

**CQM1-TC201 Temperature Monitor using the IOTC Instruction.**

**PURPOSE:**

This document will show how to configure the CQM1-TC201 to read the current temperature of the 4 loops of temperature control using the IOTC expansion instruction.

**REQUIRED EQUIPMENT:**

- |    |             |                           |
|----|-------------|---------------------------|
| 1. | CQM1-PA203  | Omron CQM1 Power Supply.  |
| 2. | CQM1H-CPU21 | Omron CQM1H PLC CPU.      |
| 3. | CQM1-TC201  | 4 Loop Temp Control Card. |
| 4. |             | 4 Thermocouples.          |

**REQUIRED SOFTWARE:**

- |    |              |                                 |
|----|--------------|---------------------------------|
| 1. | CX-PROG V9.1 | Omron PLC Programming Software. |
|----|--------------|---------------------------------|

**REQUIRED CABLES:**

- |    |            |                        |
|----|------------|------------------------|
| 1. | CS1W-CN226 | PLC Programming Cable. |
|----|------------|------------------------|

**FILES:**

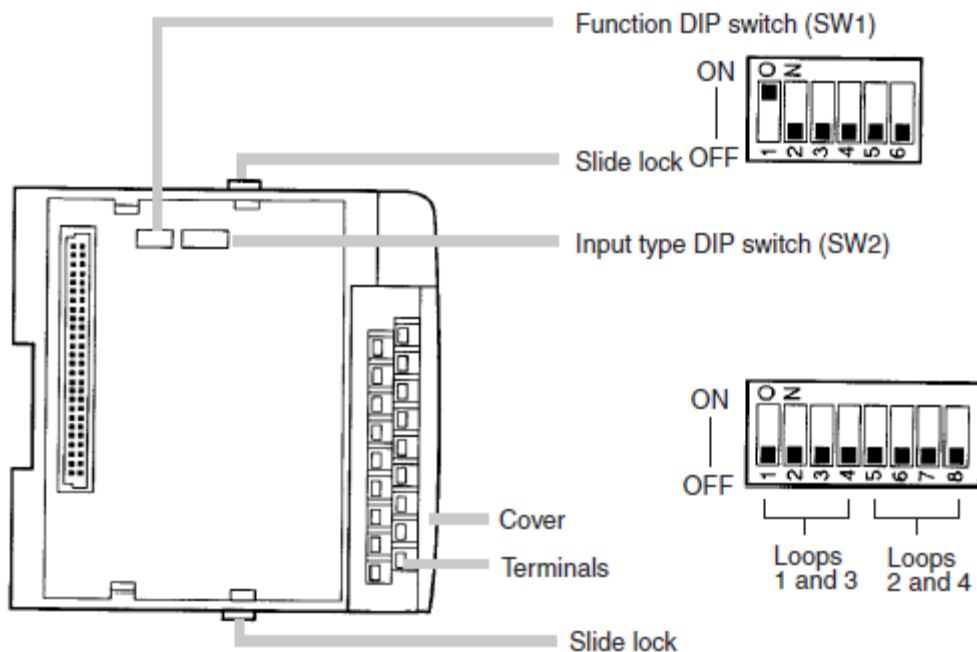
CQM1TC201 Temperature..... .doc	The file you are reading.
CQM1TC201.cxp	CX Programmer Program.

**HELPFUL MANUALS:**

W238 CQM1H Dedicated IO Unit Programming Manual  
W364 CQM1H Programming Manual

## INSTRUCTIONS:

1. Find the Dip Switches on the side of the TC Card.



2. Leave all the switches below as defaults except 5. Turn 5 on to display the temperature in BCD and not HEX .

## Switch Settings

Set all switches before mounting the Unit. Factory settings are shown in bold text in the following table.

Function DIP Switch (SW1)



Pin	Item	Settings	
1	Control method	<b>ON</b>	Advanced PID
		<b>OFF</b>	ON/OFF
2	Control operation for loops 1 and 3	<b>ON</b>	Normal (cooling control)
		<b>OFF</b>	Reverse (heating control)
3	Control operation for loops 2 and 4	<b>ON</b>	Normal (cooling control)
		<b>OFF</b>	Reverse (heating control)
4	Temperature unit	<b>ON</b>	°F (See note 1.)
		<b>OFF</b>	°C
5	Data type	<b>ON</b>	4-digit BCD
		<b>OFF</b>	16-bit binary (4-digit Hex)
6	Leave this switch set to OFF.		

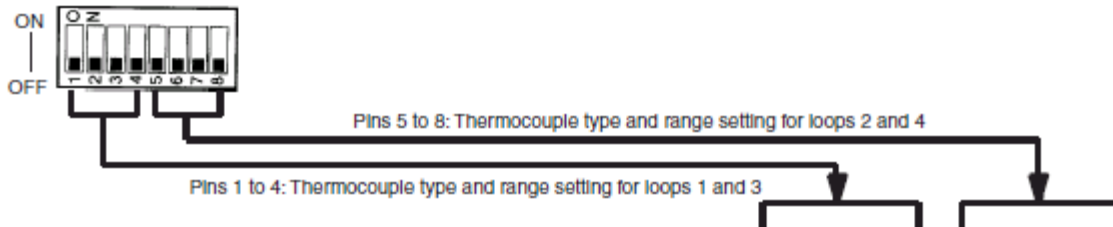
# Lakewood Automation

27911 Clemens Road

Westlake, Ohio 44145

3. Set the dip switches below to reflect the thermocouples you are using.

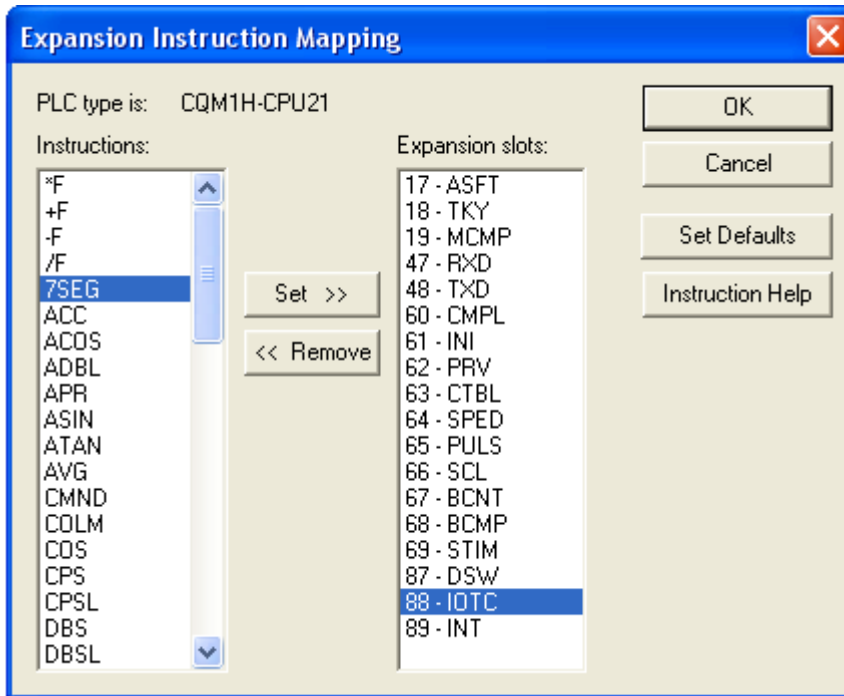
## Input Type DIP Switch (SW2)



Code No.	Input type		Setting							
	Units for thermocouples (CQM1-TC20□)	Units for platinum resistance thermometers (CQM1-TC30□)	Loops 1 and 3				Loops 2 and 4			
			1	2	3	4	5	6	7	8
0	K, -200 to 1,300 °C	Pt100, -200.0 to 650.0 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	K, 0.0 to 500.0 °C	JPt100, -200.0 to 650.0 °C	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	J, -100 to 850 °C	Pt100, -20.00 to 250.00 °C	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	J, 0.0 to 400.0 °C	JPt100, -20.00 to 250.00 °C	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	T, -200.0 to 400.0 °C	Do not set.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
5	L, -100 to 850 °C	Do not set.	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6	L, 0.0 to 400.0 °C	Do not set.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
7	R, 0 to 1,700 °C	Do not set.	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
8	S, 0 to 1,700 °C	Do not set.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
9	B, 100 to 1,800 °C	Do not set.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Note 1. ●: ON, ○: OFF

4. The IOTC(—) instruction can be used to simplify programming when using CX-Programmer version 2.0 or higher and a CQM1H CPU Unit with a lot number of 0160 or later. The programming example will use this instruction.
5. Be sure that pin 4 of the CQM1H's DIP switch is turned ON to enable use of a user-set instruction table before performing this operation.
6. In CX Programmer you will need to map the IOTC instruction to an unused instruction number. I picked 88.



7. This is the IOTC instruction explained. Note that C +2 and +3 are not used. Do not set any value for these 2 words. Not even 0.

Below is what we are going to use in our example:

First word : #100 - Because the TC201 module is the first module in the rack it takes the first output word. Therefore 100 is the first output word.

+1 : #1 - Because there is a built in input module before the TC201 module, the TC201 is assigned the second input word which is 1.

+2 & +3 are not used. Do not set them to any value.

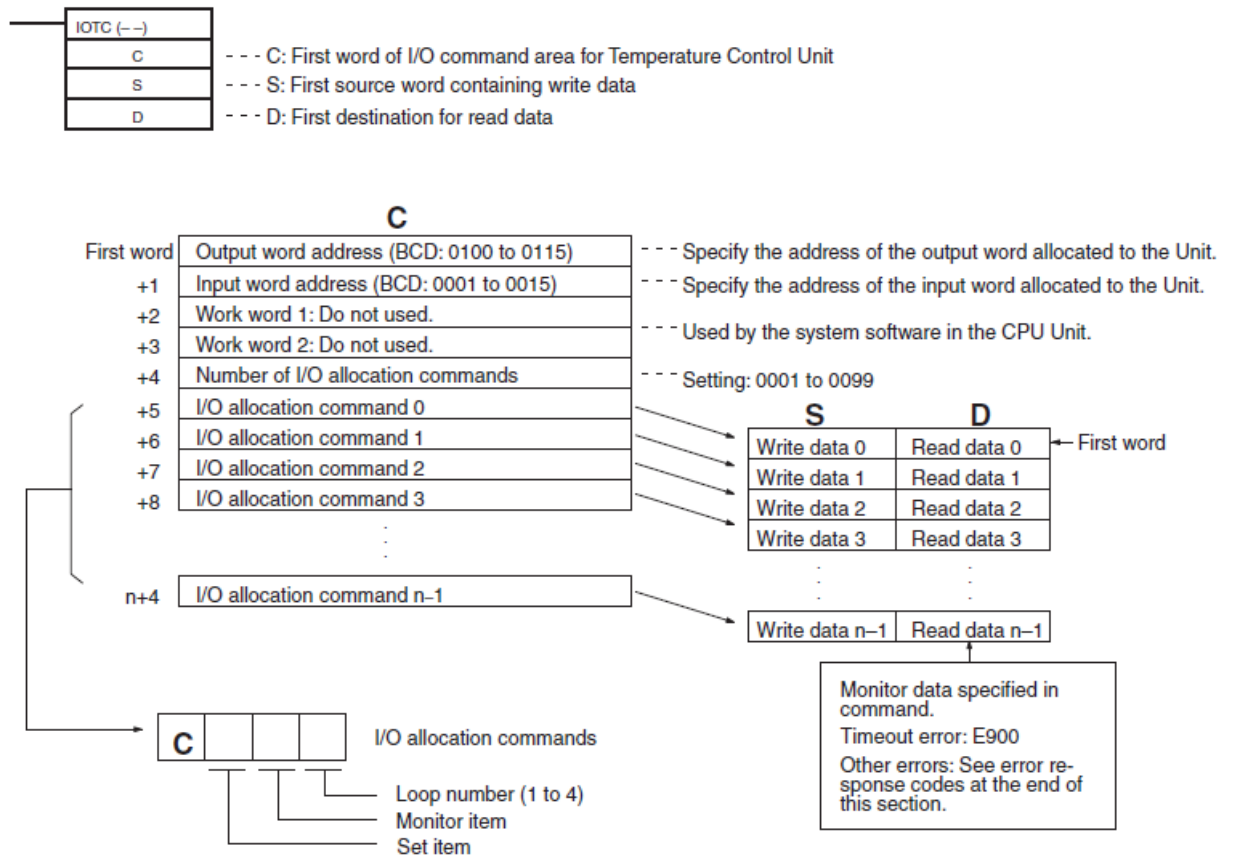
+4 : #4 - We are going to read all 4 inputs which require 4 separate IO allocation commands.

+5 : #C771 - Read Process value Loop 1.

+6 : #C772 - Read Process value Loop 2.

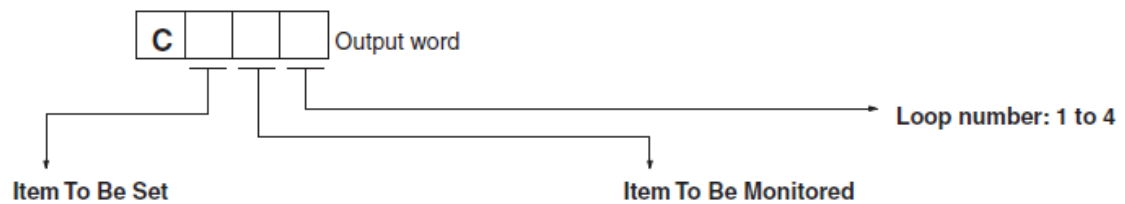
+7 : #C773 - Read Process value Loop 3.

+8 : #C774 - Read Process value Loop 4.



8. All the commands start with a C. In our example we are not setting anything so the **Item To Be Set** will be 7 which means **No Item set**. All we want to do is monitor the Process value so the **Item to be monitored** will be 7. The last thing is the Loop number which you need to do one at a time. Therefore the whole Command is C771 for loop 1, C772 for loop 2, etc.

### I/O Allocation Commands



Value	Item to be set	Value	Item to be monitored
0	Set point	0	Set point
1	Proportional band (for advanced PID)	1	Proportional band (for advanced PID)
2	Integral time (for advanced PID)	2	Integral time (for advanced PID)
3	Derivative time (for advanced PID)	3	Derivative time (for advanced PID)
4	Hysteresis (for ON/OFF control)	4	Hysteresis (for ON/OFF control)
5	Control cycle (for advanced PID or manual control)	5	Control cycle (for advanced PID or manual control)
6	Input shift value	6	Input shift value
7	No item set	7	Process value
8	Manual manipulated variable	8	Manipulated variable
9	Do not set.	9	Status
A	Heater burnout alarm setting (only for models with heater burnout alarms)	A	Heater burnout alarm setting (only for models with heater burnout alarms)
B	Do not set.	B	Heater current (only for models with heater burnout alarms)

9. If you download the .exp file, make sure Dip Switch 4 is turned on and that you also download the expansion instructions.