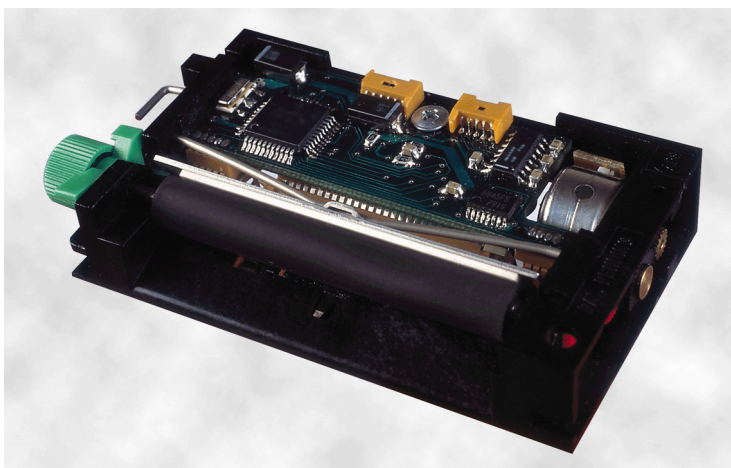


CP 205-RS



1.

2. Introduction

2.1. CP 205 RS

The CP205-RS printer is the first integrated printer in the size of a mechanism. This printer includes one CP205S print mechanism with an integrated controller board operating from a serial communication. Thanks to its optimization the volume of the complete printer is same as the print mechanism alone.

2.2. General characteristics

- Ultra-compact printer : total size W87 x H16 x D47, no wire or connector exiting this volume
- High resolution 8 dots/mm
- High speed up to 50 mm/s (@ 8.5 volts)
- only 2 small connectors for interfacing the printer
- Communication speed up to 19200 Bds
- Up to 42 characters per line
- Horizontal, 180 deg, Double and Quadruple width and height printing
- Powerfull Graphic Modes

2.3. Revision history

Rev.	Date	Page	Revision item
A	02/May/97	-	First issue
B	15/Nov/97	-	pre-serie release
C	10/May/98	-	Connector pin-out
D	28/Aug/98	-	Control codes addition

This manual provides complete informations about APS CP205-RS printer.

A.P.S. reserves the right to make changes without notice to the product to improve reliability, functions or design. A.P.S. does not assume any liability arising out of the application or use of the product or circuit described herein.



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3.

4. General Characteristics

CP 205 - RS	
Storage temperature (°C)	-40/+90
Operating temperature (°C)	-10/+70
Voltage (V)	4.5 to 8.5 (logic 5v +/-5%)
Current (A)	from 4A to 12Amp (@5V)
EMC standard	Designed to comply with Level B

5. CP 205-RS Interconnection

Please refer to drawing annexed to this specification for connectors position.

5.1. Power supply connector

Connector J1: JAE, IL-Z Series 7 contacts. Female ref: IL-Z-7S-S125C3, contacts: IL-Z-C3-A-15000. Power supply (V bat) is from 4.5v to 8.5v DC. Maximum current is 12A @5V(peak for 3ms).

Pin Number	Signal Name
1	5VL
2	V bat
3	V bat
4	GND
5	GND
6	GND

IMPORTANT NOTE:

- 1/ At power up make sure that +5v logic is present simultaneously or before Vbat. At power down make sure that Vbat is at 0v before removing +5v logic voltage.
- 2/ Wires AWG28 must be used in order not to increase the current losses
- 3/ For 5 volts only operation, (integrated inside a PC for instance), both logic and dot voltage can be tied together)

5.2. Serial communication connector

Connector J2: JAE, 5 contacts. Female ref: IL-Z-5S-S125C3, contacts: IL-Z-C3-A-15000.

Pin Number	Signal Name
1	Gnd
2	Transmit data (Txd, output)
3	Receive data (Rxd, input)
4	CTS/DSR (input)
5	RTS/DTR (output)

6. Paper Loading and Printing format

6.1. Paper loading

This can be achieved by two different methods:

- **Automatic paper loading:** if the green head-up lever is in down position, insert the paper inside the printer, then the roller with start moving taking the paper and feeding it for about 2 seconds. The printer is ready to print.
- **Manual paper loading:** after the green lever is in up-position, insert the paper inside the printer until it exits from the space between the thermal head and the roller. Then turn back the green lever to the down-position. the printer is ready to print.

6.2. Printing format

- The controller board is having one resident set of 224 characters (12 characters are selectable from the international character set: refer to ESC "R" command for further information).
- Character size is 9 pixels (8 "active dots" plus one intercharacter) x 20 pixels (16 "active" dots plus 4 interlines including underline), 1.125mm by 2,5mm. With double and quadruple height and width, maximum character size can go up to 4.5mm width by 10mm height. It is also given the customer the possibility to increase horizontal character spacing, and line spacing.
- Character per line is up 42 in standard text, 21 in double width, and 10 in quadruple width

6.3. Control codes

Control codes are non-printable characters or sequences of characters which affects the subsequent operation of the printer. Within the following description, a control code is used to cause the printer to interpret the following byte as part of a command and not as a printable character.

6.3.1. Printing codes cross reference

6.3.1.1. Setup and Harware control

Command	Description
GS / n	Set printing speed / Maximum peak current
GS C n	Set continuous printing/maximum speed
GS D n	Set print Intensity
ESC v	Send printer status
ESC @	Resets printer
GS B n	Serial Communication setting
ESC R n	Select international character Set

6.3.1.2. Text and General commands

Command	Description
ESC 3 n	Set line spacing
ESC SP n	Set character spacing
ESC !	Set print mode
ESC { n	Set/reset Rotated character
LF	Line feed
CR	Carriage return
ESC J n	Feed paper (nodotlines) forward
ESC j n	Feed paper (ndotlines) backward
CAN	Cancel print data buffer (text mode)

6.3.1.3. Graphics commands

Command	Description
ESC * n1 n2 n3 n4 n5,datas	Print graphics
ESC \$ n1,n2	Horizontal dot positionning
ESC V n1,n2,n3 datas	Horizontal bit image

6.3.2. Setup and Hardware control

GS / n

Description: Set printing speed / Maximum peak current

Format: <1Dh> <2Fh> <n>

Comments: n=0 : Set at maximum printing speed (maximum peak current on power supply, and maximum speed if GS C 1)
n=1 : (Default) Set at medium peak current (1/3 of maximum peak current). Printing speed is subsequently affected (also by GS C n command)

GS C n

Description: Set continuous printing / Maximum speed

Format: <1Dh> <43h> <n>

Comments: This command sets the current inside the stepper motor in order to allow continuous printing or maximum speed.
n=0 : continuous printing (default). In this mode, the stepper motor current is low, and its temperature does not exceed 70°C when continuous printing is performed. In this case, the printing speed is constant about 25 mm/s, over the voltage range. In some cases, this mode can be used to reduce the noise of the printer (for instance when the communication is very slow, and printing speed becomes very slow). Note that in this case, the total consumption of the stepper motor is 250 mA.
n=1 : the current inside the stepper is set at its maximum. Then, the print ratio must be less than 15%, and the maximum printout must not exceed 30 seconds. In this case the printing speed is only limited by the dot voltage and the GS / n command. If the voltage is 8.5 volts and the parameter of the GS / n command is set to 0, the printer will print at 50 mm/s. Note that at low voltage and/or in graphics mode at low communication rate, the printer may be noisy. In this case adjust communication settings, GS C n and GS / n, commands to remove any mechanical resonance.

GSD n

Description: Set print Intensity
 Format: <1Dh> <44h> <n>
 Comments: n=8Fh (127d) : (Default). Nominal print intensity
 n>8Fh (127d) : Printout becomes darker
 n<8Fh (127d) : Printout becomes lighter
 (n from 0 to 255 (FFh)).

ESC v

Description: Send printer status
 Format: <1Bh> <76h>
 Comments: The printer will transmit a single byte which reflects the status of the printer in accordance with the following table:

Bit	Function	Bit = 0	Bit = 1
0	Head temperature	OK	too high or too low
1	Head-up	No	Yes
2	Paper out	No	Yes
3	Power supply	OK	too high or too low
4	(unused always 0)	-	-
5	(unused always 0)	-	-
6	(unused always 0)	-	-
7	Cutter failure	Yes	No

This command is executed immediatly after being received, even in case of buffer full (DTR/RTS or Xoff active).

ESC @

Description: Resets printer
 Format: <1Bh> <40h>
 Comments: Clears data print buffer and initializes the printer with default values. This command is executed immediatly after being received, even in case of buffer full (DTR/RTS or Xoff active).

GS B,n Serial communication and mode settings

Description: Serial communication and mode settings
 Format: <1Dh> <42h> <n>
 Comments: sets serial communication speed and mode
 Bit 7: B7=0: Xon-Xoff mode (software control), B7=1: DSR/DTR mode (hardware control)
 Bit 6: B6=0: Normal mode; B6=1 Test mode: all characters received will generate a printout corresponding to their Hexadecimal value (00 to FF). This is usefull for communication debugging. Number of character per line is then 16 (to ease debug). Example: if character ESC (27h) is sent to the printer in this mode, the printer will print "27".
 Bit 5: Stopbit; B5=0, 1 stopbit; B5=1, 2 stopbits.
 Bit 4: B4=0, Odd (if parity=1); Bit4=1: Even
 Bit 3: Parity; B3=0, OFF; B3=1,ON.

Bit 2, 1, 0: Speed:

n	Communication speed
0	1 200
1	2 400
2	4 800
3	9 600
4	19 200

(Default n=83h: DSR/DTR; Normal mode, 1 Stopbit, Parity Even, No parity, 9600 Bds)

ESC R,n Select international character Set

Description: Select international character Set

Format: <1Bh> <4Ah> <n>

Comments: Modify the set of printable characters in accordance with the table below:

n	Country	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	USA	#	\$	@	[	\	]	^	'	{		}	~
1	France	#	\$	à	°	ç	§	^	'	é	ù	è	“
2	Germany	#	\$	§	€	...	†	^	'	œ	š	ÿ	§
3	UK	£	\$	@	[	\	]	^	'	{		}	~
4	Denmark 1	#	\$	@	®	?	•	^	'	¾	?	œ	~
5	Sweden	#	¤	f	€	...	•	†	é	Š	š	œ	ÿ
6	Italy	#	\$	@	°	\	é	^	•	à	~	è	”
7	Spain 1	Pt	\$	@	À	„	À	^	'	”	–	}	~
8	Japan	#	\$	@	[	´	]	^	'	{	?	}	~
9	Norway	#	¤	f	®	?	•	†	Ž	¾	?	œ	ÿ
10	Denmark 2	#	\$	f	®	?	•	†	Ž	¾	?	œ	ÿ
11	Spain 2	#	\$	à	À	„	À	Ž	'	'	–	–	œ
12	Latin Amer.	#	\$	à	À	„	À	Ž	ž	'	–	–	œ

6.3.3. Text and General commands

ESC 3 n

Description: Set line spacing

Format: <1Bh> <33h> <n>

Comments: Sets the character line spacing. (Default n=3). n may vary from 3 to 15. The character line spacing pitch is n/16mm.

ESC SP n

Description: Set character spacing

Format: <1Bh> <20h> <n>

Comments: Sets the character right spacing. (Default n=2, character width is 9 pixels). n may vary from 1 to 16. The character right spacing pitch is n/8mm. This spacing is proportionnal to double width (nx2) and quadruple width (nx4) commands.

ESC ! n Set print mode

Description: Set print mode

Format: <1Bh> <21h> <n>

Comments: The value of n (default 0) selects the various modes of printing as described in the table below:

Bit	Function	Bit = 0	Bit = 1
0	Not used	-	-
1	Quadruple Height	Cancelled	Set
2	Quadruple Width	Cancelled	Set
3	Not used	-	-
4	Double Height	Cancelled	Set
5	Double Width	Cancelled	Set
6	Not used	-	-
7	Underlined	Cancelled	Set

ESC { n

Description: Set/Cancel Rotated characters

Format: <1Bh> <7Bh> <n>

Comments: This command rotates by 180° the text being printed out.
n= 0 (default). Printout is normal
n=1 : Printout is rotated 180°

LF

Description: Line feed

Format: <0Ah>

Comments: Move the print position to the beginning of the next line

CR

Description: Carriage return

Format: <0Dh>

Comments: Move the print position to the beginning of the next line. Note: if CR is followed by LF, the printer will ignore the LF after CR. So, CR = LF = CR+LF

ESC J, n

Description: Feed paper (n dotlines) forward

Format: <1Bh> <4Ah> <n>

Comments: Paper is fed for n (n<256) dotlines (n times 0.125 mm). The print position is at the beginning of the next line

ESC j, n

Description: Feed paper (n dotlines) backward

Format: <1Bh> <6Ah> <n>

Comments: Paper is fed for n (n<256) dotlines (n times 0.125 mm) backward. The print position is at the beginning of the next line

CAN

Description: Cancel print data buffer (text mode)

Format: <18h>

Comments: The print buffer is cancelled and print position is at the beginning of the next line.

6.3.4. Graphics commands

ESC * n1 n2 n3 n4 n5 <datas>

Description: Print graphics

Format: <1Bh><2Ah><n1><n2><n3><n4><n5><datas>

Comments: Bytes n1 and n2 sets the number of byte N to be printed out : $N = (256 * n2) + n1$

Byte n3 sets graphic operators on data byte and has the following meaning :

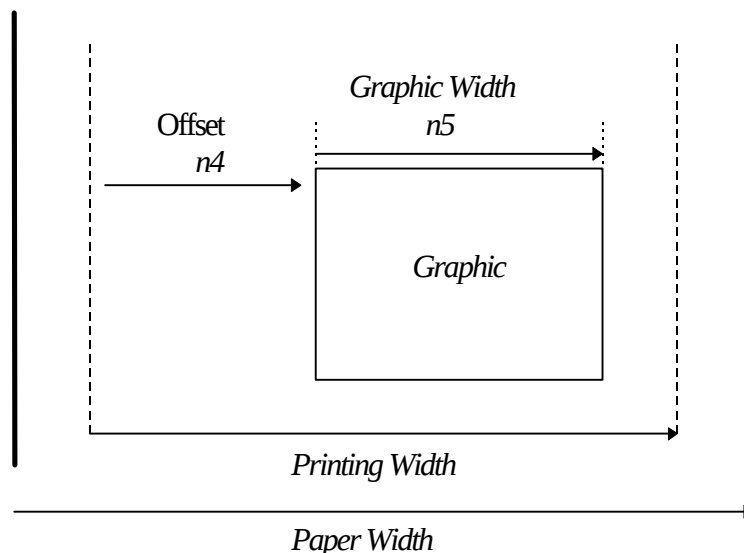
- n3=0 : print normal size data byte (full printer resolution)
- n3=1 : double width
- n3=2 : double height
- n3=3 : expanded (double width, double height)

Byte n4 sets the number of byte to be skipped before printing out the first graphic bit :

- 00 H : first graphic bit to be printed out is dot one on the head
- 01 to FF H : 1 to 255 bytes skipped (to be less than total number of head's bytes)

Byte n5 sets the width of the graphic to be printed out :

- 01 to FF H : width is 1 to 255 bytes (to be less than total number of head's bytes)



ESC \$ n1 n2

Description: Horizontal dot positioning

Format: <1Bh><24h><n1><n2>

Comments: Dot positioning command in bytes (to be used with ESC V). Dot position equals $(n1 + 256 * n2)$. n1 must

be less than 48 (384/8), and n2 is always 0.

ESC V n1 n2 n3 <datas>

Description: Horizontal bit image

Format: <1Bh><56h><n1><n2><n3><datas>

Comments: the number of bytes to be printed is equal to (n2+256*n3). n2 must be less than 48 (384/8), and n3 is always 0. n1 is the resolution: 0 is standard size, 1 is double width, 2 double height, 3 is expanded

IMPORTANT NOTES FOR GRAPHICS:

- Pay attention that n4 (offset) + n5 (graphic width) is less than the number of head's bytes (printing width). If not control code will be ignored.
- One dotline must be performed in less than 2s. If not current into stepper is removed, affecting badly the print quality.
- It is recommended for all graphics sequences to set up the communication speed at the maximum value.