

CoolGate Programmiers Reference Manual (PRM)



CoolGate CoolGate PRO

**Interface Adapter
MODBUS to VRV,VRF
Air Conditioning
Systems**



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1 Release Notes

Document revision 0.8 Sunday, May 29, 2011

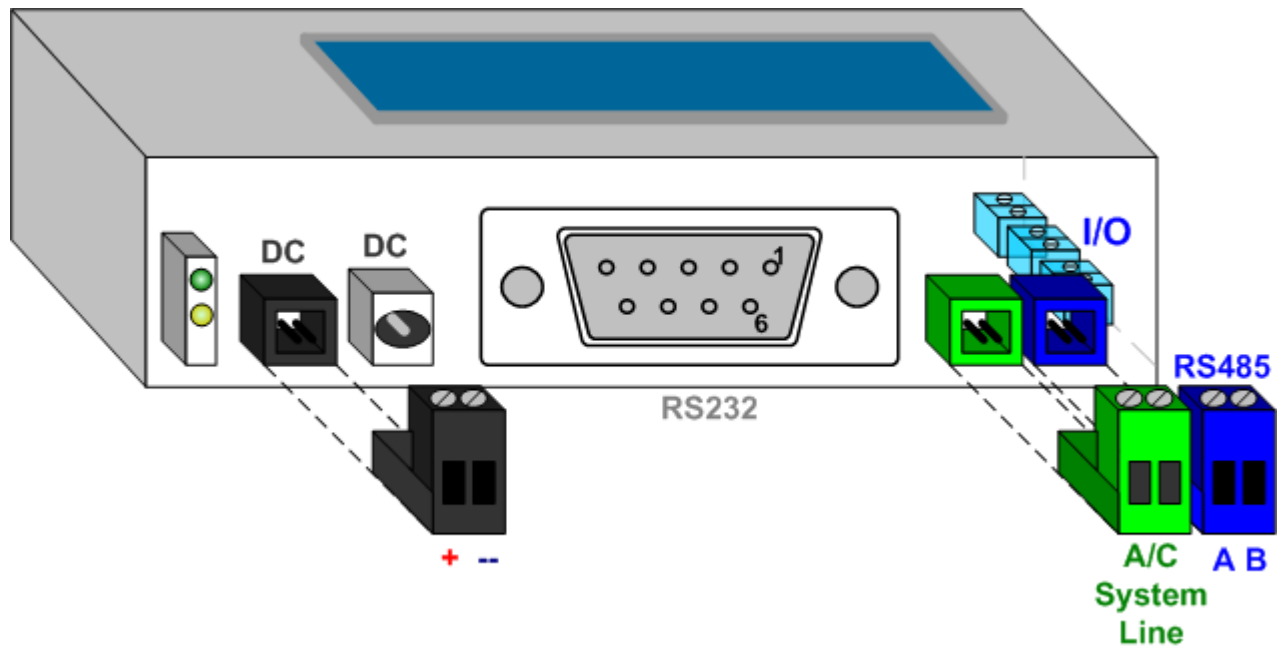
Type	Lowest Compatible FW version	
	CoolGate	CoolGate PRO
D	2.3.8	2.3.8
S	2.3.8	n.a.
T	2.3.8	n.a.
M	2.3.9	2.5.7
F	n.a.	n.a.
I(MH)	2.5.6	n.a.
H	2.5.3	n.a.

Document revision history

- 0.9
 - CoolGate 4000M PRO Features
- 0.8
 - CoolGate 8000I(MH)
- 0.7
 - CoolGate 4000M PAC-YG63, PAC-YG66 support
- 0.6
 - Indoor Central Address support for 2000S,3000T
 - Updated Failures Table
- 0.5
 - Fixed failure translation table for CoolGate S type
 - Added Modbus frame format definition
- 0.4
 - Added failure code translation for CoolGate S and T types



2 CoolGate Layout



CoolGate supports Modbus RTU Transmission Mode with following byte format:

Baud Rate	9600
Start Bits	1
Data Bits	8
Parity	No
Stop Bits	1

Physical bytes transmission is done over “Two-Wire” electrical interface in accordance with EIA/TIA-485 standard via 485-A and 485-B terminals.

CoolGate Modbus address is reported on LCD. It can be changed via RS232 terminal with **set modaddr <ADDR>** command. For details see [CoolMaster Programmers Reference Manual \(PRM\)](#).



3 General Address Allocation

Coils,Registers, Address Range (hex)	Address Zone Size	Access To	Translation
0001 - 0800	128x16=0x800	Indoor Internal Parameters via AirNet 000-127	AirNet = (Address-1 >> 4)
0801 - 0900	16x16=0x100	Outdoor System Parameters 0-15	Outdoor System = (Address-1-0x800)>>4
0901 - 0B00	32x16=0x200	Outdoor Unit 0-15	Outdoor Unit = (Address-1-0x900)>>5
0B01 - 1000	0x500	Reserved	
1001 - F640	0xE640	Indoor Units 1-00 - 15-99	Indoor System = (Address-1-0x1000) >> 12 + 1 Indoor Unit = ((Address-1-0x1000) >> 4) & 0xFF
F641 - F700	0xC0	Reserved	
F701 - F800	0x100	Indoor Group Operations	
F801 - FFFF	0x800	Reserved	

Backward conversion

Indoor System Parameters via AirNet 000-127	Address = AirNet << 4 +1
Outdoor System 0-15	Address = (OutdoorSystem << 4)+0x800 +1



4 Indoor Internal Parameters

Access to Indoor internal parameters available in CoolGate PRO only.

4.1 CoolGate D

To access indoor internal parameters in CoolGate D type Indoor units must be assigned AirNet address. AirNet address range is 000-127

AirNet Address	Base Address (hex)	Input Registers (hex)	
000	0001	0001	Suction Temperature
		0002	Liquid Pipe Temperature
		0003	Gas Pipe Temperature
		0004	EV Opening
		0005	Failure Code
001	011		
002	021		
...			
127	07F1		

4.2 CoolGate M

Unit Address	Base Address (hex)	Input Registers (hex)		
			F/P	PUHZ-RP4HA
001	0011	0011	Indoor Unit Type Code	
		0012	TH1*10	TH1
		0013	TH2*10	TH2
		0014	TH3*10	TH3
		0015		TH4
		0016	SH*10	TH5
		0017	SC*10	TH6
		0018	Li	TH7
		0019		TH8
		001A		Fan
		001B		Hz
		001C		SC*10
		001D		LevA
		001E		LevB
		002	0021	
003	0031			
...				
050	0321			

Indoor Type Codes

Code (hex)	Indoor Type
80FF	F/P (VRV Indoor)
800F	F/P (VRV Indoor)
800C	PUHZ-RP4HA (Mr SLIM)



Note:

1. Parameter*10 means that value read from CoolGate should be divided by 10 to get real parameter value.
2. For understanding of the meaning of the parameter codes please refer to this document:
[Maintenance Tools for MN converter & G-50A -Advanced](#)



5 Outdoor Systems

Access to Outdoor system parameters available in CoolGate PRO only.

5.1 CoolGate D

Outdoor System	Base Address (hex)	Input Registers (hex)	
0	0801	0801	System HP
		0802	System Current in 0.1A units
		0803	Evaporation Temperature
		0804	Condensing Temperature
		0805	System Failure
1	0811		
2	0821		
...			
15	08F1		



6 Outdoor Unit Parameters

Access to Outdoor Unit parameters available in CoolGate PRO only.

6.1 CoolGate D

Outdoor Unit	Base Address (hex)	Input Registers (hex)	
0	0901	0901	System Number
		0902	HP
		0903	Ambient Temperature
		0904	Suction Temperature
		0905	Evaporation Temperature
		0906	Condensing Temperature
		0907	Inverter Revolution Speed
		0908	EV Opening 1
		0909	EV Opening 2
		090A	STD1
		090B	STD2
		090C	Fan Step
		1	0921
2	0941		
...			
15	0AE1		



6.2 CoolGate M

Outdoor Unit Address	Base Address (hex)	Input Registers (hex)	
051	0921	0921	Outdoor Unit Type Code
		0922	TH1*10
		0923	TH2*10
		0924	TH3*10
		0925	TH4*10
		0926	TH5*10
		0927	TH6*10
		0928	TH7*10
		0929	THHS*10
		092A	THBox*10
		092B	63HSI*10
		092C	63LS*10
		092D	Tc*10
		092E	Te*10
		092F	Vdc*10
		0930	Iu*10
		0931	Iw*10
		0932	FAN
		0933	Foc
		0934	F(Hz)
		0935	
		0936	
		0937	
		0938	
		0939	
		093A	SCo*10
		093B	SCc*10
093C	SHb*10		
052	0941		
053	0961		
...			
058	0A01		

Outdoor Type Codes

Code (hex)	Indoor Type
83A9	PUHY
83A2	PURY

Note:

1. Parameter*10 means that value read from CoolGate should be divided by 10 to get real parameter value.
2. For understanding of the meaning of the parameter codes please refer to this document: [Maintenance Tools for MN converter & G-50A -Advanced](#)



7 Indoors Address Map

Indoor Unit	Base Address (hex)	Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
		Address	Description	Address	Description	Address	Description	Address	Description
1-00	1001	1001	Present	1001	On/Off	1001	Mode	1001	Room Temperature
				1002	Filter Sign	1002	Fan Speed	1002	Failure Code
						1003	Temperature		

1-01	1011
------	------

1-02	1021
------	------

...

2-00	2001
------	------

...

3-00	3001
------	------

...

4-00	4001
------	------

...

Indoor Unit - Indoor Unit number same as in **stat** command.

CoolGate Type	Indoor Unit number	Modbus Map Base Address
D	1-00 .. 1-15	0x1001 .. 0x10F1
	2-00 .. 2-15	0x2001 .. 0x20F1
	3-00 .. 3-15	0x3001 .. 0x30F1
	4-00 .. 4-15	0x4001 .. 0x40F1
S T	1-01 .. 1-99	0x1011 .. 0x1631
	2-01 .. 2-99	0x2011 .. 0x2631

	14-01 .. 14-99	0xE011 .. 0xE631
	Central Address 01-64	0xF011 .. 0xF401
M, I(MH)	001 .. 050 ...	0x1011 .. 0x1321 ...

Mode Encoding

Cool	0
Heat	1
Auto	2
Dry	3
Haux	4
Fan	5

Fan Speed Encoding

Low	0
Medium	1
High	2
Auto	3
Top	4



8 Special Devices

8.1 PAC-YG63, PAC-YG66

CoolGate 4000M v2.5.6 and higher supports PAC-YG66 - digital I/O extender and PAC-YG63 - analog I/O extender. Access to this devices available via Indoor Units address range. Below are examples for PAC-YG66/63 at centralized address 001.

- PAC-YG66

Indoor Unit	Base Address (hex)	Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
		1011	Present					1012	Failure Code
001	1011	1013	Input 1	1013	Output 1				
		1014	Input 2	1014	Output 2				
		1015	Input 3	1015	Output 3				
		1016	Input 4	1016	Output 4				
		1017	Input 5	1017	Output 5				
		1018	Input 6	1018	Output 6				

- PAC-YG63

Indoor Unit	Base Address (hex)	Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
		1011	Present					1012	Failure Code
001	1011							1013	Analog Input 1 *10
								1014	Analog Input 2 *10

The actual Analog Input value should be calculated as

$$\text{Analog Input Value} = \text{Input Register Value} / 10$$

For example if temperature sensor is connected to Analog Input 1 and corresponding Input Register is read as 275 the temperature is $275/10 = 27.5$



9 Indoor Group Operations

Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
		F701	All On/Off (Write Only)				



10 Failure Codes

Below is a translation table between failure code register value and failure code used by A/C manufacturer. For M model register value and failure code are the same and requires no translation.

• For CoolGate D type

000 (0x00) - 00	001 (0x01) - 01	002 (0x02) - 02	003 (0x03) - 03
004 (0x04) - 04	005 (0x05) - 05	006 (0x06) - 06	007 (0x07) - 07
008 (0x08) - 08	009 (0x09) - 09	010 (0x0A) - 0A	011 (0x0B) - 0H
012 (0x0C) - 0C	013 (0x0D) - 0J	014 (0x0E) - 0E	015 (0x0F) - 0F
016 (0x10) - A0	017 (0x11) - A1	018 (0x12) - A2	019 (0x13) - A3
020 (0x14) - A4	021 (0x15) - A5	022 (0x16) - A6	023 (0x17) - A7
024 (0x18) - A8	025 (0x19) - A9	026 (0x1A) - AA	027 (0x1B) - AH
028 (0x1C) - AC	029 (0x1D) - AJ	030 (0x1E) - AE	031 (0x1F) - AF
032 (0x20) - C0	033 (0x21) - C1	034 (0x22) - C2	035 (0x23) - C3
036 (0x24) - C4	037 (0x25) - C5	038 (0x26) - C6	039 (0x27) - C7
040 (0x28) - C8	041 (0x29) - C9	042 (0x2A) - CA	043 (0x2B) - CH
044 (0x2C) - CC	045 (0x2D) - CJ	046 (0x2E) - CE	047 (0x2F) - CF
048 (0x30) - E0	049 (0x31) - E1	050 (0x32) - E2	051 (0x33) - E3
052 (0x34) - E4	053 (0x35) - E5	054 (0x36) - E6	055 (0x37) - E7
056 (0x38) - E8	057 (0x39) - E9	058 (0x3A) - EA	059 (0x3B) - EH
060 (0x3C) - EC	061 (0x3D) - EJ	062 (0x3E) - EE	063 (0x3F) - EF
064 (0x40) - H0	065 (0x41) - H1	066 (0x42) - H2	067 (0x43) - H3
068 (0x44) - H4	069 (0x45) - H5	070 (0x46) - H6	071 (0x47) - H7
072 (0x48) - H8	073 (0x49) - H9	074 (0x4A) - HA	075 (0x4B) - HH
076 (0x4C) - HC	077 (0x4D) - HJ	078 (0x4E) - HE	079 (0x4F) - HF
080 (0x50) - F0	081 (0x51) - F1	082 (0x52) - F2	083 (0x53) - F3
084 (0x54) - F4	085 (0x55) - F5	086 (0x56) - F6	087 (0x57) - F7
088 (0x58) - F8	089 (0x59) - F9	090 (0x5A) - FA	091 (0x5B) - FH
092 (0x5C) - FC	093 (0x5D) - FJ	094 (0x5E) - FE	095 (0x5F) - FF
096 (0x60) - J0	097 (0x61) - J1	098 (0x62) - J2	099 (0x63) - J3
100 (0x64) - J4	101 (0x65) - J5	102 (0x66) - J6	103 (0x67) - J7
104 (0x68) - J8	105 (0x69) - J9	106 (0x6A) - JA	107 (0x6B) - JH
108 (0x6C) - JC	109 (0x6D) - JJ	110 (0x6E) - JE	111 (0x6F) - JF
112 (0x70) - L0	113 (0x71) - L1	114 (0x72) - L2	115 (0x73) - L3
116 (0x74) - L4	117 (0x75) - L5	118 (0x76) - L6	119 (0x77) - L7
120 (0x78) - L8	121 (0x79) - L9	122 (0x7A) - LA	123 (0x7B) - LH
124 (0x7C) - LC	125 (0x7D) - LJ	126 (0x7E) - LE	127 (0x7F) - LF
128 (0x80) - P0	129 (0x81) - P1	130 (0x82) - P2	131 (0x83) - P3
132 (0x84) - P4	133 (0x85) - P5	134 (0x86) - P6	135 (0x87) - P7
136 (0x88) - P8	137 (0x89) - P9	138 (0x8A) - PA	139 (0x8B) - PH
140 (0x8C) - PC	141 (0x8D) - PJ	142 (0x8E) - PE	143 (0x8F) - PF
144 (0x90) - U0	145 (0x91) - U1	146 (0x92) - U2	147 (0x93) - U3
148 (0x94) - U4	149 (0x95) - U5	150 (0x96) - U6	151 (0x97) - U7
152 (0x98) - U8	153 (0x99) - U9	154 (0x9A) - UA	155 (0x9B) - UH
156 (0x9C) - UC	157 (0x9D) - UJ	158 (0x9E) - UE	159 (0x9F) - UF
160 (0xA0) - M0	161 (0xA1) - M1	162 (0xA2) - M2	163 (0xA3) - M3
164 (0xA4) - M4	165 (0xA5) - M5	166 (0xA6) - M6	167 (0xA7) - M7
168 (0xA8) - M8	169 (0xA9) - M9	170 (0xAA) - MA	171 (0xAB) - MH
172 (0xAC) - MC	173 (0xAD) - MJ	174 (0xAE) - ME	175 (0xAF) - MF
176 (0xB0) - 30	177 (0xB1) - 31	178 (0xB2) - 32	179 (0xB3) - 33
180 (0xB4) - 34	181 (0xB5) - 35	182 (0xB6) - 36	183 (0xB7) - 37
184 (0xB8) - 38	185 (0xB9) - 39	186 (0xBA) - 3A	187 (0xBB) - 3H
188 (0xBC) - 3C	189 (0xBD) - 3J	190 (0xBE) - 3E	191 (0xBF) - 3F
192 (0xC0) - 40	193 (0xC1) - 41	194 (0xC2) - 42	195 (0xC3) - 43
196 (0xC4) - 44	197 (0xC5) - 45	198 (0xC6) - 46	199 (0xC7) - 47
200 (0xC8) - 48	201 (0xC9) - 49	202 (0xCA) - 4A	203 (0xCB) - 4H
204 (0xCC) - 4C	205 (0xCD) - 4J	206 (0xCE) - 4E	207 (0xCF) - 4F
208 (0xD0) - 50	209 (0xD1) - 51	210 (0xD2) - 52	211 (0xD3) - 53
212 (0xD4) - 54	213 (0xD5) - 55	214 (0xD6) - 56	215 (0xD7) - 57
216 (0xD8) - 58	217 (0xD9) - 59	218 (0xDA) - 5A	219 (0xDB) - 5H
220 (0xDC) - 5C	221 (0xDD) - 5J	222 (0xDE) - 5E	223 (0xDF) - 5F
224 (0xE0) - 60	225 (0xE1) - 61	226 (0xE2) - 62	227 (0xE3) - 63
228 (0xE4) - 64	229 (0xE5) - 65	230 (0xE6) - 66	231 (0xE7) - 67
232 (0xE8) - 68	233 (0xE9) - 69	234 (0xEA) - 6A	235 (0xEB) - 6H
236 (0xEC) - 6C	237 (0xED) - 6J	238 (0xEE) - 6E	239 (0xEF) - 6F
240 (0xF0) - ?0	241 (0xF1) - ?1	242 (0xF2) - ?2	243 (0xF3) - ?3
244 (0xF4) - ?4	245 (0xF5) - ?5	246 (0xF6) - ?6	247 (0xF7) - ?7
248 (0xF8) - ?8	249 (0xF9) - ?9	250 (0xFA) - ?A	251 (0xFB) - ?H
252 (0xFC) - ?C	253 (0xFD) - ?J	254 (0xFE) - ?E	255 (0xFF) - ?F



• For CoolGate S or T type

000 (0x00) - A00	001 (0x01) - A01	002 (0x02) - A02	003 (0x03) - A03
004 (0x04) - A04	005 (0x05) - A05	006 (0x06) - A06	007 (0x07) - A07
008 (0x08) - A08	009 (0x09) - A09	010 (0x0A) - A10	011 (0x0B) - A11
012 (0x0C) - A12	013 (0x0D) - A13	014 (0x0E) - A14	015 (0x0F) - A15
016 (0x10) - A16	017 (0x11) - A17	018 (0x12) - A18	019 (0x13) - A19
020 (0x14) - A20	021 (0x15) - A21	022 (0x16) - A22	023 (0x17) - A23
024 (0x18) - A24	025 (0x19) - A25	026 (0x1A) - A26	027 (0x1B) - A27
028 (0x1C) - A28	029 (0x1D) - A29	030 (0x1E) - A30	031 (0x1F) - A31
032 (0x20) - C00	033 (0x21) - C01	034 (0x22) - C02	035 (0x23) - C03
036 (0x24) - C04	037 (0x25) - C05	038 (0x26) - C06	039 (0x27) - C07
040 (0x28) - C08	041 (0x29) - C09	042 (0x2A) - C10	043 (0x2B) - C11
044 (0x2C) - C12	045 (0x2D) - C13	046 (0x2E) - C14	047 (0x2F) - C15
048 (0x30) - C16	049 (0x31) - C17	050 (0x32) - C18	051 (0x33) - C19
052 (0x34) - C20	053 (0x35) - C21	054 (0x36) - C22	055 (0x37) - C23
056 (0x38) - C24	057 (0x39) - C25	058 (0x3A) - C26	059 (0x3B) - C27
060 (0x3C) - C28	061 (0x3D) - C29	062 (0x3E) - C30	063 (0x3F) - C31
064 (0x40) - E00	065 (0x41) - E01	066 (0x42) - E02	067 (0x43) - E03
068 (0x44) - E04	069 (0x45) - E05	070 (0x46) - E06	071 (0x47) - E07
072 (0x48) - E08	073 (0x49) - E09	074 (0x4A) - E10	075 (0x4B) - E11
076 (0x4C) - E12	077 (0x4D) - E13	078 (0x4E) - E14	079 (0x4F) - E15
080 (0x50) - E16	081 (0x51) - E17	082 (0x52) - E18	083 (0x53) - E19
084 (0x54) - E20	085 (0x55) - E21	086 (0x56) - E22	087 (0x57) - E23
088 (0x58) - E24	089 (0x59) - E25	090 (0x5A) - E26	091 (0x5B) - E27
092 (0x5C) - E28	093 (0x5D) - E29	094 (0x5E) - E30	095 (0x5F) - E31
096 (0x60) - F00	097 (0x61) - F01	098 (0x62) - F02	099 (0x63) - F03
100 (0x64) - F04	101 (0x65) - F05	102 (0x66) - F06	103 (0x67) - F07
104 (0x68) - F08	105 (0x69) - F09	106 (0x6A) - F10	107 (0x6B) - F11
108 (0x6C) - F12	109 (0x6D) - F13	110 (0x6E) - F14	111 (0x6F) - F15
112 (0x70) - F16	113 (0x71) - F17	114 (0x72) - F18	115 (0x73) - F19
116 (0x74) - F20	117 (0x75) - F21	118 (0x76) - F22	119 (0x77) - F23
120 (0x78) - F24	121 (0x79) - F25	122 (0x7A) - F26	123 (0x7B) - F27
124 (0x7C) - F28	125 (0x7D) - F29	126 (0x7E) - F30	127 (0x7F) - F31
128 (0x80) - H00	129 (0x81) - H01	130 (0x82) - H02	131 (0x83) - H03
132 (0x84) - H04	133 (0x85) - H05	134 (0x86) - H06	135 (0x87) - H07
136 (0x88) - H08	137 (0x89) - H09	138 (0x8A) - H10	139 (0x8B) - H11
140 (0x8C) - H12	141 (0x8D) - H13	142 (0x8E) - H14	143 (0x8F) - H15
144 (0x90) - H16	145 (0x91) - H17	146 (0x92) - H18	147 (0x93) - H19
148 (0x94) - H20	149 (0x95) - H21	150 (0x96) - H22	151 (0x97) - H23
152 (0x98) - H24	153 (0x99) - H25	154 (0x9A) - H26	155 (0x9B) - H27
156 (0x9C) - H28	157 (0x9D) - H29	158 (0x9E) - H30	159 (0x9F) - H31
160 (0xA0) - J00	161 (0xA1) - J01	162 (0xA2) - J02	163 (0xA3) - J03
164 (0xA4) - J04	165 (0xA5) - J05	166 (0xA6) - J06	167 (0xA7) - J07
168 (0xA8) - J08	169 (0xA9) - J09	170 (0xAA) - J10	171 (0xAB) - J11
172 (0xAC) - J12	173 (0xAD) - J13	174 (0xAE) - J14	175 (0xAF) - J15
176 (0xB0) - J16	177 (0xB1) - J17	178 (0xB2) - J18	179 (0xB3) - J19
180 (0xB4) - J20	181 (0xB5) - J21	182 (0xB6) - J22	183 (0xB7) - J23
184 (0xB8) - J24	185 (0xB9) - J25	186 (0xBA) - J26	187 (0xBB) - J27
188 (0xBC) - J28	189 (0xBD) - J29	190 (0xBE) - J30	191 (0xBF) - J31
192 (0xC0) - L00	193 (0xC1) - L01	194 (0xC2) - L02	195 (0xC3) - L03
196 (0xC4) - L04	197 (0xC5) - L05	198 (0xC6) - L06	199 (0xC7) - L07
200 (0xC8) - L08	201 (0xC9) - L09	202 (0xCA) - L10	203 (0xCB) - L11
204 (0xCC) - L12	205 (0xCD) - L13	206 (0xCE) - L14	207 (0xCF) - L15
208 (0xD0) - L16	209 (0xD1) - L17	210 (0xD2) - L18	211 (0xD3) - L19
212 (0xD4) - L20	213 (0xD5) - L21	214 (0xD6) - L22	215 (0xD7) - L23
216 (0xD8) - L24	217 (0xD9) - L25	218 (0xDA) - L26	219 (0xDB) - L27
220 (0xDC) - L28	221 (0xDD) - L29	222 (0xDE) - L30	223 (0xDF) - L31
224 (0xE0) - P00	225 (0xE1) - P01	226 (0xE2) - P02	227 (0xE3) - P03
228 (0xE4) - P04	229 (0xE5) - P05	230 (0xE6) - P06	231 (0xE7) - P07
232 (0xE8) - P08	233 (0xE9) - P09	234 (0xEA) - P10	235 (0xEB) - P11
236 (0xEC) - P12	237 (0xED) - P13	238 (0xEE) - P14	239 (0xEF) - P15
240 (0xF0) - P16	241 (0xF1) - P17	242 (0xF2) - P18	243 (0xF3) - P19
244 (0xF4) - P20	245 (0xF5) - P21	246 (0xF6) - P22	247 (0xF7) - P23
248 (0xF8) - P24	249 (0xF9) - P25	250 (0xFA) - P26	251 (0xFB) - P27
252 (0xFC) - P28	253 (0xFD) - P29	254 (0xFE) - P30	255 (0xFF) - P31