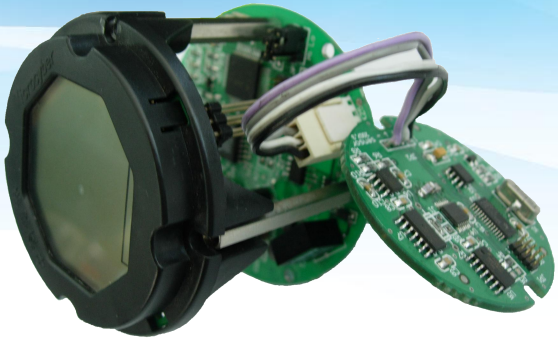
MICROCYBER

Solution of Fieldbus products development

-- Fieldbus Communication Controller

and Communication board



About Us

Microcyber Inc. is a high-tech enterprise established by Chinese Academy of Sciences. The company engages in R&D, manufacturing, sales and engineering service of advanced industrial control systems, equipments, instruments and chips for industrial process control solutions.

Microcyber Inc. is looking forward to the long-term smooth and close cooperation with you

Products Application

- **Electromotion Actuator：**

  Emerson Process Management,Valve Actuation, LLC (USA)

  Dalian Ouya Instrument Co., Ltd

- **Flow Transmitter**

  Dandong Top Electronics Instrument Co., Ltd

  Tianjin Instruments Group Co., Ltd

  China Silian Instruments Group Co., Ltd

- **Liquid-Level Transmitter**

  Dandong Top Electronics Instrument Co., Ltd

  Beijing Jingyi Hifor Automation Instrument Co., Ltd

- **Pressure Transmitter**

  Microcyber Inc., etc.

- **Temperature Transmitter**

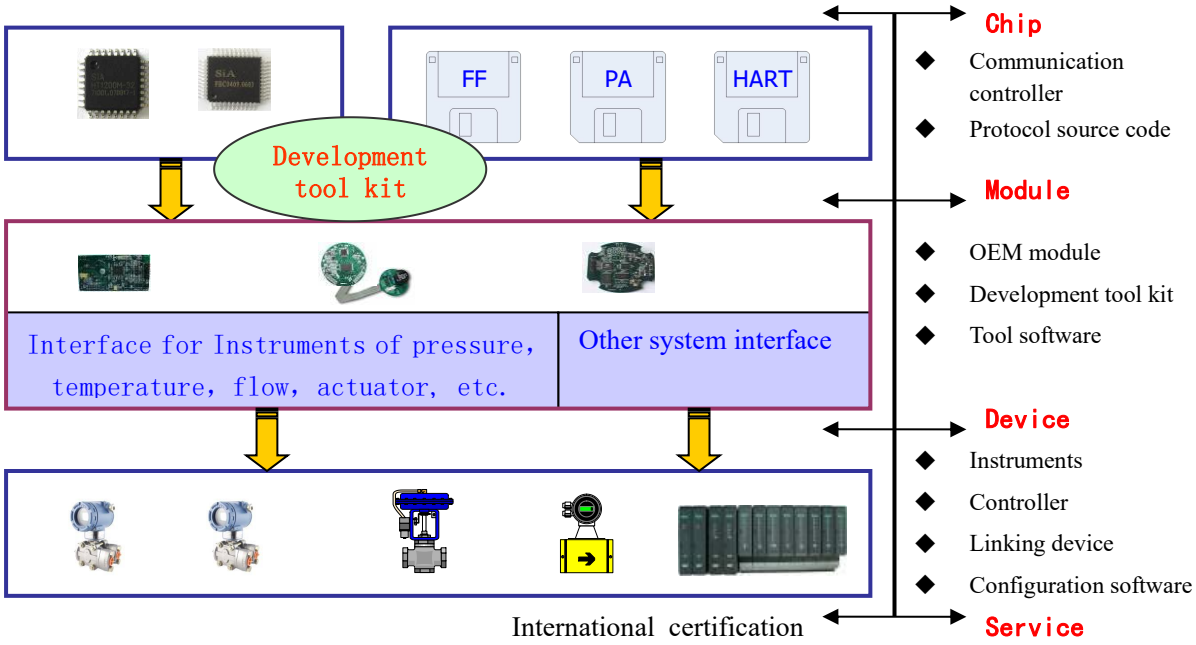
  Microcyber Inc., etc.

- **Fieldbus Current Converter**

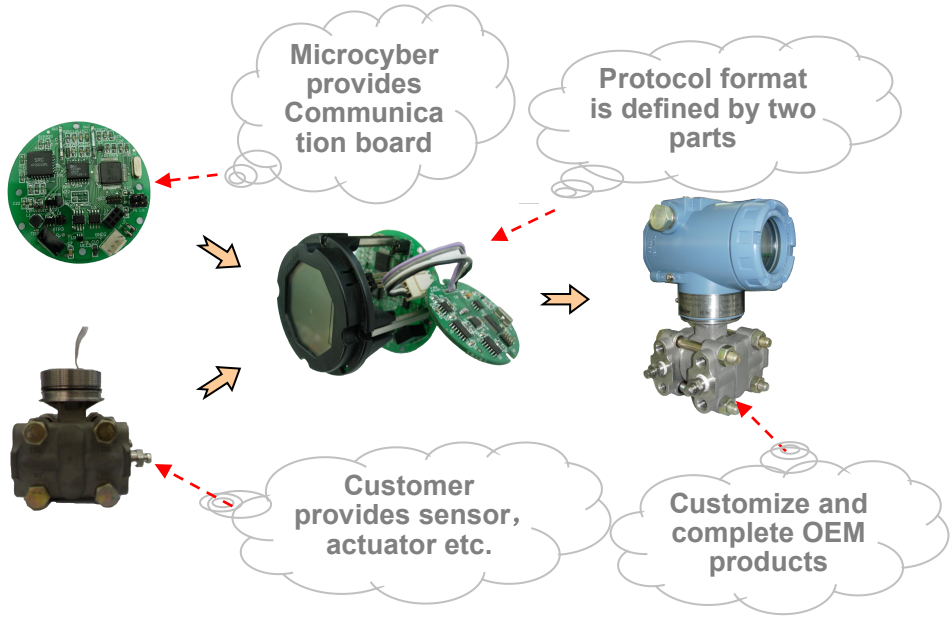
  Microcyber Inc., etc.

Solution of Fieldbus products development

Microcyber provides a series of fieldbus solution for communication controller, communication board and instruments with HART、 FF H1 or Profibus PA protocol according to all different user's requirements. If Microcyber's fieldbus communication Board is used by Instrument Company, we may help user to complete related international certification.



Flow chart of cooperation development for pressure transmitter



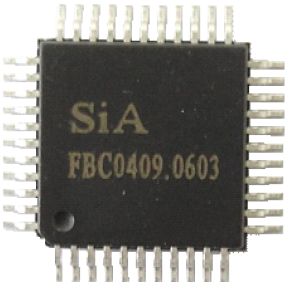
Boards Supply

Microcyber has lots of experience with developing pressure transmitter, temperature transmitter, level transmitter, flow transmitter, etc. We satisfy all user's requirement.

Fieldbus Communication Controller

FBC0409 Fieldbus Communication Controller

1. Brief Introduction

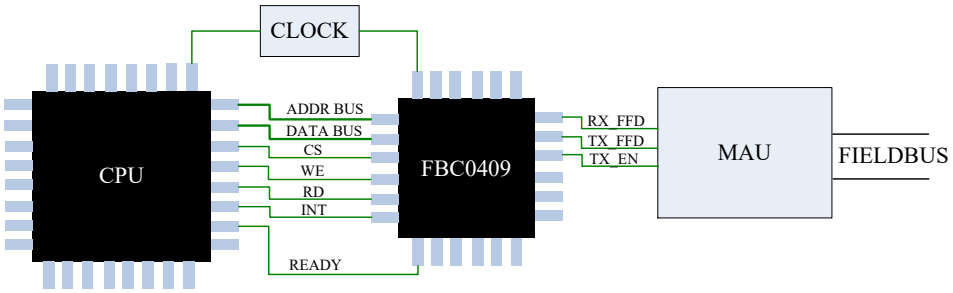


- Designed to comply with IEC 61158-2
- Has physical layer and some function of link layer
- Good at integration, simple external circuit, small size
  - ➢ Available in 44-pins TQFP package
  - ➢ Internal 4k bytes asynchronous SRAM storage data for transmitting, receiving and address lookup table
  - ➢ Low power consumption design：<600UA
- Available for developing the products with FF H1，PROFIBUS PA

2. Performance Characteristic

- Supports line data rate 31.25K BIT/S
- Build-in Manchester Encoder/Decoder
- Transmitter Jibber inhibit, receiver super long frame inhibit
- Automatic parity recognition and correction
- Build-in two channels DMA controller，used to control data transmitting, receiving and address recognition
- Build-in bus arbiter, CPU accessing internal SRAM correctly
- Internal loop back for test
- Operating temperature：-40℃～85℃

3. Typical Application

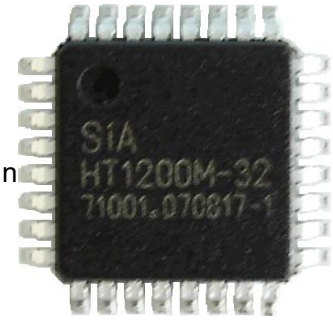


HT1200M HART Communication Controller

1. Brief Introduction

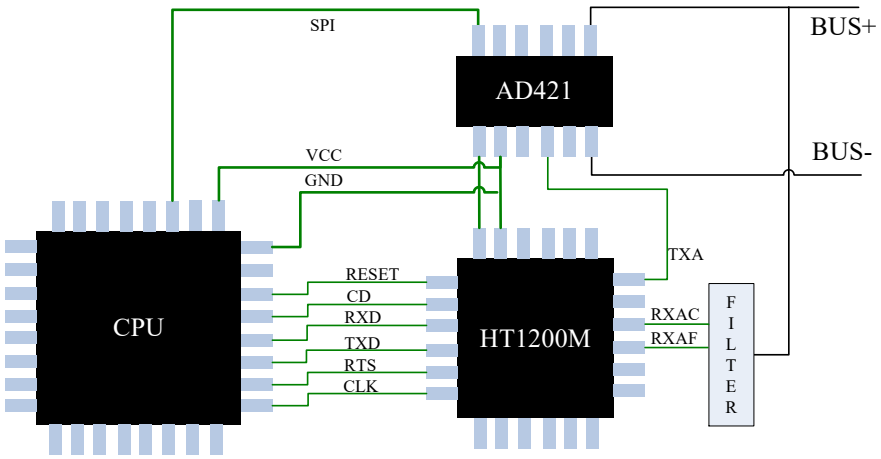
- As the modulation and demodulation controller with low power consumption, HT1200M is used for developing HART products and good at performance, cost and quality etc.
- HT1200M is compatible with HT20C15 and SYM20C15.

2. Main Characteristic



- Single chip
- FSK modem (Semi-duplex 1200b/s)
- Integrates circuit of receiving band-pass filter with circuit of sendin signal waveform and reshaping
- External connection with 460.8kHz crystal or ceramic filter
- Internal clock vibrator or external clock input
- Operation temperature: -40℃～85℃
- Voltage: 3.3V～5.0V
- Operation current：<200uA
- LQFP32 and PLCC28 package

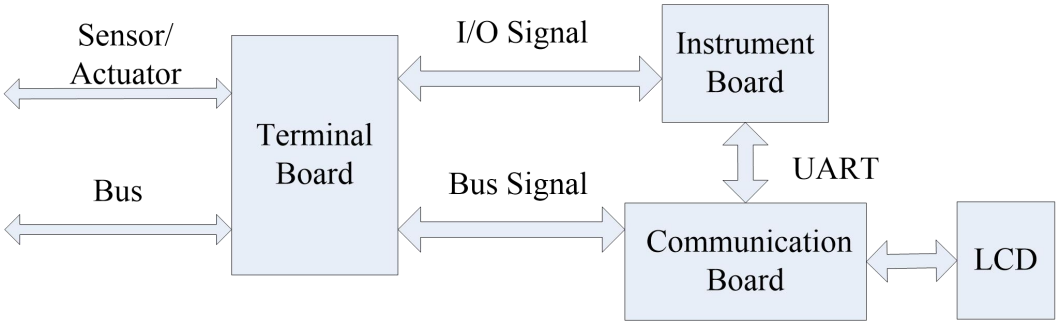
3. Typical Application



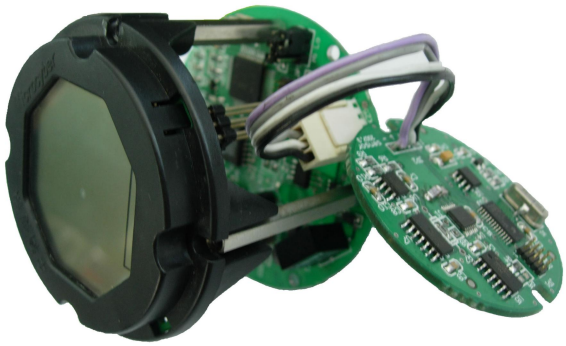
Solution of Fieldbus Board Set

Microcyber provides fieldbus communication boards with HART、FF H1 or Profibus PA and instrument boards connected with different sensors. We have the instrument boards for difference capacitance pressure sensor, resistance bridge, thermoelectricity resistance, thermocouple and current, etc. there is UART serial port for communication between communication board and instrument board. The communication board support isolated DC power supply and communicates data with the instrument board, also provides power supply to LCD and drives it to display.

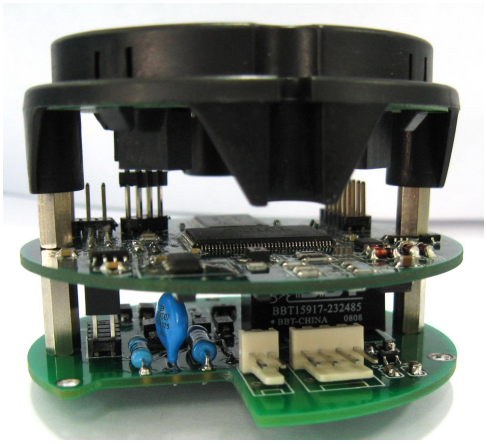
The Instrument board can be connects with many kind of sensor and actuator, etc., and transfers measuring values to communication board through serial protocol or receives data from the communication board to output.



Hardware Structure of Transmitter



A Board Set for HART Capacitance Pressure Transmitter



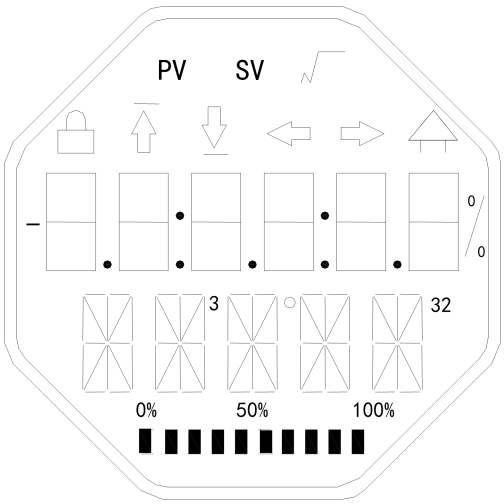
A FF/PA Board Set

NCS-LCM LCD Module

1. Main Characteristic

- Three-wire serial interface
- Operation temperature：-30 ~ +80℃
- Operation voltage：3.3V DC
- Operation current：210uA
- Four directions revolving installation
- 6 bits numerical, 5 bits characters and 17 normal standard instruments icon
- Size：Φ65mm

2. Display Appearance

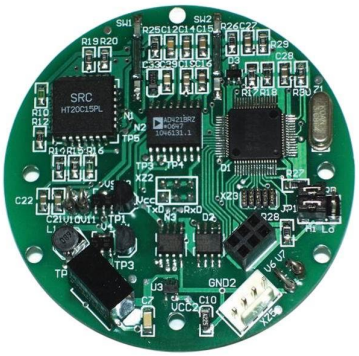


LCD segment sketch map

NCS-RC105 HART Communication Board

NCS-RC105H HART communication board is developed with the standard of HART protocol. It becomes the digital field device combined with traditional instruments, so it can be used as HART or 4-20mA instrument. NCS-RC105H HART communication board provides the function of control, capture/output and display for field device.

1. Main Characteristic



- 4 ~ 20mA output with digital communication of HART protocol（two-wire）
- Communication of interface: UART
- Support CPU failure alarm
- Write-protect jumper
- IEC Ex intrinsic safety certification
- EMC test certification
- With optical coupler
- Support LCD and magnetism stick operation
- Support Rosemount 275/375 Controller
- Size：Φ65mm（customized according to user's requirements）

2. Technical Parameter

- Power supply: 11.9 ~ 45V
- Accuracy: 0.02%
- High alarm current: 〉=20.8mA
- Low alarm current:〈=3.9mA
- Power supply of interface board:

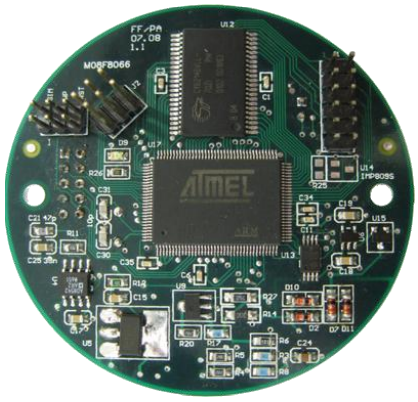
  isolation 3.3V, 3 mA
- Operation temperature: - 40℃~ 85
- Damping adjusting: 0 ~ 32s, stepping 0.1s

NCS-RC105 FF/PA Communication Board

NCS-RC105 FF/PA Communication Board is developed with the standard of FF H1 and Profibus PA. As the core module of intelligent instruments, NCS-RC105F provides the function of control, capture/output and display for field device. NCS-RC105FF H1 can be the Link Master or Slave device and provide abundant function blocks.

1. Hardware Characteristic

- Realize FF H1 or PROFIBUS PA device by using different firmware
- EMC test certification and FISCO intrinsic safety certification：Ex ia IIC T4/T6
- Bus power suppluy：9 ～ 32 VDC
- Current consumption：≤ 14mA
- Support asynchronism serial port and I/O port
- Designed to comply with IEC61158-2
- Support LCD and magnetism stick operation
- Operation temperature：-40~85℃
- Support 6mA/3.3V power supply（or customized according to user's requirements）
- Communication interface for instrument board: UART
- Optional instrument board isolation
- Size：Φ65mm（customized according to user's requirements）



2. Software Characteristic of FF Communication Board

- Passed FF compatibility test and interoperability test
- Support standard FMS、SM services
- Support Link Master function
- Support transducer block, standard function and advanced function
- Support function instantiation

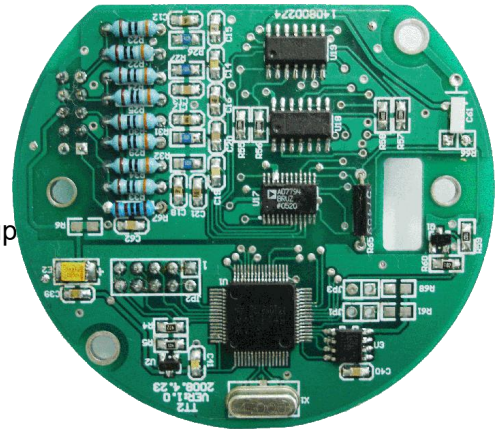
3. Software Characteristic of PA Communication Board

- Firmware includes PROFIBUS PA communication stack and guild regulation function
- Passed PNO certification
- Support PROFIBUS DP-V0 and DP-V1communication protocol, and GSD& EDD device description

- Comply with PROFIBUS PA guild regulation 3.01version

NCS-YB-TT Instrument Board for Temperature Transmitter

1. Main Characteristics



- Input signal:

  Resistance: Pt100、CU50、CU100、0～500Ω

  Thermocouple: B，E，J，N，K，R，S，T

  Voltage signal: -100mV～100mV

- Two channels
- Provide digital cold junction compensation for thermocoup
- Isolation of analog and digital signal
- Check on open circuit
- Support RTD connection for two-wire and three-wire
- Communication of interface：UART
- Operation temperature：-40～85℃
- Size：Φ69mm（customized according to user's requirements）

2. Technical Parameters

1) RTD precision（25℃）

Type of signal	Recommended application range（℃）	Accuracy
Resistance signal	0~500Ω	±0.05%
PT100	-200 ~ 850℃	±0.3℃
PT1000	-200 ~ 800℃	±0.3℃
CU50	-50 ~ 150℃	±0.4℃
CU100	-50~ 150℃	±0.3℃

2) Other technical specification of RTD:

Content	Specification

Connection	2、3、4
Refresh rate	≥ 1HZ/per channel
Common-mode rejection rate	>80dB（50Hz）
Differential-mode rejection rate	>60dB（50Hz）
Temperature-drift	<50ppm/℃

3) Thermocouple precision（25℃）

Type of signal	Recommended application range（℃）	Accuracy
mV	-100mV ~ +100mV	0.05%
B	500 ℃~ 1810℃	±2.4℃
E	-200 ℃~ 1000℃	±0.6℃
J	-190 ℃~ 1200℃	±0.8℃
K	-200℃ ~ 1372℃	±0.5℃
N	-190℃ ~ 1300℃	±1.0℃
R	0℃ ~ 1768℃	±2.1℃
S	0 ℃~ 1768℃	±2.2℃
T	-200℃ ~ 400℃	±0.7℃

4) Other technical specification of thermocouple：

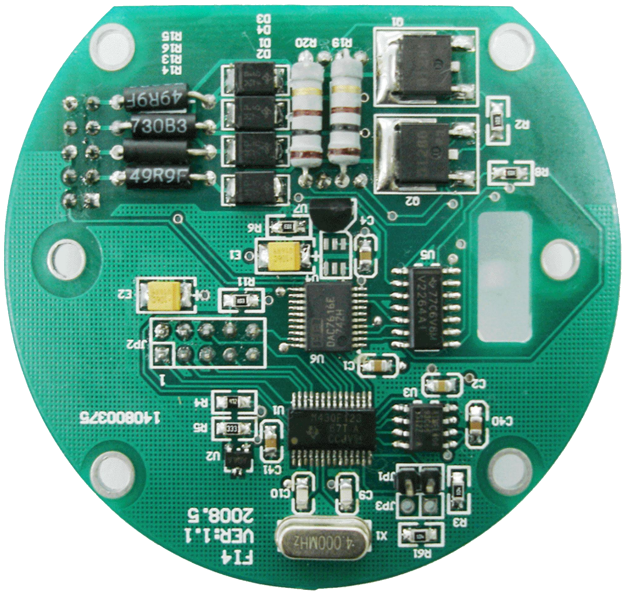
Content	Specification
Precision compensation	< ±1℃
Refresh rate	> 1Hz
Type of sensor	B，E，J，N，K，R，S，T；-100mV～+100mV
Common-mode rejection rate	>60dB（50Hz）
Differential-mode rejection rate	>60dB（50Hz）
Temperature-drift	<50ppm/℃

NCS-YB-FI Instrument Board for 4～20mA Output Current

1. Main Characteristic

- 4 channels
- Communication of interface：UART
- Operation temperature：-40～85℃
- Size：Φ69mm

（customized according to user's requirements）



2. Technical Parameters

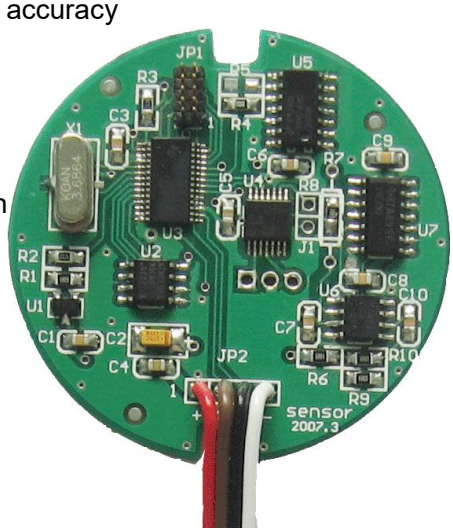
Content	Specification
Output signal	4 ～ 20mA
Channel	4 channels
Current output	NPN cllector output
Accuracy	Normal temperature：<0.1% ；40℃ ～ +70℃：<0.5%
Maximum load	1000Ω
External power supply	9 ～ 32VDC Note：voltage≥（output current*load resistance+5VDC）

NCS-YB-DDC Instrument Board

for Capacitance Pressure Transmitter

Main Characteristic

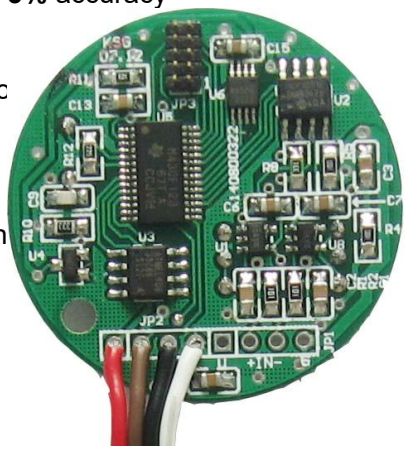
- Assist capacitance pressure transmitter to achieve **0.05%** accuracy
- Digital measurement
- Low temperature-drift, automation temperature-drift compensation for capacitance sensor
- Supports advanced instrument temperature compensation and calibration software & technics
- Operation temperature：-40℃～85℃
- Size：Φ43mm



NCS-YB-RB Resistance Bridge Instrument Board

Main Characteristic

- Assist diffused silicon pressure transmitter to achieve **0.075%** accuracy
- Supports different kind of resistance bridge sensor
- Supports constant voltage and constant current driving mc
- Low temperature-drift, measuring bridge resistance, automation temperature-drift compensation for sensor
- Supports advanced instrument temperature compensation and calibration software & technics
- May measure minute voltage and distinguish uV signal
- Operation temperature：-40℃～85℃
- Size：Φ37mm

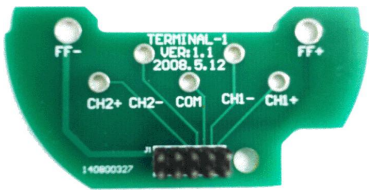


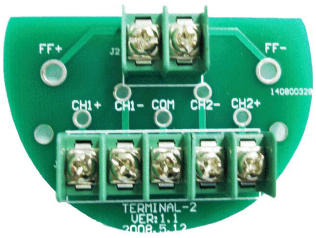
Terminal Board

Terminal board connects with sensor, instrument board and communication board, also may integrates with protection component. It supports EMC protection function to the boards connected with it. The size of terminal board depends on the housing of instrument and is customized according to user's requirements.

1. NCS-YB-PORT-PT Terminal Board for Pressure Transmitter

2. NCS-YB-PORT-TT Terminal Board for Temperature and Current Output Transmitter





Fieldbus Development Tool Kit

Not only the hardware mentioned before is available for user, also Feildbus Development Tool Kit is provided to fieldbud device manufacturer.

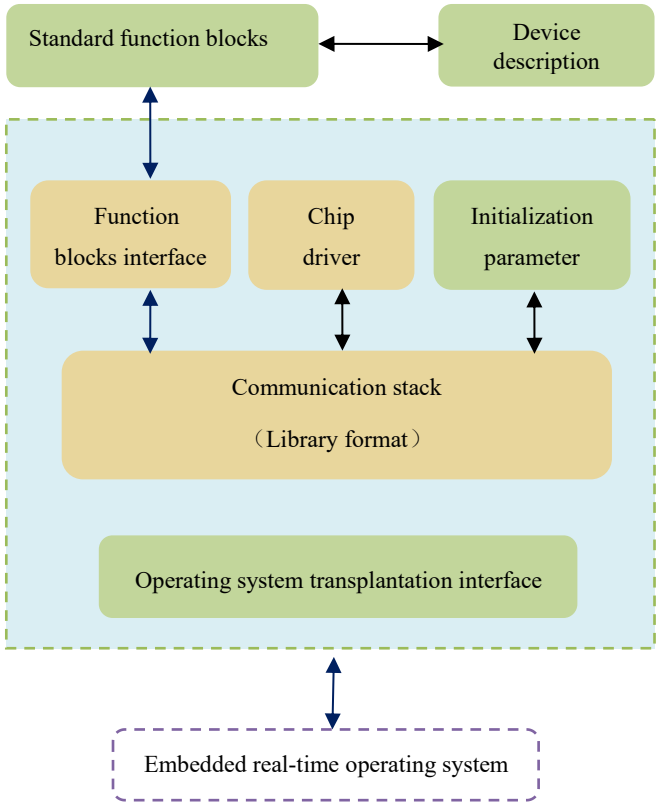
The tool kit includes：

- Hardware schematic diagram，PCB diagram
- Device capacity file（CFF）description templet（only for FF H1）
- Source code for device description templet

  (DDL language，only for FF H1）
- EDDL/GSD file templet（text file，only for Profibus PA）
- Function blocks source code（C language）
- Protocol library（FF H1or Profibus PA）
  - Library file
  - Header
  - User interface function
- Interface library for function block
  - Library file
  - Header
  - User interface function
- Operating system interface
- Source code for driving communication

  controller（C language）

Software structure

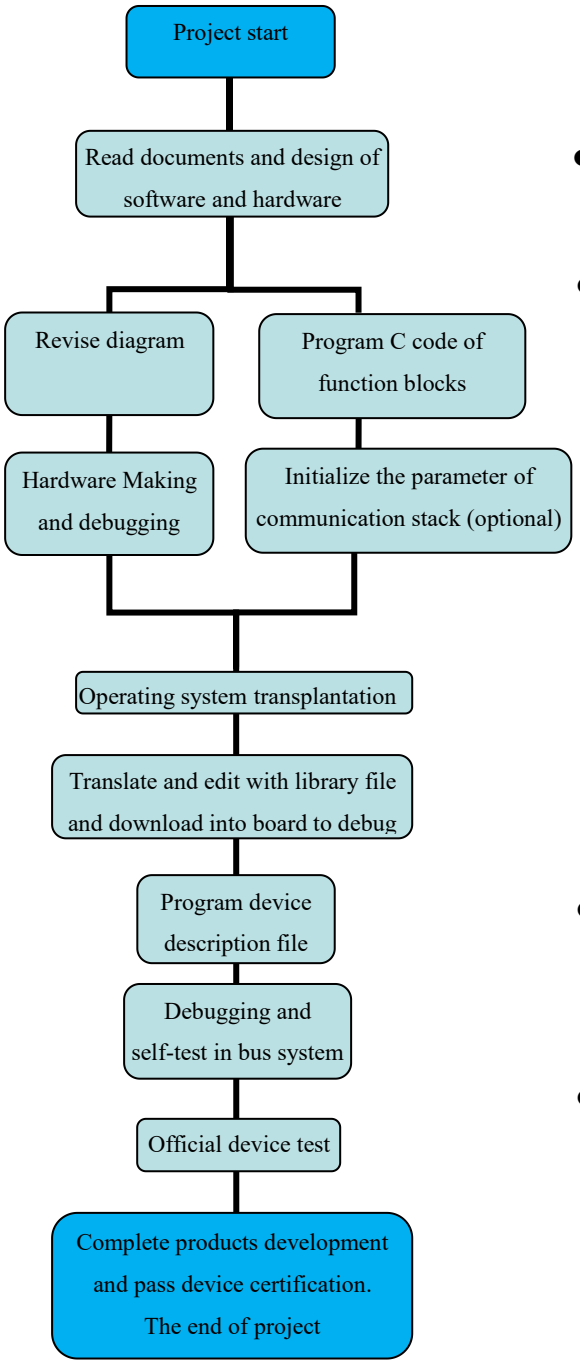


User needs to have:

- ARM integration development tool
- FF Tokenizer DD development tool（including standard DD library and compiler）

  V2..0 upwards（only for FF H1）
- ARM emluator
- Testing and debugging environment: Profibus system, FF system

Development Procedure of Fieldbus Device



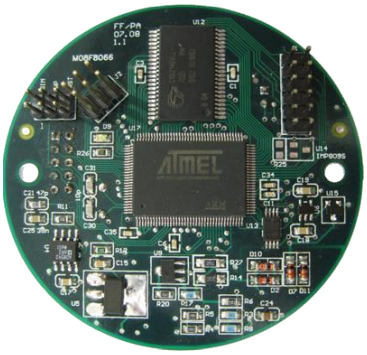
- Useful documents include user manual of development tool kit and related documents of developing device.
- Program transducer blocks according to requirements, and add output parameter and calibration etc. Development tool kit includes all standard function blocks and most of advanced function blocks. If there are no special requirements, the function blocks do not need to be developed. The parameters of communication stack have default initial value, the parameters of communication stack do not need to be revised. If user has special requirements, some parameters can be revised by using configuration software, such as device address, device data link layer parameter and device timer parameter.
- Development tool kit use Nucleus operating system. If user uses different operating system, operating system transplantation needs to be done.
- Developing device description with FF H1: CFF file（text file）and DD file（using DDL language need to be programmed; DD file can be used after translating and edit.
  Developing device description with Profibus PA: GSD and EDDL file（text file）.

OEM Cooperation Application

Customer: Emerson Process Management, Valve Actuation, LLC.（USA）

Product: FF electromotion actuator

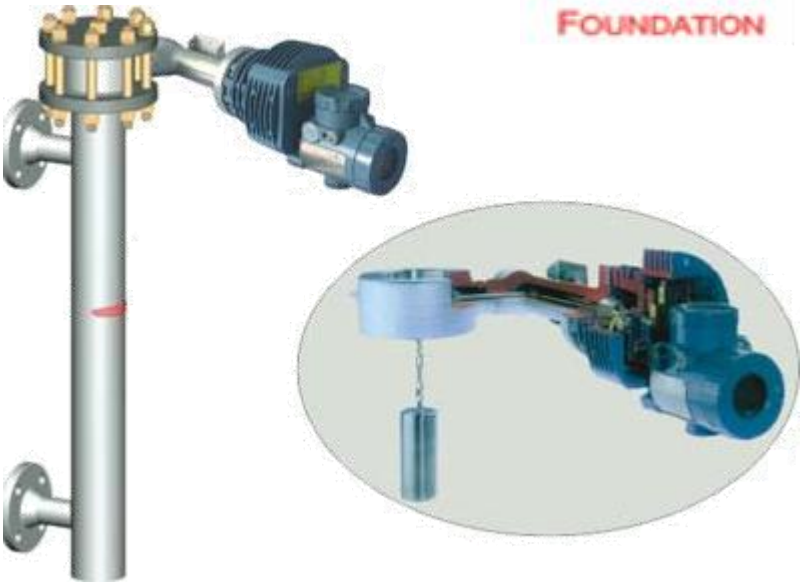
- Supplier of FF communication board：Microcyber
- Supplier of actuator: customer
- Communication of interface between FF communication board and control board of actuator: Modbus
- Customized FF transducer block and AI/AO/DI/DO function block
- Pass FF international certification

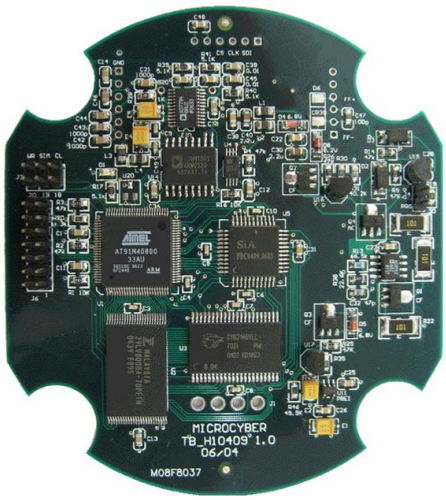


Customer: Dandong Top Electronics Instrument Co., Ltd

Product: FF flow transmitter, FF liquid-level transmitter

- Supplier of FF communication board：Microcyber
- Supplier of sensor: customer
- Complete data capture and calibration arithmetic
- Customized FF transducer block and AI function block
- Pass FF international certification

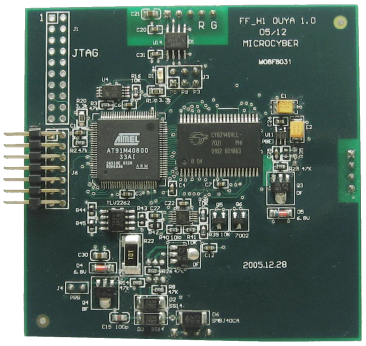




Customer: Dalian Ouya Instrument Co., Ltd

Product: FF electromotion actuator

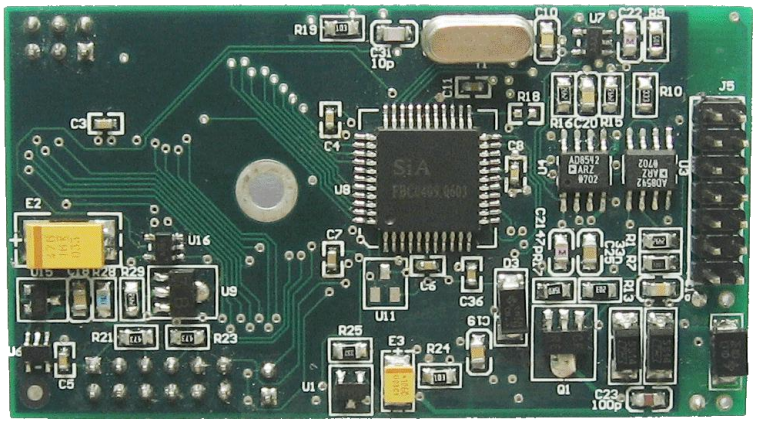
- Supplier of FF communication board：Microcyber
- Supplier of actuator: customer
- Communication protocol is defined by two parts
- Customized FF transducer block and AO function block



Customer: Tianjin Instruments Group Co., Ltd

Product: FF electromagnetism flow transmitter

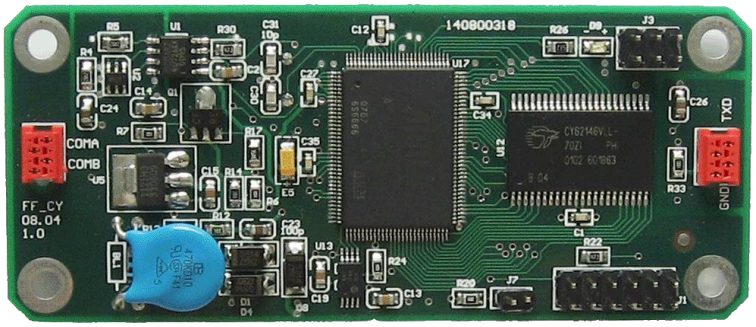
- Supplier of FF communication board：Microcyber
- Supplier of sensor: customer
- Communication protocol is defined by two parts
- Customized FF transducer block and AI function block



Customer: China Silian Instruments Group Co., Ltd

Product: FF electromagnetism transmitter

- Supplier of FF communication board：Microcyber
- Supplier of sensor: customer
- Communication protocol is defined by two parts
- Customized FF transducer block and AI function block



Registered Products on Fieldbus Foundation

EIM Controls Inc. --- DCM Fiedbus Actuator

Website:http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1365&ffb status=Registered&Itemid=324

Dandong Top Electronics Instrument Co., Ltd --- DDTOP-L

Website:http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1307&ffb status=Registered&Itemid=324

Microcyber Inc. --- NCS-FI105 Converter

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Product Information

MICROCYBER INC. (SHENYANG BOWEI)
NCS-FI105

Category:	Converter (Transducer)
Revision:	1.0
Type:	FI Converter
Registered Function Blocks:	1xRB(e), 2xAO(s), 3xPID(s)
Other Blocks:	9xTB(c)
H1 Profile Class:	31PS, 32LT
H1 Device Class:	Link Master
Test Campaign Number:	IT029100
MANUFAC_ID (HEX):	000105
DEV_TYPE (HEX):	0002
DEV_REV (HEX):	02
Device Tester Version:	4.6
Test Status:	Registered

STACK

Manufacturer (H1):	Microcyber Inc.
Revision (H1):	1.0
Test Campaign Number (H1):	CT0076FF

PHYSICAL LAYER

Website: http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1047

Microcyber Inc. --- NCS-LD105 Linking Device

Fieldbus Foundation

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Product Information

MICROCYBER INC. (SHENYANG BOWEI)
NCS-LD105

Category:	Linking Device
Revision:	1.0
Type:	Linking Device
H1 Profile Class:	
H1 Device Class:	Basic
HSE Profile Class:	42a2
Number of H1 Ports:	1
HSE Speeds:	100Mbps
HSE Media Options:	Wire
Test Campaign Number:	HT001100
MANUFAC_ID (HEX):	000105
DEV_TYPE (HEX):	0008
DEV_REV (HEX):	01
Device Tester Version:	1.2
Test Status:	Registered

STACK

Manufacturer (HSE):	
Revision (HSE):	
Test Campaign Number (HSE):	

Website:http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1045

Microcyber Inc. --- NCS-PT105 Pressure Transmitter

Website: http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1046

Integration Test with Control System

NCS-PT105 pressure transmitter (FF) and NCS-FI105 fieldbus to current converter (FF) provided by Microcyber Inc. have passed integration test with ABB control system.

Category	Vendor	Device Type 1)	Application	Device Description (Device Type / Device Revision, DD Revision)
		FPAC		0x0001 / 02,01
		FPAC-ESD		0x0003 / 01,01
		ICoT		0x1100 / 01,01
	Yamatake	AVPx03 V1		0x0203 / 01,01
		AVPx03 V2		0x0203 / 02,01
	Yokogawa	YVP110		0x0001 / 03,01
Pressure	ABB	2010TA, 2010TD, 2020TA,	Pressure and Level	0x0089 /01,01
		2600T Series 264	Pressure and Level	0x004 / 01,01
				0x004 / 02,01
		2600T Series 267xx, 269xx	Pressure and Level	0x008A / 02,01
		2600T Series 265	Pressure and Level	0x0089 /02,01
	Anderson Instruments	FPP		0x1000 / 01,01
	Dynisco	SPX series		0x3031 / 01,01
	Endress+Hauser	Cerabar S (PMC 631, 731; PMP 635, 731)		0x1007 / 05,01
		DELTABAR-S PMD230, FMD230, PMD235, FMD630, FMD633		0x1009 / 02,01
		Deltapilot S		0x100B / 01,02
	Foxboro	I/A series		0xBA30 / 20,01
	Fuji Electric	FCX-AX2		0x0032 / 01,01
	Honeywell	ST3000		0x0002 / 08,01
	Microcyber Inc	NCS-PT105		0x03 / 02,03
	Rosemount	3051		0x3051 / 07,02
		3051S		0x3051 / 14,02
		3095 MV		0x3095 / 01,01
	Siemens	SITRANS P DSIII		0x000B / 01,01
	Smar	LD302		0x0001 / 04,02
	VEGA	VEGABAR 50/60 Series		0x076F / 01,01
	Yamatake	ST3000 Series 900		0x0103 / 01,03
	Yokogawa	EJX		0x000C / 02,01
		EJA		0x0003 / 02,01
Temperature	ABB	TF02(-EX), TF202(-EX)		0x001E / 01,01
	Anderson Instrument	FPT		0x2000 / 01,01
	Endress + Hauser	TMT165		0x1200 / 04,01
	Foxboro	RTT25-F2		0x0034 / 02,02
	Honeywell	STT35		0x0101 /
	Pepperl+Fuchs	TM-I		0x0003 / 01,01
	PR Electronics	PRETN 6350		0x0081 / 01,01
		PRETOP 5350		0x0080 / 02,01
	Rosemount	644		0x0644 / 01,02
		3144P		0x3144 / 01,03
		848T		0x848 / 05,0B
	Smar	TT302		0x0002 / 03,02
	Turck	KMU40-Ex		0xFF9C / 01,01
	Yamatake	ATT60		0x0401 / 01,02
	Yokogawa	YTA320		0x0005 / 02,01
Various	ABB	2600T Series 264IB	Indicator	0x0006 / 01,01
	BEKA	BAx8x xF Series	Display	0x0488 / 02,01
	Microsyber Inc	NCS-FI105	Converter	0x02 / 02,02
	Rosemount	752	Display	0x0752 / 02,05
	Smar	FP302	FF to Pneumatic converter	0x0004 / 03,02

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