SpireCapture™ Series

280C-1 Smart M-Bus Concentrator

A member of the SpireCapture™ Series, the 280C-1 Smart M-Bus Concentrator, is the first member of the 3rd generation concentrators from Spire Metering. Compared with other variations, 280C-1 provides an intelligent gateway to link an M-Bus network to a data center computer through various communication methods, RS232, RS485, Ethernet, GSM/GPRS, Radio, BACnet, Lonworks and MetaSysN2. With its second uplink port, it can link an M-Bus network to both AMR system and BMS at the same time. This allows an AMR system to read utility meters for billing purpose, and meanwhile allows a BMS system to access the same utility meters for security and property management purpose.

M-Bus system is a simple two-wire bus system, widely used in utility metering. It is not only reliable, but also easy and economical to implement.

An M-Bus system is consisted of an M-Bus master, often the M-Bus concentrator, and many utility meters with M-Bus interface (slaves).

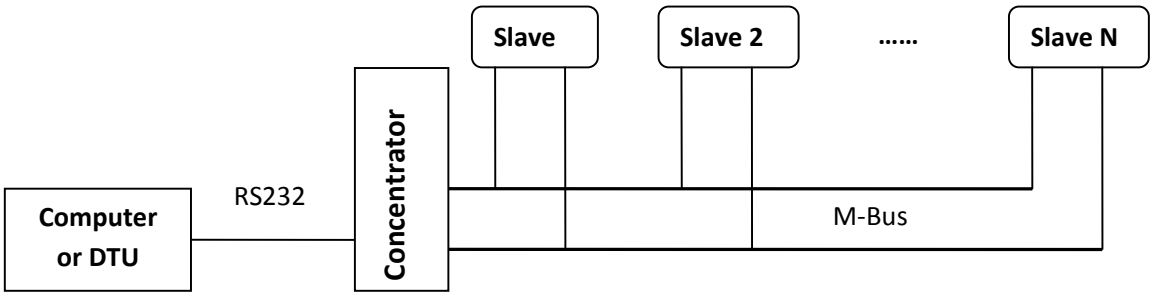
The 280C-1 is a powerful M-Bus master. It is able to discover all the slave meters connected to its M-Bus port. It can sign M-Bus address to each meter automatically. Based on preset schedule, 280C-1 can read all its slave meters automatically and save the data to its large memory. The data will stay in the memory even after power outage.

The 280C-1 can also act as the power supply for its slave meters, so the slave meters are able to save their battery. Besides, it can be set to transparent mode, thus, can be used as a transparent level converter.

The 280C-1 is an ideal device for automatic meter reading (AMR/AMI) and building automation.

FEATURES AND BENEFITS

- Automatic remote meter reading with M-Bus
- Automatic scanning and discovering
- Reading schedule programmable
- Easy to switch to transparent mode
- Supporting up to 250 utility meters (90 meters for BACnet, LonWorks and MetaSysN2)
- Short-circuit protection with auto recovery
- Overload protection with alarm
- Large data storage. SD card can be easily removed for data retrieval
- Dual uplink to support both AMR/Billing system BMS system simultaneously
- Various uplink options: RS232, RS485/MODBUS, RF, GSM/GPRS, Ethernet, BACnet, LonWorks and MetaSysN2



SPECIFICATIONS

Function:	Normal Mode: M-Bus meter (slave) discovery and addressing Automatic meter reading Meter reading schedule Data storage management Alarm detection System configuration Transparent Mode: Transmit data upward, transfer command downward
Interface - Downward:	M-Bus. Default settings: 2400,8,E,1 Half duplex, communicating with one slave at a time

Communication Protocol: M-Bus (EN1434/EN13757)

Load capacity: 90 M-Bus slaves if uplink is BACnet, LonWorks and MetaSysN2. Otherwise, 60/120/250 M-Bus devices

M-Bus cable (according to M-Bus Standard recommendation):

The M-Bus uses two wire cables which are going from the M-Bus Master / Repeater to each M-Bus device (bus structure). The M-Bus is polarity independent and needs no line termination resistors at the end of the cables.

Any cable type may be used as long as the cable is suitable for 42 V / 500 mA. Shielding is not necessary and not recommended since the capacity of the cable should be minimized. In most cases a standard telephone cable is used which is a twisted pair wire with a diameter of 0.8 mm each (2 x 0.8 mm). This type of cable should be used for the main wiring. For the wiring to the meters from the main wiring (last 1 .. 5 m to the meter) a cable with smaller diameter may be used.

Interface - Upward:

Normal Mode:

- Communication Protocol:
  - (a) Modbus. Refer to Appendix A for the register table.
  - (b) BACnet/IP. Refer to Appendix B for the BACnet points.
  - (c) LonWorks.
  - (c) Proprietary protocol, compatible with SpireCapture™ software suite.
- Physical layer:

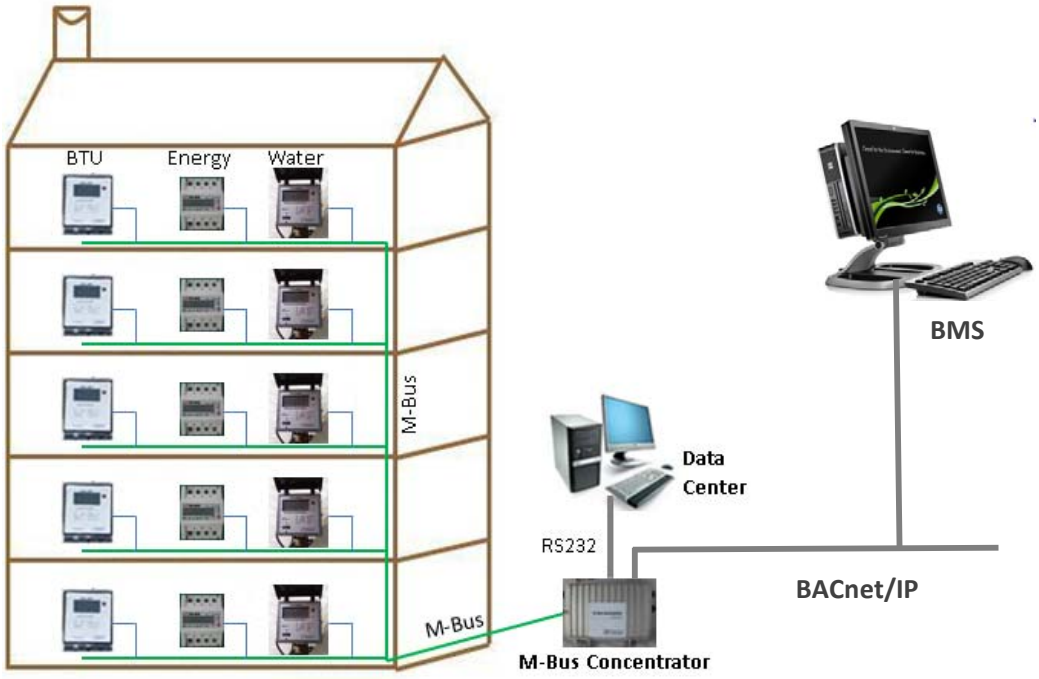
Uplink Port A	Uplink Port B
M-Bus: 2400,8,E,1	M-Bus: 2400,8,E,1
RS232. Default: 9600,8,N,1	RS232. Default: 9600,8,N,1
RS485/Modbus. Default: 9600,8,N,1	RS485/Modbus. Default: 9600,8,N,1
Ethernet	
RF (433MHz)	
GSM wireless	
GPRS wireless	
BACnet/IP	
BACnet/MSTP	
LonWorks	
MetaSysN2	

Technical Specifications

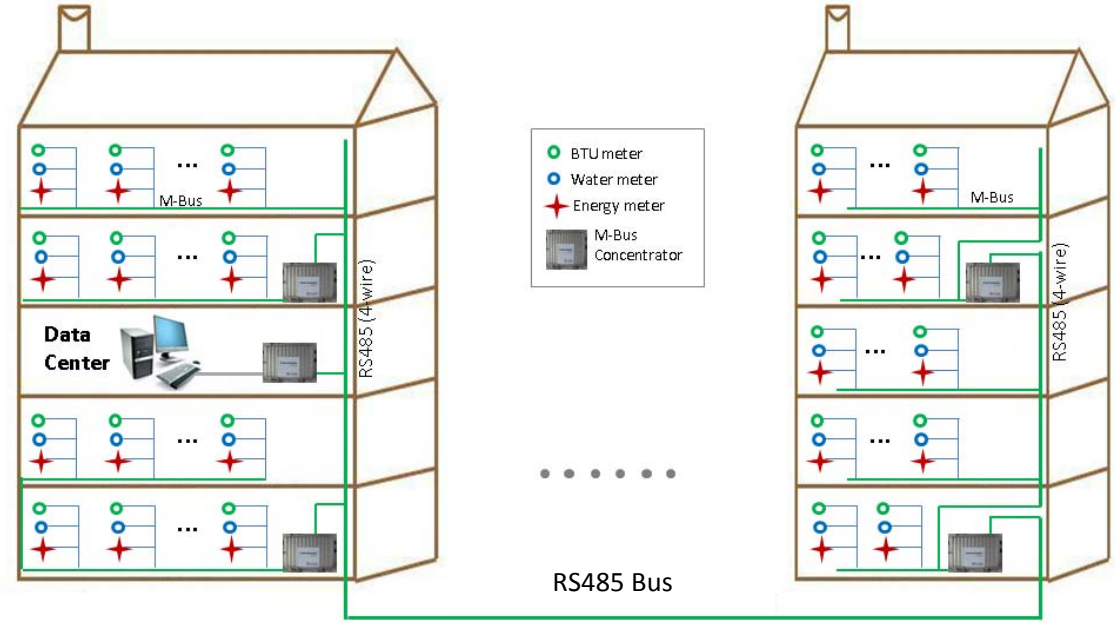
	Transparent Mode: - Communication Protocol: M-Bus (EN1434/EN13757) - Physical layer: M-Bus/RS232/RS485. Default settings: 2400,8,E,1
Data logger:	Large memory SD card is used to store historical data. The SD card can be removed from the concentrator easily. It can be plugged into a PC to download the data to the PC.
LEDs:	Indicators for communication status, overload alarm and power
Overload protection:	If the number of M-Bus meters is more than a certain amount, the alarm lamp will flicker. After clearing the fault, the equipment will get back to work properly
Short-circuit protection:	If the bus is short circuited, the alarm lamp will keep lighted and the communication will be broken off. After clearing the fault, the equipment will get back to work properly
Power:	110-240VAC /24Watts
Enclosure:	Aluminum, IP65. Dimension: 250mmx205mmx80mm (10”x8”x3”)

Applications

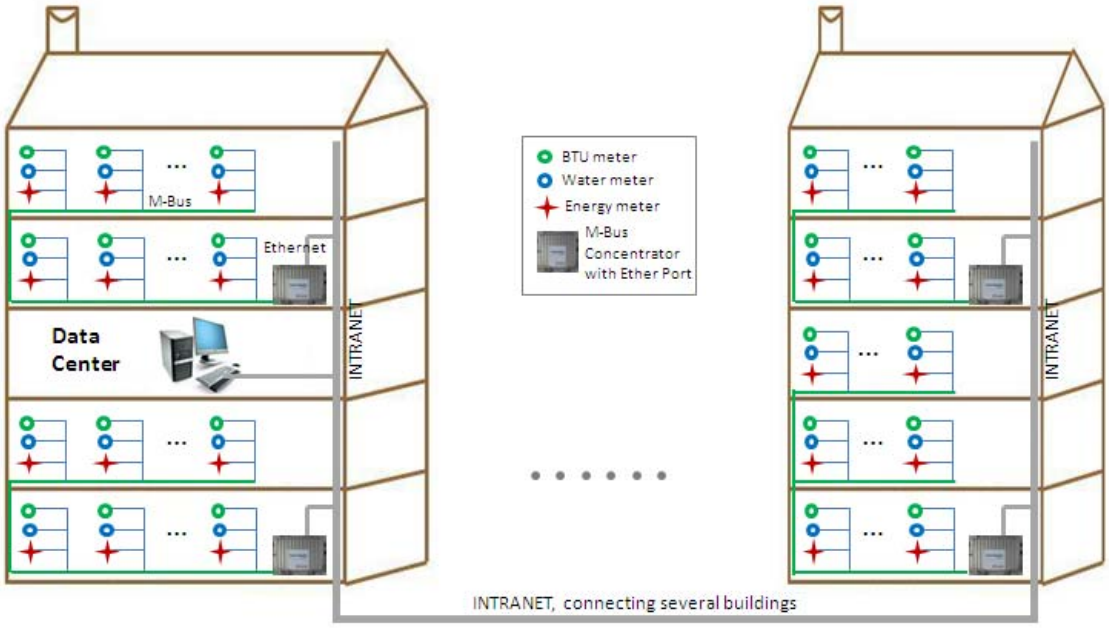
1. **A simple AMR system based on 280C-1 with dual uplink (RS232 and BACnet/IP)**



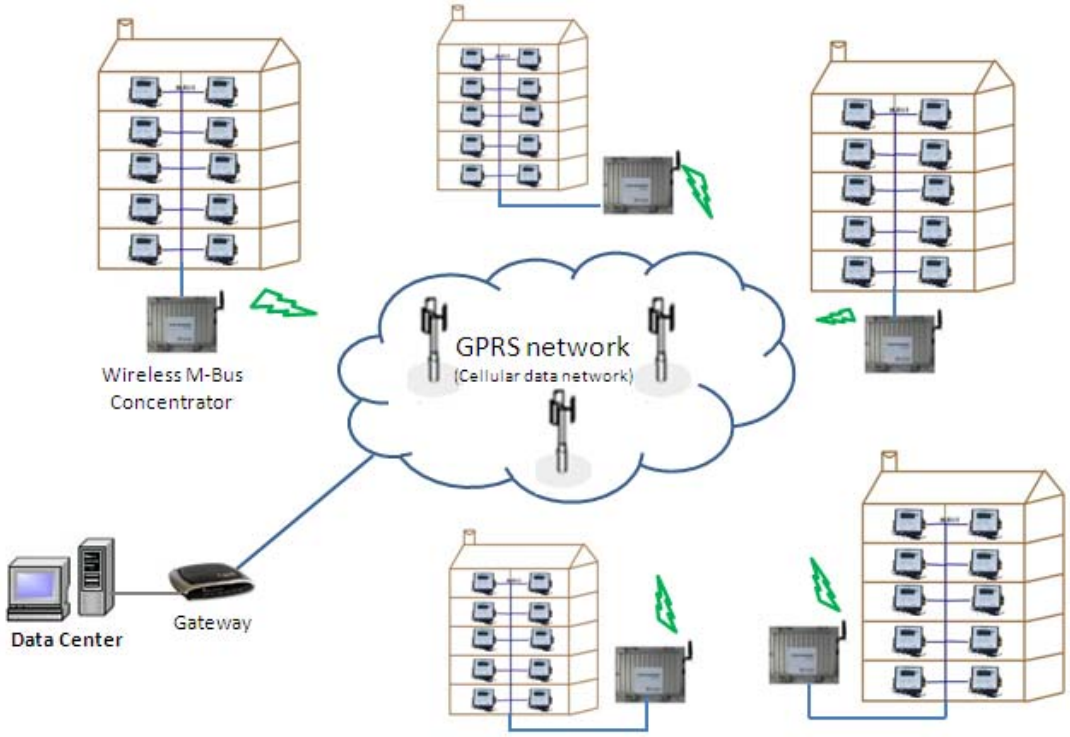
2. **A typical AMR system based on 280C-1 with RS485/Modbus uplink**



3. An AMR system based on 280C-1 with Ethernet uplink

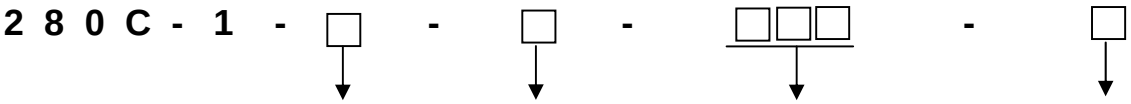


4. A Remote AMR System based on 280C-1 with GSM/GPRS Wireless



For more information on Spire Metering's AMR/AMI solution, please contact solutions@spiremt.com.

HOW TO ORDER



Uplink Interface A

A) M-Bus
B) RS232
C) RS485/MODBUS
D) Ethernet
E) GSM
F) GPRS
G) Radio
H) BACnet/IP
I) BACnet/MSTP
J) LonWorks
K) MetaSysN2

Uplink Interface B (Optional)

A) None
B) M-Bus
C) RS232
D) RS485/MODBUS

Downlink Interface*

060) M-Bus. Support 60 slaves
090) M-Bus. Support 85 slaves
120) M-Bus. Support 120 slaves
250) M-Bus. Support 250 slaves

Power Supply

A) 90-120VAC
B) 220-240VAC

**Note: BACnet, Lonworks and MetaSysN2 can support up to 90 M-Bus slaves only.*

Appendix A:

MODBUS Register Table

280C-1 is a smart M-Bus concentrator. It has varies uplink options, such as RS232, RS485, Ethernet, GSM/GPRS, etc. They all support both proprietary protocol (for concentrator configuration, data management and some special functions) and MODBUS protocol.

For MODBUS protocol, function codes 03 and 06 for reading register and writing to single register have been implemented. Here lists all the MODBUS registers.

Register Address	# of registers	Variable Name	Data Type	Notes
0-1	2	Flow Rate	LONG	Lowest bytes in lower reg. Higher bytes are higher reg. Unit: l/h
2-3	2	Flow Total	LONG	Lowest bytes in lower reg. Higher bytes are higher reg. Unit: defined by next register
4	1	Flow Total Unit	INTEGER	0: Liter; 1: m3
5-6	2	Energy Rate	LONG	Lowest bytes in lower reg. Higher bytes are higher reg. Unit: kw
7-8	2	Energy Total	LONG	Lowest bytes in lower reg. Higher bytes are higher reg. Unit: defined by next register
9	1	Energy Total Unit	INTEGER	0: kwh; 1: GJ
10	1	T1 /Supply Temp	INTEGER	x0.01degC
11	1	T2 /Return Temp	INTEGER	x0.01degC
12	1	SN# (lower 4 digits)	BCD	High on left
13	1	SN# (higher 4 digits)	BCD	High on left
14	1	MODBUS ADDR	INTEGER	Writable (saved in flash)
15	1	Meter Type	BCD	xxyy (Hex BCD) xx = AA: mfr identifier for Spire Metering yy = 01: BTU meter = 02: Water Meter = 03: Electricity Meter = 04: Gas Meter
16	1	Comm Mode	INTEGER	Writable. 0: Normal mode (MODBUS) 1-9999 – Transparent mode (the number represents the amount of seconds the mode will stay. Reboot

				power will reset the mode to Normal)
17	1	Baud Rate	INTEGER	Writable. 0 - 9600/MODBUS（Default） 1- 2400/Mbus
18	1	Firmware Version	INTEGER	Hex

Appendix B:

BACnet Points Table

280C-1-H or 280C-1-I is a smart M-Bus concentrator with BACnet interface for uplink. It supports up to 90 M-Bus utility meters. For each meter, there are 16 BACnet points defined in the following table.

Index	Variable Name	Data Type	Notes
1	Flow Rate	Float	Unit: l/h
2	Flow Total	Float	Unit: defined by next register
3	Flow Total Unit	Binary	0: Liter; 1: m3
4	Energy Rate	Float	Unit: kw
5	Energy Total	Float	Unit: defined by next register
9	Energy Total Unit	Binary	0: kwh; 1: GJ
10	T1 /Supply Temp	Float	x0.01degC
11	T2 /Return Temp	Float	x0.01degC
12	SN#_L	Float	Lower 4 digits of SN#
13	SN#_H	Float	Higher 4 digits of SN#
14	MODBUS ADDR	Float	0-255
15	Meter Type	Float	01- BTU Meter 02- Water Meter 03- Electricity meter 04- Gas meter

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