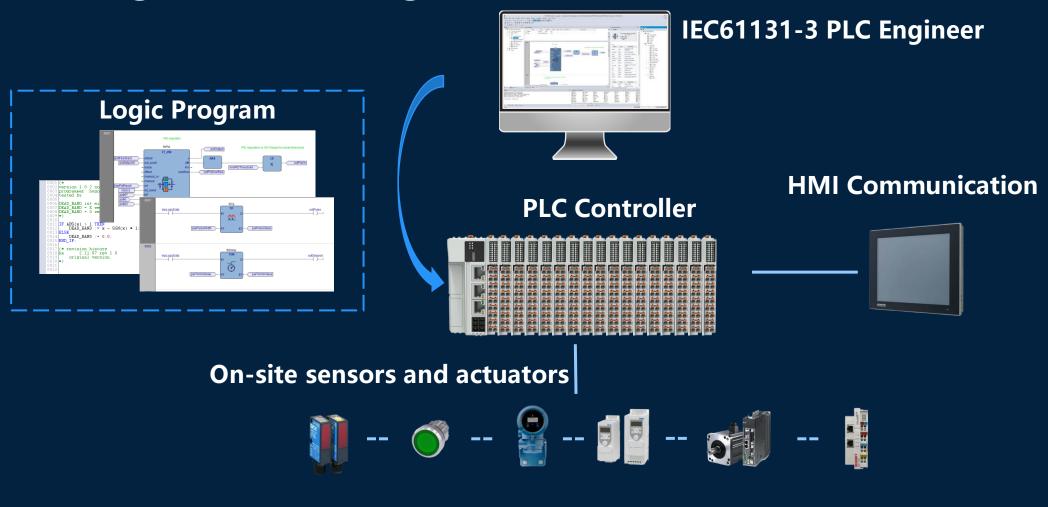


Mitsubish(12.9%)

NXTROL

Omron(11.2%)

Programmable Logic Controller



Key points of new model high performance PLC from Market



Integration - Integrating more debugging tools to lower the application threshold.



High speed and more axis - 12 Axis:125us/128 Axis: less than 1ms



Low interrupt latency - 5us

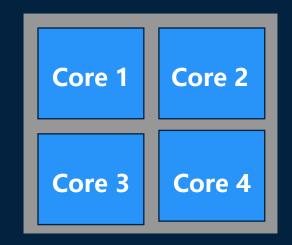


High performance - around 27 times than traditional PLC



High Capacity - Approximately 2-100 times that of traditional models.

ARM Cortex-A Quad Core





Select best platform combination







Open Cooperation

Full functionality reference design





MPU & Reference Board



SOM module



Software Technology







Open Cooperation

Performance & Cost Balanced



MPU



PLC Hardware



Local & Remote IO



Housing & Connector

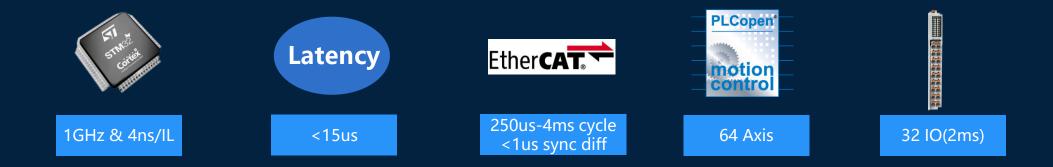


Software Technology











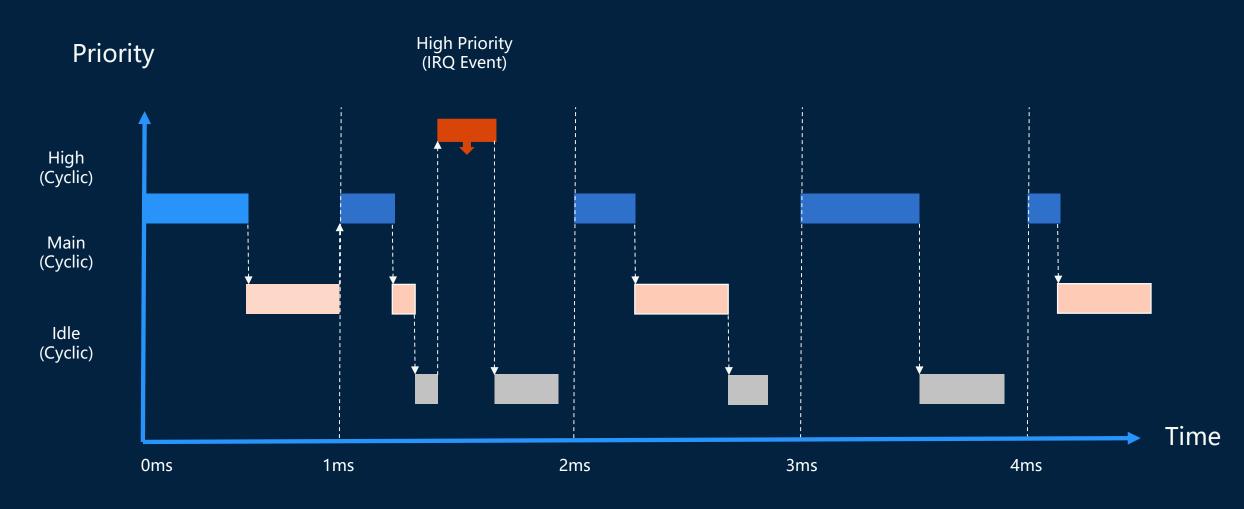


100% opensource and free RTOS - ThreadX







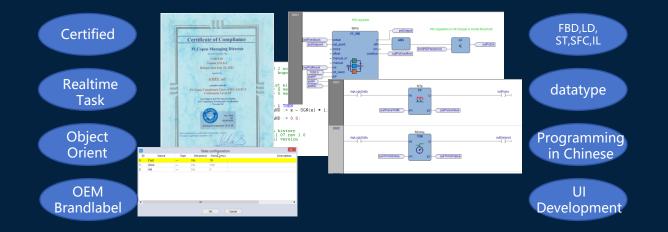


PLC program execution

NXT

LogicLab IDE feature

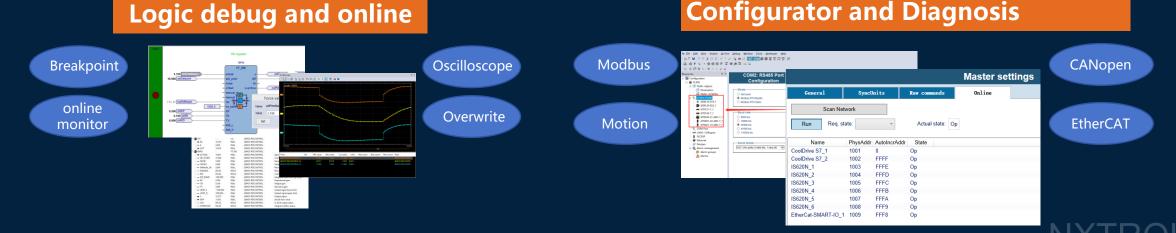
IEC61131-3 Standard



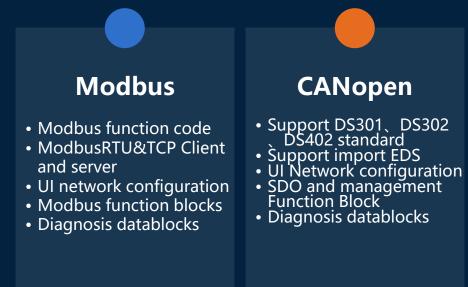
Lightweight and high-performance

- Full feature installation < 200MB
- Machine code execution, more than 10 times faster than traditional PLC
- Fast compiling and debuging
- Low resource requirement, support IEC61131-3 on resource constrain MCU

Configurator and Diagnosis



High performance Modbus&CANopen protocol



ilter:			通用	参数化	PDO发送Tx - 输入	PDO接收Rx - 输出
设备名	版本	描述	·			
Modbus FC-01	1.0	读线圈 - 功能01(0×01)		_		
Modbus FC-02	1.0	读裔散输入 - 功能02(0×(名称	G	eneric CANopen device_1	
Modbus FC-03	1.0	读保持寄存器 - 功能03(0	节点号(1127)	1		
Modbus FC-04	1.0	读输入寄存器 - 功能04(0	节点保护周期(ms)	2	00	
Modbus FC-05	1.0	写入单线圈 - 功能05(0×(
Modbus FC-06	1.0	写入单个寄存器 - 功能06	存活时间參數	3		
Modbus FC-15	1.0	写多个线圈 - 功能15(为0	引导时间	1	0000	
Modbus FC-16	1.0	写多个寄存器 - 功能16(0	等待启动消息	2	7	
			节点心跳生产者时间	(ms) 0		
显示所有版本			节点心跳消费者时间	(ms) 0		
414 - P			主站心跳时间(ms)	0		
- 模式			强制性的]	
 ○ 未使用 ● Modbus RTU主站 			标识对象检查			
〇 Modbus RTU从站						
			一过程数据对象PDC	D映射		
O 600 b/s			允许变量PDO映射			
 1200 b/s 2400 b/s 		模式	过程数据对象PDO自	动映射		
O 2400 b/s O 4800 b/s		 ○ 未使用 ● 主站 				
 9600 b/s 19200 b/s 			一过程数据对象PDC	D发送Tx通讯设置-		
 38400 b/s 			 用户自定义模式 			• 用
O 57600 b/s		0 1 Mb/s 0 800 Kb/s	 同步模式 			
O 76800 b/s O 115200 b/s		○ 500 Kb/s				
		© 250 Kb/s				
		0 125 Kb/s 0 100 Kb/s				
N,8,1 (No parity, 8 data bits, 1 stop	bit) 🔽	○ 50 Kb/s				
		 主站设置				
		节点ID(1127):	127			
		心跳时间(ms):	0			
		同步COBID:	128			
		同步周期(臺秒):	0			

』 设备目录



·过程数据对象 ● 用户自定ン ○ 同步模式

High performance EtherCAT master

Core feature

- COE、FOE、EOE
- Online Configuration and Diagnosis
- Support standard ESI and ENI
- Support DC correction
- 125us-4ms EtherCAT cycle time

Configuration

- Import ESI and generate and standard ENI
- Online scan and parameter setting
- Init commands and PDO configuration
- Online read and write EtherCAT ESC register、PDO、COE object
- Online monitor slaves status
- No slaves limitation, free of charge

Development

- PDO mappingSDO read and write
- Master and slave monitor
- Support PLC and C/C++
- API

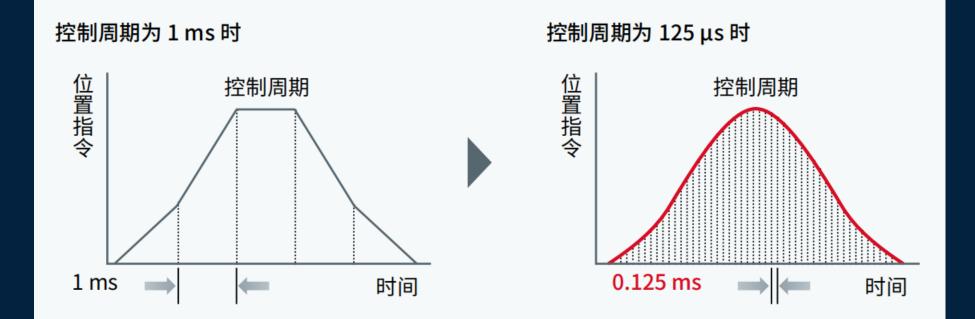
× u			Slav	e settings				设备目录		
ECN-T800								设备名	版本	描述
() 公共対象	General	Startup	Input	Output	Mailbox	BC		III 🔐 ACTI		
	General						~	Beckhoff Automation GmbH & Co.		
								Berghof Automation GmbH		
₹, COM1-R5485	✓ Enabled							Boneng		
₹, COM2-RS232	Slave name:	CoolDrive S7_1								
Ethernet	Auto incr address:	0						Bonfiglioli Vectron MDS GmbH		
■ 10 主要同格	Physical address:	1001 Manual	cfg					III HCFA Co.,Ltd		
CoolDrive S7_1	Previous port	Master	Output port: B					🗉 🔣 Helmholz GmbH & Co. KG		
CoolDrive S7 2								INEXBOT		
2 IS620N 1								🗉 🚉 Inovance		
- 2 15620N_2	Device info-							🗉 🎫 Kolimorgen		
2 15620N_3	Slave type:	CoolDrive S7		1.0				H Maxsine		
2: 15620N_4	Product/revision	6-1						Nanjing Solidot Electronic Technol		
- 2 15620N_5	Documentation URL		entre com	Open					2	
- 2 15620N_6										
EtherCat-SMART-ID_1	Check VendorID		ectrical Technology (B							
Web Site	Check ProductCo			0x6						
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Alarm groups	Check SerialNo			0x0				I T Stone		
	Check Identificat	News	×	0				D Tsino-Dynatron Electrical Technolo		
MQTT				•						
								X) Xinje Electronics, Inc.		

	描述						Master set	tings
•	. 1842		General	SyncUnits		Raw commands	Online	
			Scan Net	vork				
			Run Req. sta	ite:	~	Actual state: Op		
			Name	PhysAddr	AutoIncrAddr	State		
			CoolDrive S7_1	1001	0	Ор		
			CoolDrive S7_2	1002	FFFF	Op		
			IS620N_1	1003	FFFE	Op		
			IS620N_2	1004	FFFD	Ор		
			IS620N_3	1005	FFFC	Ор		
			IS620N_4	1006	FFFB	Op		
			IS620N_5	1007	FFFA	Op		
			IS620N_6	1008	FFF9	Op		
			EtherCat-SMART-IO_1	1009	FFF8	Ор		

Read sel	acted	Read ALL Write select	COE Objects ted Virite on edit	🖌 Read	d after write			- 0	2
Auto up	idate [Show error messages Add to Sta	artup cmd					All flags	
Index	Subidx	Name	Туре	Bit len	Flags	Value		Default	
0x1000		Device type	UDINT	32	R0, 0		1314	74 (0x20192)	ï
0x1001		Error Register	USINT	8	R0, 0		0 (0x0)))	
0x1008		Device name	STRING(31)	248	RO				
0x1009		Hardware version	STRING(4)	32	RO				
0x100A		Software version	STRING(4)	32	R0, 0				
0x1C00	0	Sync manager type - SubIndex 000	USINT	8	RO, O		4 (0x)	I)	
0x1C00	1	Sync manager type[1]	USINT	8	R0, 0		1 (0x1	ŋ	
0x1C00	2	Sync manager type[2]	USINT	8	RO, O		2 (0x2	0	
0x1C00	3	Sync manager type[3]	USINT	8	RO, O		3 (0x3	5)	
0x1C00	4	Sync manager type[4]	USINT	8	R0, 0		4 (0x4	¹)	
0x1018	0	Identity - Subindex 000	USINT	8	RO		4 (0x)	I)	
0x1018	1	Identity - Vendor ID	UDINT	32	RO		10.485	576 (0x10000	ĸ
0x1018	2	Identity - Product Code	UDINT	32	RO		78665	6 (0xC0108)	1
0x1018	3	Identity - Revision Number	UDINT	32	RO		65537	(0x10001)	
0x1600	0	1st receive PDO Mapping - SubIndex 000	USINT	8	RW		3 (0x3	9	

Advantage of High performance EtherCAT

▶【高精度】位置指令的精度比较



NXTROL

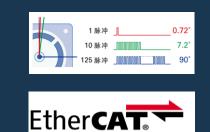
Motion Control solution



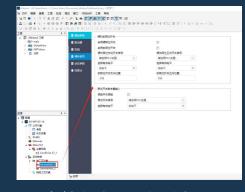
Duo Instruction (PLCopen & Base)

	MC_MoveAbsolute)	
-	Axis Done	-	
•	Execute Busy	-	AxisMoveAbs
•	ContinuousUpdate Active	- ·	- Axis
•	Position CommandAborted	- ·	Position
•	Velocity Error	- ·	Velocity
•	Acceleration Errorld	- ·	Direction
•	Deceleration		
•	Jerk		
•	Direction		
•	BufferMode		
)	





Configuration and Diag

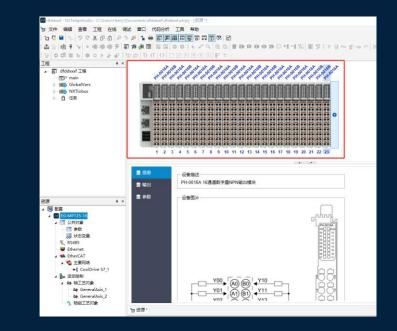


所有轴参数配置均通过界面 配置完成



Extend LoigcLab IDE through SDK

dfddood - NXTedgeStudio - C:\Users\	Henry\Documents\dfdboxd\dfdd	toxf.plcprj - [资源 *]				
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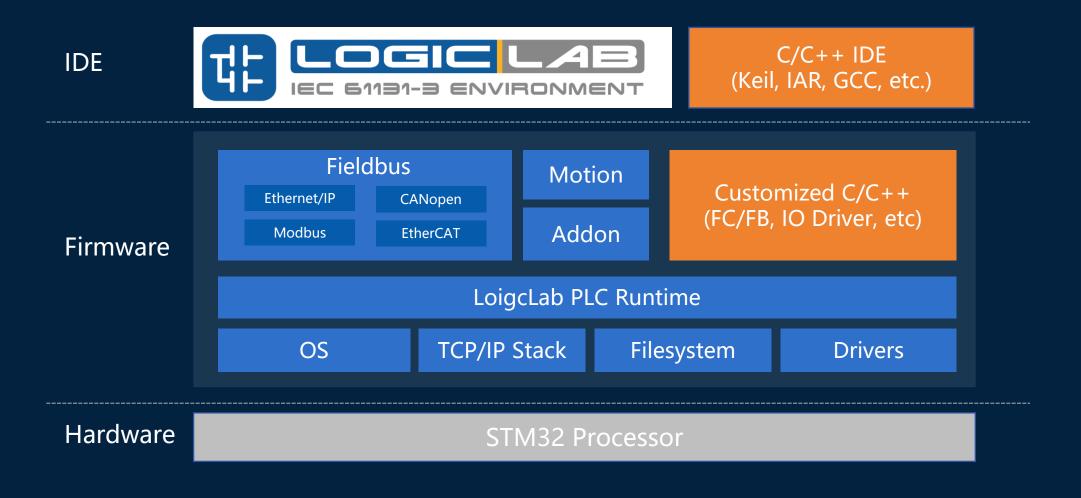


Axis Configuration and Diagnosis

IO Bus Configuration and Diagnosis



One-stop software solution for core technologies of PLC





STM32MP257 + RTOS + LogicLab(Future)



- High performance High CPU frequence and multi core optimization
- 2
- **Realtime enhancement DDR4 high performance RAM**
- High performance network TSN switch support high performance communication



3

PCI-E interface - Possible to replace traditional Motion Control Card



Middle and large scale PLC



Display and PLC integrated controller



Motion Control Card



Thanks for your attention!





