

OFFICIAL DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Siemens technical pages

SIEMENS SIMATIC S7-1200

6ES7241-1AH32-0XB0

CM 1241 RS232 COMMUNICATION MODULE

Selected official pages retain the original technical tables, ratings, notes and pagination.

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Siemens S7-1200 A5E02486680-AO, 05/2021; RS232 pin extract p1354

Original pages 1353, 894-895, 902, 905-906; RS232 pin extract from 1354

This technical extract does not replace the complete equipment and system manuals. Check the installed hardware and project before use.

A.16.4.2 CM 1241 RS232 specifications

Table A-253 General specifications

Technical data	CM 1241 RS232
Article number	6ES7241-1AH32-0XB0
Dimensions (mm)	30 x 100 x 75
Weight	150 grams

Table A-254 Transmitter and receiver

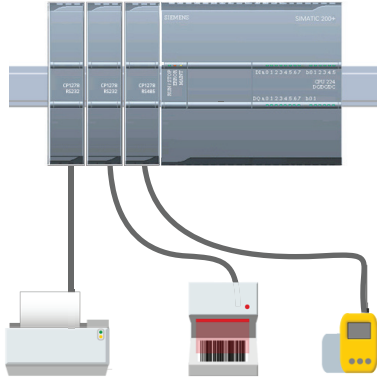
Technical data	CM 1241 RS232
Type	RS232 (full-duplex)
Transmitter output voltage	+/- 5 V min. at $R_L = 3K \Omega$
Transmit output voltage	+/- 15 V DC max.
Receiver input impedance	3 K Ω min.
Receiver threshold/sensitivity	0.8 V min. low, 2.4 max. high 0.5 V typical hysteresis
Receiver input voltage	+/- 30 V DC max.
Isolation RS 232 signal to chassis ground RS 232 signal to CPU logic common	707 V DC (type test)
Cable length, shielded	10 m max.
Baud rate	300 baud, 600 baud, 1.2 kbits, 2.4 kbits, 4.8 kbits, 9.6 kbits (default), 19.2 kbits, 38.4 kbits, 57.6 kbits, 76.8 kbits, 115.2 kbits
Parity	No parity (default), even, odd, Mark (parity bit always set to 1), Space (parity bit always set to 0)
Number of stop bits	1 (default), 2
Flow control	Hardware, software
Wait time	0 to 65535 ms

Table A-255 Power supply

Technical data	CM 1241 RS232
Power loss (dissipation)	1 W
From +5 V DC	200 mA

13.3.1 PtP, Freeport communication

PtP with a Freeport, or freely constructed, protocol provides maximum freedom and flexibility, but requires extensive implementation in the user program.



PtP enables a wide variety of possibilities:

- The ability to send information directly to an external device such as a printer
- The ability to receive information from other devices such as barcode readers, RFID readers, third-party camera or vision systems, and many other types of devices
- The ability to exchange information, sending and receiving data, with other devices such as GPS devices, third-party camera or vision systems, radio modems, and many more

This type of PtP communication is serial communication that uses standard UARTs to support a variety of baud rates and parity options. The RS232 and RS422/485 communication modules (CM 1241) and the RS485 communication board (CB 1241) provide the electrical interfaces for performing the PtP communications.

PtP Freeport over PROFIBUS or PROFINET

PtP enables you to use a PROFINET or PROFIBUS distributed I/O rack to communicate to various devices (RFID readers, GPS device, and others):

- PROFINET (Page 564): You connect the Ethernet interface of the S7-1200 CPU to a PROFINET interface module. PtP communication modules in the rack with the interface module can then provide serial communications to the PtP devices.
- PROFIBUS (Page 739): You insert a PROFIBUS communication module in the left side of the rack with the S7-1200 CPU. You connect the PROFIBUS communication module to a rack containing a PROFIBUS interface module. PtP communication modules in the rack with the interface module can then provide serial communications to the PtP devices.

For this reason, the S7-1200 supports two sets of PtP instructions:

- Legacy point-to-point instructions (Page 1056): These instructions existed prior to version V4.0 of the S7-1200 and only work with serial communications using a CM 1241 communication module or CB 1241 communication board.
- Point-to-point instructions (Page 911): These instructions provide all of the functionality of the legacy instructions, plus the ability to support PtP communication modules over PROFINET and PROFIBUS distributed I/O. The point-to-point instructions allow you to access the communication modules over the distributed I/O rack.

The S7-1200 CM 1241 modules must have a minimum firmware version of V2.1 to use the point-to-point instructions. These modules are limited to the local rack to the left side of the S7-1200 CPU. You can also use the point-to-point instructions with a CB 1241.

Communications over distributed I/O use the following modules:

Station	Module	Article number	Interface
ET 200MP	CM PtP RS232 BA	6ES7540-1AD00-0AA0	RS232
	CM PtP RS232 HF	6ES7541-1AD00-0AB0	RS232
	CM PtP RS422/485 BA	6ES7540-1AB00-0AA0	RS422/RS485
	CM PtP RS422/485 HF	6ES7541-1AB00-0AB0	RS422/RS485
ET 200SP	CM PtP	6ES7137-6AA00-0BA0	RS232 and RS422/RS485

Note

You can use the point-to-point instructions to access a communication board, local (or left side) serial modules, serial modules over PROFINET, and serial modules over PROFIBUS. STEP 7 provides the legacy point-to-point instructions only to support existing programs. The legacy instructions still function, however, with the current S7-1200 CPUs. You do not have to convert prior programs from one set of instructions to the other.

Note

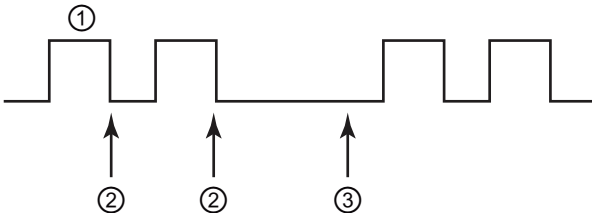
CM module firmware version requirement for Time synchronization and PtP communication

If you have enabled "CPU synchronizes the modules of the device" in the Time synchronization (Page 161) properties for the Profinet interface in the device configuration, update the firmware versions of the connected communication modules to the latest available versions. Enabling module time synchronization for communication modules with old firmware versions can cause communication issues or errors.

Message start conditions

You can determine how the communication interface recognizes the start of a message. The start characters and the characters comprising the message go into the receive buffer until a configured end condition is met.

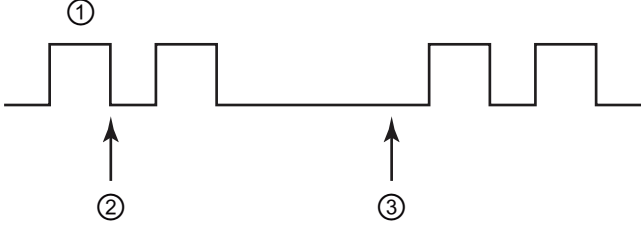
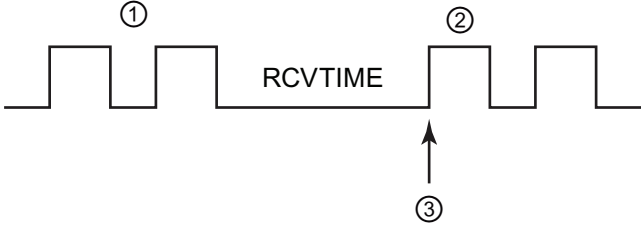
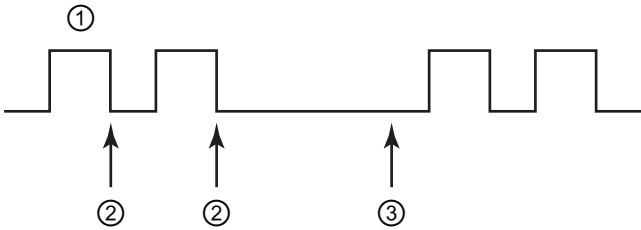
You can specify multiple start conditions. If you specify more than one start condition, all of the start conditions must be met before the message is considered started. For example, if you configure an idle line time and a specific start character, the CM or CB will first look for the idle line time requirement to be met and then the CM will look for the specified start character. If some other character is received (not the specified start character), the CM or CB will restart the start of message search by again looking for an idle line time.

Parameter	Definition
Start on Any Character	The Any Character condition specifies that any successfully received character indicates the start of a message. This character is the first character within a message.
Line Break	The Line Break condition specifies that a message receive operation starts after a break character is received.
Idle Line	The Idle Line condition specifies that a message reception starts once the receive line has been idle or quiet for the number of specified bit times. Once this condition occurs, the start of a message begins.  ① Characters ② Restarts the idle line timer ③ Idle line is detected and message receive is started
Special condition: Recognize message start with single character	Specifies that a particular character indicates the start of a message. This character is then the first character within a message. Any character that is received before this specific character is discarded. The default character is STX.
Special condition: Recognize message start with a character sequence	Specifies that a particular character sequence from up to four configured sequences indicates the start of a message. For each sequence, you can specify up to five characters. For each character position, you specify either a specific hex character, or that the character is ignored in sequence matching (wild-card character). The last specific character of a character sequence terminates that start condition sequence. Incoming sequences are evaluated against the configured start conditions until a start condition has been satisfied. Once the start sequence has been satisfied, evaluation of end conditions begins. You can configure up to four specific character sequences. You use a multiple-sequence start condition when different sequences of characters can indicate the start of a message. If any one of the character sequences is matched, the message is started.

The order of checking start conditions is:

- Idle line
- Line break
- Characters or character sequences

message will end if the message takes longer than 300 milliseconds to receive, or if the gap between any two characters exceeds 40 bit times, or if 50 bytes are received.

Parameter	Definition
Recognize message end by message timeout	The message end occurs when the configured amount of time to wait for the message end has expired. The message timeout period begins when a start condition has been satisfied. The default is 200 ms and the range is 0 to 65535 ms.  ① Received characters ② Start Message condition satisfied: message timer starts ③ Message timer expires and terminates the message
Recognize message end by response timeout	The message end occurs when the configured amount of time to wait for a response expires before a valid start sequence is received. The response timeout period begins when a transmission ends and the CM or CB begins the receive operation. The default response timeout is 200 ms and the range is 0 to 65535 ms. If a character is not received within the response time period, RCVTIME, then an error is returned to the corresponding RCV_PTP instruction. The response timeout does not define a specific end condition. It only specifies that a character must be successfully received within the specified time. You must configure another end condition to indicate the actual end of a message.  ① Transmitted characters ② Received characters ③ First character must be successfully received by this time.
Recognize message end by inter-character gap	The message end occurs when the maximum configured timeout between any two consecutive characters of a message has expired. The default value for the inter-character gap is 12 bit times and the maximum number is 65535 bit times, up to a maximum of eight seconds.  ① Received characters ② Restarts the intercharacter timer ③ The intercharacter timer expires and terminates the message.

13.3 Point-to-point (PtP) communication

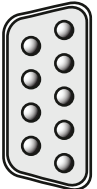
Parameter	Definition
Recognize message end by receiving a fixed number of characters	The message end occurs when the specified number of characters has been received. The valid range for the fixed length is 1 to 4096. Note that for the S7-1200, this end condition is only valid for V4.0 CPUs or higher.
Recognize message end by max length	The message end occurs when the configured maximum number of characters has been received. The valid range for maximum length is 1 to 1024. This condition can be used to prevent a message buffer overrun error. When this end condition is combined with timeout end conditions and the timeout condition occurs, any valid received characters are provided even if the maximum length is not reached. This allows support for varying length protocols when only the maximum length is known.
Read message length from message	The message itself specifies the length of the message. The message end occurs when a message of the specified length has been received. The method for specifying and interpreting the message length is described below.
Recognize message end with a character	The message end occurs when a specified character is received.
Recognize message end with a character sequence	The message end occurs when a specified character sequence is received. You can specify a sequence of up to five characters. For each character position, you specify either a specific hex character, or that the character is ignored in sequence matching. Leading characters that are ignored characters are not part of the end condition. Trailing characters that are ignored characters are part of the end condition.

Example configuration: End message with a character sequence

Consider the following end message condition configuration:

In this case, the end condition is satisfied when two consecutive 0x6A characters are received, followed by any two characters. The character preceding the 0x6A 0x6A pattern is not part of the end character sequence. Two characters following the 0x6A 0x6A pattern are required to

Table A-256 RS232 connector (male)

Pin	Description	Connector (male)	Pin	Description
1 DCD	Data carrier detect: Input		6 DSR	Data set ready: Input
2 RxD	Received data from DCE: Input		7 RTS	Request to send: Output
3 TxD	Transmitted data to DCE: Output		8 CTS	Clear to send: Input
4 DTR	Data terminal ready: Output		9 RI	Ring indicator (not used)
5 GND	Logic ground		SHELL	Chassis ground