V B - C A D P

Dual-Port Communication Expansion Module

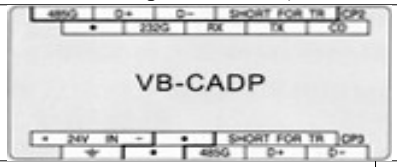
This VB-CADP module is a multi-functional communication expansion module. It uses the original flat cable to connect on the left side of a VB/VH series Main Unit or by a dedicated cable connects to a M series CPU Unit, then the PLC Main Unit will has three communication ports.

★ Features :

- CP2 and CP3 expansion module.
- CP2 provides isolated RS-232 or RS-485 communication interface. The communication distance of this RS-485 is up to 1000M (3280').
- CP3 provides isolated RS-485 communication interface with the communication distance of this RS-485 is up to 1000M (3280').
- CP2 is a multi-functional communication port which can be assigned for various communication applications, e.g. Computer Link, CPU Link, Parallel Link, Easy Link, MODBUS Communication, MODEM Communication and Non-Protocol Communication.

The CP2 in M series is assigned to the CPU expansion card (e.g. M-232R or M-485).

★ Specifications :

Item\Port	**CP1**	**CP2***		**CP3**
Transmission Standard	RS-232C	RS-232C	RS-485	RS-485
Isolation Method	No Isolation	Photocoupler Isolation		
LED Signal	RX, TX	RX, TX		RX, TX
Max. Transmission Distance	15M (49')	15M (49')	1000M (3280')	1000M (3280')
Communication Method	Half duplex			
Baud Rate	19200 bps	300/600/1200/2400/4800/9600/19200/38400 bps		19200 bps
Communication Protocol	**Computer Link :** M , VB and VH Series PLC communication protocol Data Length : 7 bit (ASCII) Parity : EVEN Stop bit : 1 bit	**Computer Link** **Easy Link** **MODEM(RS-232)** } M , VB and VH Series PLC communication protocol **CPU Link(RS-485)** **Parallel Link** } Dedicated communication protocol **MODBUS** : The MODICON's communication protocol **Non Protocol** : User-defined. It communicates to other devices by the PLC's program (RS instruction).		**Computer Link :** M , VB and VH Series PLC communication protocol Data Length : 7 bit (ASCII) Parity : EVEN Stop bit : 1 bit
Power Require	DC24V±10% 70mA (to the external input terminals)			
Connection	Under the cap, by the USB-A type or JST 4P connector	Terminal Block Connection 		
Parameter Configuration Setting	Communication station number setting is by the developmental software: Ladder Master. (00~255)**	For selection of CP2 application types and relevant parameter configuration settings, please use the developmental software Ladder Master, then open the option: "System – 2nd COM Port Setting.... " .		Communication station number setting is by the rotary switch on the left side of the module. (00~99)

* The CP2 can be used for either RS-232 or RS-485 standard. The setting, wiring and the selective jumper (under the cap) must be set correctly.

** Since, the CP1 is designed for connecting with the Ladder Master, PLCmate or NeoTouch, the VB series CP1's station number must always keep its default value "0".

★ COM Port Instructions :

● COM Port 1 (CP1)

CP1 is a built-in RS-232 communication standard interface. It is available to connect with other equipment via either the USB-A type or the white JST 4P connector.

The communication application type of CP1 is the Computer Link, which is to execute the M, VB and VH Series communication protocol. Its main purposes are to:

1. Connect to programing tools (Computer + Ladder Master).
2. Connect to the HMI (Human-Machine Interface) or SCADA (Supervisor Control And Data Acquisition).
3. Connect with a MODEM, which is for remote program modification and data monitoring.

◎ When a Main Unit is connected with a VB-CADP Module, the CP1 in the Main Unit will be disabled and its function will be replaced by the CP1 in the VB-CADP.

● COM Port 2 (CP2)

CP2 is a multi-functional expansion communication port and can be used for various communication applications. To select the communication mode of this port, please install the VB-CADP with the PLC then turn ON PLC's power. Link the PLC and computer via CP1 (or CP3). Start the computer's " Ladder Master " and go to the " System " ----- " CPU 2nd. communication (COM PORT) setting " to assign a mode below.

1. **Computer Link** – Uses the M, VB and VH Series communication protocol and it has the same purpose for use as CP1 in RS-232 interface. In RS-485 interface, the computer and several PLCs constitute the monitoring local access network.
2. **CPU Link** – Uses the dedicated communication protocol and it is only available in RS-485 interface. CPU Link allows data exchange between (2~8) PLCs, usually it is used for the distributed control system.
3. **Parallel Link** – Uses the dedicated communication protocol and it has the same purpose for use as CPU Link. Except it with the simple procedure and allows data exchange between only 2 PLCs.
4. **Easy Link** – Uses M, VB and VH Series communication protocol. Basically this application type is similar to Computer Link, except this Easy Link uses a M or VB Series PLC (which is called "Master PLC") to replace the computer, HMI or SCADA in the local network. For the data exchange in the network, we use the LINK instruction (FNC89) in the Master PLC's program to access all the Slave PLC's data.
5. **MODBUS** – Uses the MODBUS communication protocol (the MODBUS is a standard open source communication protocol). Usually all of the SCADA (Supervisor Control And Data Acquisition) and HMI (Human-Machine Interfaces) will support MODBUS communication protocol. In case, if a devices without M, VB and VH Series communication protocol, it can be link to VB, VH Series PLCs via this MODBUS application.
6. **MODEM Communication** – Actively contacts with MODEM when the PLC boots up (MODEM's "AA" sign should light on), then exercises M, VB and VH Series communication protocol. By the linked MODEMs, the PLC allows to perform remote program modification or data monitoring.
7. **MODEM Dialing** – Uses the function of MODEM Communication above (if the dialing function of VB Series PLC and MODEM are activated) then triggers the PLC's Dial-up Connection to link with the other PLC. The function is very useful, especially for remote abnormality report, security system and data collector.
8. **Non Protocol** – It does not administer any specific communication protocol. All communication processes are customized and completed by PLC program. It uses RS instruction (FNC80) to receive and transfer communication operation. This communication type is usually used for links with other peripherals in the market, such as temperature controller, frequency converter, display, printer, card reader or bar code reader.

● COM Port 3 (CP3)

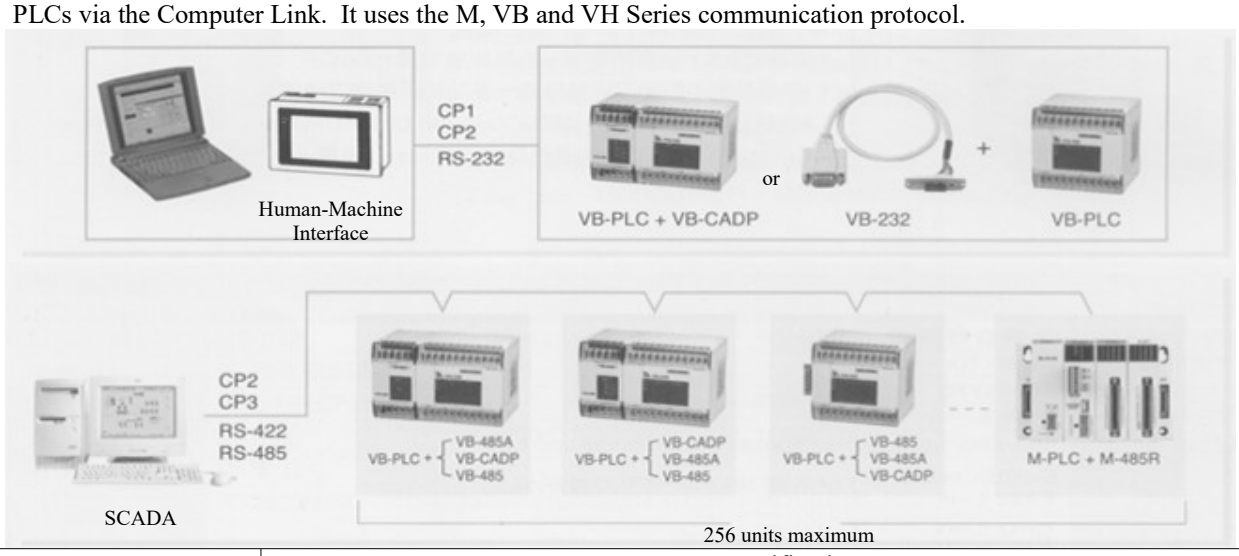
CP3 is a RS-485 communication port which is expanded by the VB-CADP expansion module and the communication type is assigned as Computer Link (using the M,VB and VH Series communication protocol). It is usually linked with the HMI (Human-Machine Interface) or the SCADA (Supervisor Control And Data Acquisition) to make the monitoring of local networking.

★ Appendix :

M, VB and VH Series PLC have complete communication functions. They provide several communication operation modes, which can be used for various applications. (such as local network monitoring, dispersive control, links to peripherals, MODEM communication, etc.) The communication operation modes of M, VB and VH Series PLC are specified as follows:

◆ Computer Link

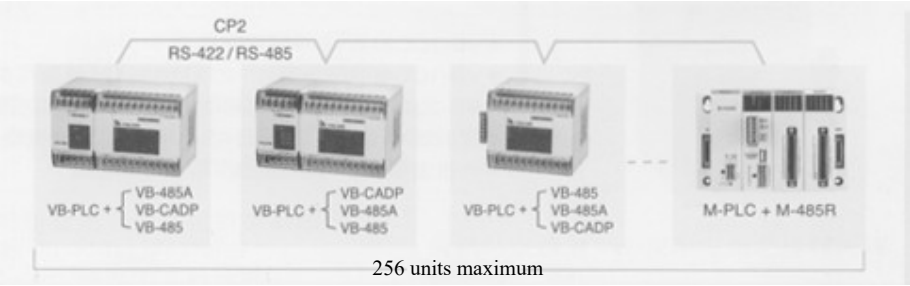
- A computer, HMI (Human-Machine Interface) or SCADA (Supervisor Control And Data Acquisition) can connect to PLCs via the Computer Link. It uses the M, VB and VH Series communication protocol.



Item	Specification	
Transmission Standard	RS-232	RS-422/RS-485
Communication Protocol	M, VB and VH Series Communication Protocol	
Communication Method	Half duplex	
Communication Parameter	Data Length: 7 bits (ASCII); Parity: EVEN; Stop Bit: 1 bit	
Baud Rate	CP1 and CP3: 19200 bps; CP2: 4800/9600/19200/38400 bps	
Max. Transmission Distance	15 M (49')	1000 M (3280'); (50 M/164', if the network loop exists a VB-485)
Number of Stations Connected	1 station	256 stations maximum (a powered booster is required when there are more than 32 stations)
Connection Facility	CP1: Main Unit Built-in CP2: VB-232 or VB-CADP	CP2: VB-485, VB-485A or VB-CADP CP3: VB-CADP; M Series: M-485R
Linkable PLC	VB Series, VH Series and M Series PLC	
Data Transfer Category	Including all of X, Y, M, S, T, C and D	

◆ Easy Link

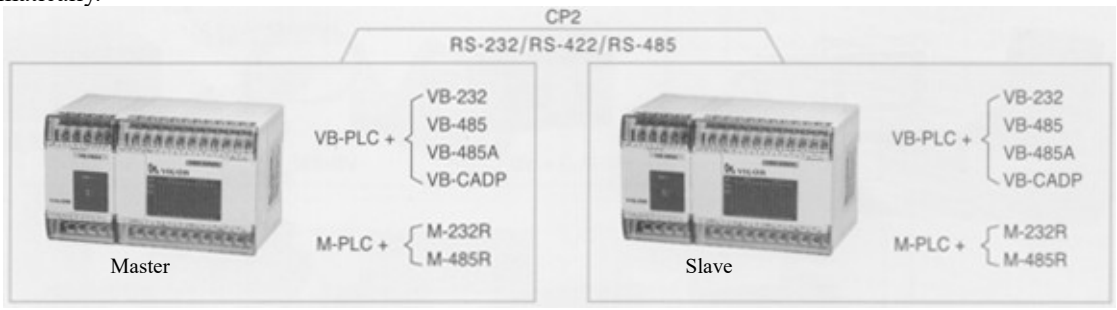
- PLC uses the CP2 via the M, VB and VH Series communication protocol, by the Master (M or VB series) PLC's program to control the data transfer between PLCs.



Item	Specification
Transmission Standard	RS-422/RS-485
Communication Protocol	M, VB and VH Series Communication Protocol
Communication Method	Half duplex
Communication Parameter	Data Length: 7 bits (ASCII); Parity: EVEN; Stop Bit: 1 bit
Baud Rate	4800/9600/19200/38400 bps
Max. Transmission Distance	1000 M (3280'); (50 M/164', if the network loop exists a VB-485)
Number of Link Stations	256 stations max. (an additional power amplifier is required when there are more than 32 stations)
Connection Facility	VB or VH Series: VB-485, VB-485A or VB-CADP; M Series: M-485R
Linkable PLC	VB Series and M Series PLC (VH Series can be used as a Slave)
Data Transfer Category	Including all of X, Y, M, S, T, C and D

◆ Parallel Link

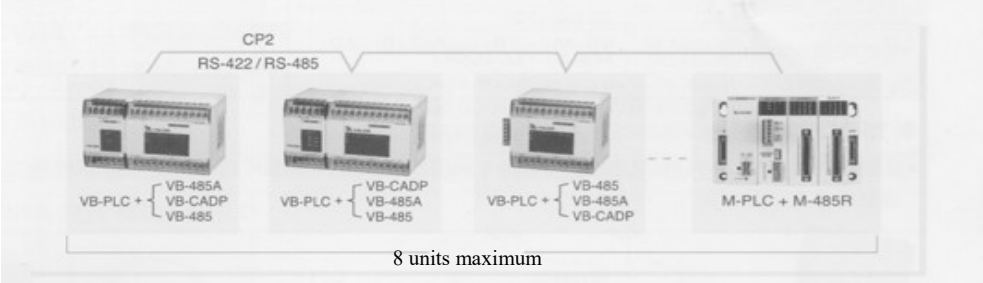
- PLCs will use dedicated communication protocol. Depend on this configuration setting, two PLCs will transfer data automatically.



Item		Specification	
Transmission Standard		RS-232	RS-422/RS-485
Communication Protocol		Dedicated Communication Protocol	
Communication Method		Half duplex	
Baud Rate		4800/9600/19200/38400 bps	
Max. Transmission Distance		15 M (49')	1000 M (3280'); (50 M/164', if the network loop exists a VB-485)
Number of Link Stations		2 stations	
Connection Facility		VB Series: VB-232 or VB-CADP M Series: M-232R	VB Series: VB-485, VB-485A or VB-CADP M Series: M-485R
Linkable PLC		VB Series and M Series PLC	
Data Transfer Range	Low Speed	Master→Slave: M800~899, D490~499; Slave→Master: M900~999, D500~509	
	High Speed	Master→Slave: D490 and D491; Slave→Master: D500 and D501	
Communication Time	Low Speed	Master's Scan Time + Slave's Scan Time + 73ms (when the Baud Rate = 19200 bps)	
	High Speed	Master's Scan Time + Slave's Scan Time + 14ms (when the Baud Rate = 19200 bps)	

◆ CPU Link

- PLC will enable dedicated communication protocol, and PLCs in the network will transfer data automatically depending on configuration settings.



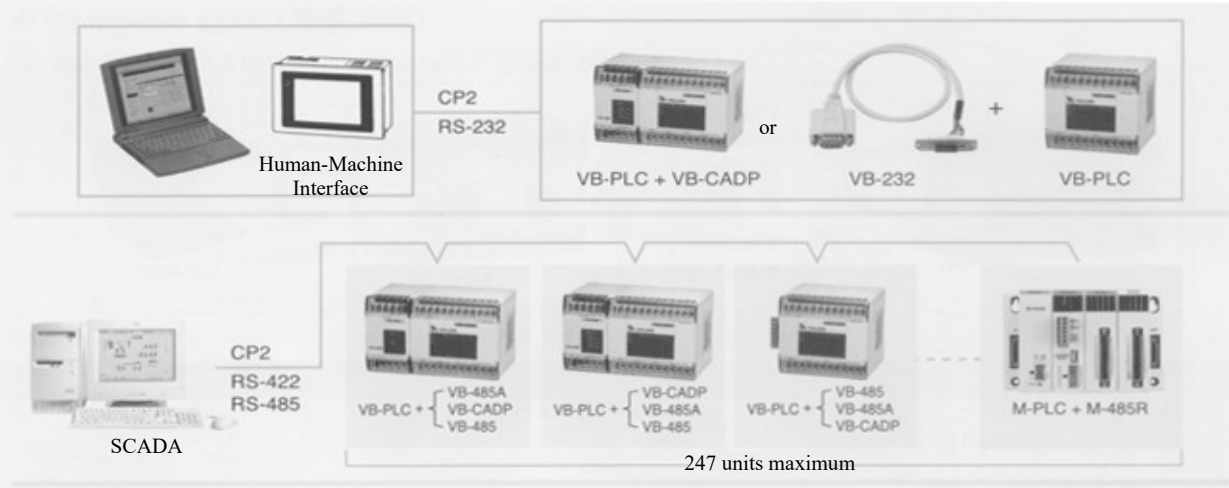
Item		Specification							
Transmission Standard		RS-422/RS-485							
Communication Protocol		Dedicated Communication Protocol							
Communication Method		Half duplex							
Baud Rate		38400 bps							
Max. Transmission Distance		1000 M (3280'); (50 M/164', if the network loop exists a VB-485)							
Number of Link Stations		2~8 stations							
Connection Facility		VB Series: VB-485, VB-485A or VB-CADP; M Series: M-485R							
Linkable PLC		VB Series and M Series PLC							
Data Transfer Range	Station No.	0 (Master)	1 (Slave)	2 (Slave)	3 (Slave)	4 (Slave)	5 (Slave)	6 (Slave)	7 (Slave)
	Mode 1	D0~3	D10~13	D20~23	D30~33	D40~43	D50~53	D60~63	D70~73
	Mode 2	D0~3 M1000~1031	D10~13 M1064~1095	D20~23 M1128~1159	D30~33 M1192~1223	D40~43 M1256~1287	D50~53 M1320~1351	D60~63 M1384~1415	D70~73 M1448~1479
	Mode 3	D0~7 M1000~1063	D10~17 M1064~1127	D20~27 M1128~1191	D30~37 M1192~1255	D40~47 M1256~1319	D50~57 M1320~1383	D60~67 M1384~1447	D70~77 M1448~1511

CPU Link Communication Time :

Number of Linked Stations	2 Stations	3 Stations	4 Stations	5 Stations	6 Stations	7 Stations	8 Stations
Mode 1	7ms	11ms	15ms	19ms	23ms	27ms	31ms
Mode 2	10ms	15ms	20ms	25ms	30ms	35ms	40ms
Mode 3	16ms	24ms	33ms	42ms	50ms	59ms	68ms

◆ MODBUS Communication

- Communication between PLC and Computer, HMI (Human-machine Interface), SCADA (Supervisor Control And Data Acquisition) and other devices, via the MODBUS communication protocol.



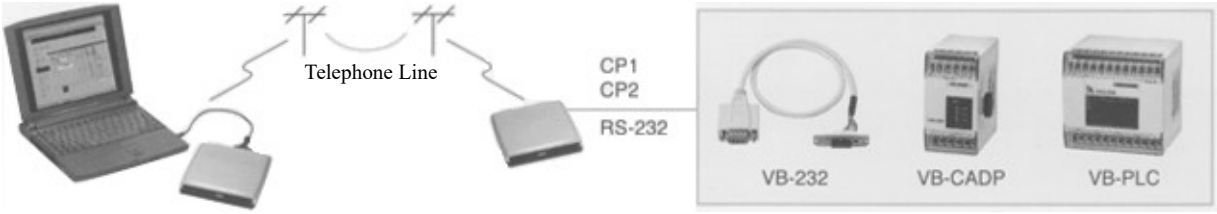
Item	Specification	
Transmission Standard	RS-232	RS-422/ RS-485
Communication Method	Half duplex	
Communication Parameter	Communication Mode: ASCII or RTU Data Length: 7 bits/ 8 bits Parity: None/Odd/Even Stop Bit: 1 bit/ 2 bits	
Baud Rate	300/600/1200/2400/4800/9600/19200/38400 bps	
Max. Transmission Distance	15 M (49')	M1000 (3280'); (50 M/164', if the network loop exists a VB-485)
Number of Link Stations	1 station	Up to 247 Stations
Connection Facility	VB-232 or VB-CADP	VB-485, VB-485A or VB-CADP; M Series: M-485R
Linkable PLC	VB Series, VH Series and M Series PLC	

Contrast of Component Number between VB-PLC and MODBUS

Bit Component		Character Component	
VB-PLC Component No.	MODBUS Component No.	VB-PLC Component No.	MODBUS Component No.
X000 ~ X177	1 0000 ~ 1 0127	D0 ~ D8191	4 0000 ~ 4 8191
Y000 ~ Y177	0 0000 ~ 0 0127	T0 ~ T255	4 8192 ~ 4 8447
M0 ~ M5119	0 0512 ~ 0 5631	C0 ~ C199	4 8448 ~ 4 8647
S0 ~ S999	0 5632 ~ 0 6631	C200 ~ C255	4 8648 ~ 4 8759
T0 ~ T255	0 6656 ~ 0 6911	D9000 ~ D9255	4 8760 ~ 4 9015
C0 ~ C255	0 6912 ~ 0 7167		
M9000 ~ M9255	0 7424 ~ 0 7679		

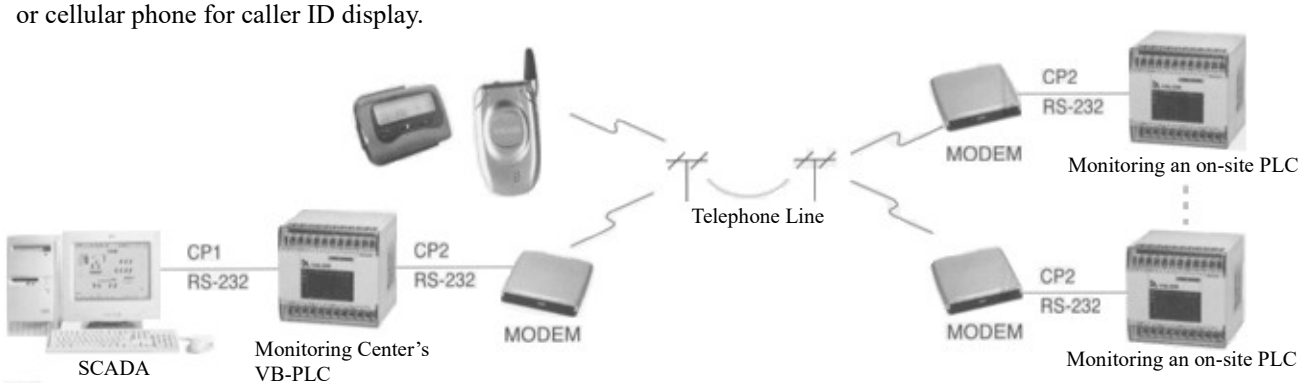
◆ MODEM Communication

- This communication mode is implemented by the M and VB, VH Series communication protocol. When a computer using this mode, through the telephone system, it allows to telecommute monitor a PLC, and it also can do the system maintenance or data collection.



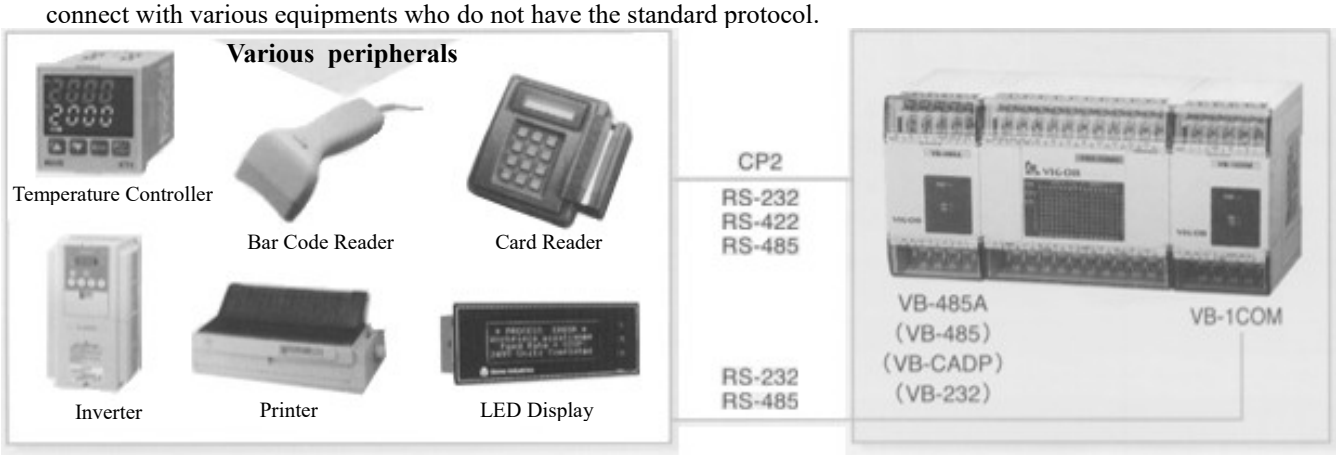
◆ MODEM Dialing

- M and VB, VH Series PLC have specific Registers to memorize the telephone numbers, which can be used for the MODEM Dialing function. The on-site PLCs through this MODEM Dialing function, they will transfer data automatically to the monitoring center's M and VB, VH series PLC for data collection. Also, they can dial-up to a pager or cellular phone for caller ID display.



◆ Non Protocol Communication

- M and VB series PLC can use this Non Protocol Communication function, it does not administer specific communication protocol. All communication processes are customized and completed by PLC program, which is for connect with various equipments who do not have the standard protocol.



CP 2 Non Protocol Communication Specification

Item	Specification	
Transmission Standard	RS-232	RS-422/ RS-485
Communication Protocol	Non Protocol	
Communication Method	Half duplex	
Communication Parameter (Please use the option "System – 2nd COM Port Setting...." of the developmental software Ladder Master.)	Baud Rate	300/600/1200/2400/4800/9600/19200 bps
	Data Length	7 bits/ 8 bits
	Parity	None/Odd/Even
	Stop Bit	1 bit/ 2 bits
	Initiation Code	None or customized data
	Termination Code	None or customized data
Max. Transmission Distance (refer to connected peripherals)	Up to 15 M (49')	Up to 1000 M (3280'); (50 M/164', if the network loop exists a VB-485)
Connection Facility	VB-232 or VB-CADP	VB-485, VB-485A or VB-CADP
Linkable PLC	VB Series and M Series PLC	

★ Note :

- When connecting with a VB/VH PLC by the flat cable, the adapter accessory in the box must be used between the connector and the Main Unit.
- Before connecting the VB-CADP to the VB series PLC, please check that station number of the PLC's CP1 is "0".
- When the VB-CADP is connected to a PLC, the original PLC's CP1 will invalid, that is switched to the VB-CADP's CP1.