

If a low battery is detected, it should be replaced as soon as possible. The programmed values will all be lost and the unit will be prevented from running on the next power interruption. The RTC/Battery is located on the Chiller Logic Board shown as follows:

### **MICROBOARD (331-03478-XXX)**

The 331-03478-xxx microboard was developed as a direct replacement for the 031-02478-xxx line of microboards. No adapter harness is required when replacing a 02478 with the new 03478. The 03478 uses the IPUII processor card and provides some new features for the chillers that the 02478 did not have. The 03478 program resides in flash memory instead of EPROM. Program updates are accomplished by loading the new program from an SD card inserted into the SD card reader/writer. This same SD card reader/writer also allows the user to datalog the operating parameters to an SD card every 5 seconds. This information is invaluable when troubleshooting unit and system problems since it allows the service technician to view operating parameters prior to a unit fault. Details on the new datalogging capability are explained in the OPTIONS Key area of this manual. A Real Time Clock/BRAM keeps time and setpoints during power outtages.

### **Power Supplies and LEDs**

The 03478 has LEDs to indicate various states of operation of the microboard.

**STATUS** – Flashes every ½ second to indicate that the base board processor is running its program.

**POWER** – On solid indicates that the base board +12V and +5V power supplies are operational.

**TX1** – Red LED flashes when transmitting data out Port 1 TB3 (Future native communications BAS port)

**RX1** – Green LED flashes when receiving data in Port 1 TB3 (Future native communications BAS port)

**TX2** – Red LED that flashes when transmitting data out Port 2 (E-Link TB2 or printer TB1)

**RX2** – Green LED that flashes when receiving data in Port 2 (E-Link TB2 or printer TB1)

**VSD\_TX** – Red LED that flashes when transmitting data out Port 3 to the VSD Logic board

**VSD\_RX** – Green LED that flashes when receiving data in Port 3 from the VSD Logic board

24VAC power is applied to the 331-03478-xxx microboard connector J12 and is then used to create the various DC power sources required by the microboard circuitry. If the chiller control is malfunctioning, the power supply test points should be measured to determine the status of the microboard.

### **Power Supply Test Points**

TP1 GND (Measure TP2, TP3, TP4 and TP5 in reference to this Test Point)

TP2 +3.3V [3.2 to 3.4VDC] provides power to the processors

TP3 +5V [4.8 to 5.2VDC] power communication ports 2,3 and 4 and analog sensors

TP4 +12V [11.64 to 12.36VDC] powers the display and backlight and is regulated to become the +5V

TP5 +15V [11.3 to 16.6VDC] powers the analog outputs to the EEV valves

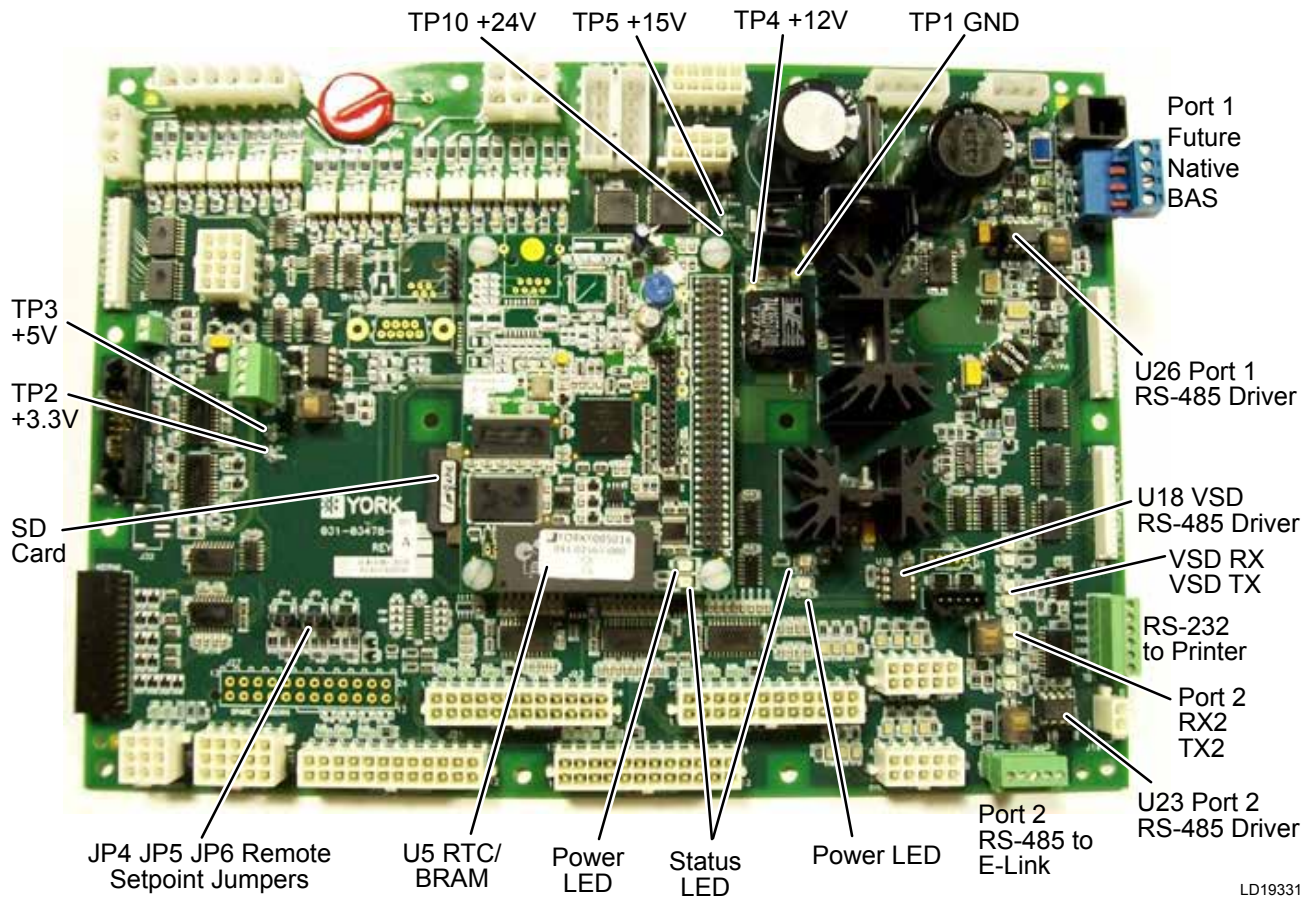
### **Configuration Jumpers**

The same configuration jumpers that existed on the 02478 are provided on the 03478.

JP4 Remote Temp Reset jumper position Pins 1 to 2 (left) = 4-20 mA, Pins 2 to 3 (right) = 0-10 VDC

JP5 Remote Current Limit jumper position Pins 1 to 2 (left) = 4-20 mA, Pins 2 to 3 (right) = 0-10 VDC

JP6 Remote Sound Limit jumper position (Pins 1 to 2 (left) = 4-20 mA, Pins 2 to 3 (right) = 0-10 VDC



**FIGURE 107 - NEW 331-03478-XXX MICROBOARD**

### Communication Ports

TB3 Port 1 Native BAS RS-485.

SW1 RS-485 Biasing Switch for Port. Set to ON if Chiller is in an End Of Line position on the network.

U26 is the Port 1 RS-485 Driver Chip. It is socketed to allow field replacement. RX1 and TX1 LEDs illuminate to indicate Port 1 communications activity.

### E-Link

SW2 RS-485 Biasing Switch for E-link Port 2, should be in the OFF position.

TB2 is the Port 2 RS-485 E-Link Communications Port. RX2 and TX2 LEDs illuminate to indicate the Port 2 communications activity. U23 is the Port 2 RS-485 Driver Chip. It is socketed to allow field replacement. J16 provides +12VDC to power the E-Link.

### VSD

J2 VSD#1 and J1 VSD#2 connections headers for RS-485 communications to the Variable Speed Drive(s).

VSD RX and VSD TX LEDs illuminate to indicate the VSD communications activity. U18 is the VSD Port RS-485 Driver Chip. It is socketed to allow field replacement.

### PROGRAM UPDATE

The Application software and BACnet database are stored in the IPU II Flash memory. Copying a new version of software and/or database from the SD Flash card changes the IPU II Flash. The new application software must be named SOFTWARE.BIN. The new BACnet database must be named DATABASE.BIN. These files must be located in the root directory of the SD Flash card. The software can be updated without updating the database. In this case, the existing database will be used with the new software. The database cannot be updated without updating the software.

To update the Program:

1. Copy the new software in to the root directory of the SD card.
2. Rename this new program file SOFTWARE.BIN.

3. Turn the Unit Switch OFF.
4. Insert the SD card in to the SD card Reader/Writer slot.
5. Press the OPTIONS Key and then press the Down Arrow Key until FLASH CARD UPDATE DISABLED is displayed.
6. Press the RIGHT ARROW Key to change the DISABLED to ENABLED
7. Press the ENTER Key to start the update. Once the ENTER Key is pressed the message FLASH CARD UPDATING PLEASE WAIT... is displayed until the update has been completed. The keypad and display will not respond during the flash update.



***Do not reset or power down the chiller until the update is finished. Interrupting the Flash Update procedure can corrupt the program file and render the control board inoperative.***

8. After the software is finished updating, the controller will automatically reboot.
9. If an error occurs during the update, an error message will be displayed where XXXX is the Error Code

**TABLE 29 - FLASH CARD UPDATE ERROR XXXXX**

FLASH CARD UPDATE ERROR CODE	DEFINITION
0	Okay
10	Flash card not found.
11	SOFTWARE.BIN file not found
14	SOFTWARE.BIN file larger than expected.
15	RAM to IPU Flash transfer of DATABASE.BIN failed.
16	RAM to IPU Flash transfer of SOFTWARE.BIN failed.
17	Could not allocate sufficient memory to read or write file.
99	Internal software error.

10. After the update is completed and the controller reboots, the keypad and display will return to full functionality. The SD card may be left in place for datalogging or else replaced with another SD card dedicated for datalogging.
11. To remove the SD card, GENTLY press the card in slightly then release the pressure. The card should then pop out slightly to allow removal.

**DATA LOGGING**

A 2GB SD card (p/n 031-03466-000) may be inserted into the 03478 IPUII SD card slot to record the chiller operating parameters at 5 second intervals. The data is stored in a folder named RMYYYMM where YYYY is the year and MM is the month the data was recorded. The controller creates a file for each day within this folder with the format YYYYMMDD.csv where DD equals the day of the month in addition to the Y Year and M Month fields. For example: The folder named RM201503 is a folder created in March of 2015. Within this folder would be a file for each day of that month that the datalogging is running. If a review of the History Report shows that an abnormal event occurred on March 3rd at 2:05pm, the user can import the 20150303.csv file into Excel and look at the system parameter details leading up to the 2:05pm event.



***Follow all JCI Safety Directives when inserting or removing the SD card since the card is located inside the control cabinet.***

To start the Data Logging, insert the SD card into the SD card slot on the 03478 IPUII board. The label on the SD card should be facing outwards.

Once the SD card is inserted and the unit is powered up, press the OPTIONS key. Then press the Down Arrow key to advance to the DATA LOG TO FLASH-CARD selection. Next press the Right Arrow key to select ON then press the ENTER key to start the Data Log. A 2GB SD card will hold about 8 months worth of data. A smaller card may be used that will hold less data but should be tested for compatibility. The controller operating system does not support SD cards larger than 2GB. When the SD card becomes full, the oldest date file is automatically deleted and a new day log file is written in its place.

**TABLE 30 - DATA LOGGING**

HOUR	MIN	SEC	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1	SYS 1
			SUCT PRESS	DSCH PRESS	OIL PRESS	SUCT TEMP	SAT SUCT TEMP	SUCT SHEAT	MTR CURR FLA	DSCH TEMP	SAT DSCH TEMP	DSCH SHEAT	OIL TEMP	COMP STATUS	ECON	FAN STAGE	MOTOR TEMP1
0	0	10	82.6	84.4	84.4	93	77.5	15.5	0	83	78.6	4.4	82	OFF	OFF	0	107.9
11	0	15	82.6	84.4	84.4	93	77.5	15.5	0	83	78.6	4.4	82	OFF	OFF	0	107.9
11	22	20	82.6	84.4	84.4	93	77.5	15.5	0	83	78.6	4.4	82	OFF	OFF	0	107.9
11	22	25	82.6	84.4	84.4	93	77.5	15.5	0	83	78.6	4.4	82	OFF	OFF	0	107.9
11	22	30	82.6	84.4	84.4	93	77.5	15.5	0	83	78.6	4.4	82	OFF	OFF	0	107.9
11	22	35	82.5	84.4	84.4	93	77.4	15.6	0	83	78.6	4.4	82	OFF	OFF	0	107.9

To stop the data logging and retrieve the SD card, press the OPTION key and then the Down Arrow key to display the DATA LOG TO FLASHCARD option and then use the Right Arrow key to select OFF then press the ENTER key.

Again, follow the JCI Safety Directives to stop the chiller, power off the unit and open the control cabiner door to retrieve the SD card.

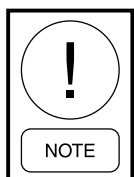
Once inside the control cabinet, lightly press in on the SD card and then release the pressure. The SD card should pop out slightly to allow removal. You may then copy the files to a PC for analysis or email the file to someone. The files are saved as a CSV format which can be read by Excel. Below is a sample of some of the data imported from a YCIV Chiller. Once the file is read in to Excel, you can hide unrelated columns or plot desired parameters to analyze the data.

### Invalid Number of Compressors Warning

The INVALID NUMBER OF COMPRESSORS SELECTED Warning will occur after the VSD has been initialized, if no "Number of Compressors Select" jumpers are installed or if more than 1 jumper is installed. The following warning message will be displayed indefinitely.

**UNIT WARNING:  
INVALID NUMBER OF COMPRESSORS SELECTED**

To clear this warning, both the control panel and VSD control voltage must be turned OFF and the jumpers properly installed in the VSD wiring harness.



*These jumpers are factory installed in the wire harness plug and should not require changes.*

### Invalid Serial Number Warning

If the INVALID SERIAL NUMBER message appears, immediately contact Johnson Controls Product Technical Support. The appearance of this message may mean the chiller has lost important factory programmed information. The serial number can be entered using the SERVICE key.

**UNIT WARNING: INVALID SERIAL NUMBER  
ENTER UNIT SERIAL NUMBER**

This status message can be bypassed to view additional messages under the STATUS key by pressing the STATUS key repeatedly to scroll through as many as three STATUS messages that could possibly be displayed at any time.

### UNIT SAFETIES

#### Unit Safety Operation

Unit faults are safeties that cause all running compressors to be shut down, if a safety threshold is exceeded for 3 seconds. Unit faults are recorded in the history buffer along with all data on the unit and system operating conditions. Unit faults are auto reset faults where the unit will be allowed to restart automatically after the fault condition is no longer present. The only exception is any of the VSD related unit faults. If any 3 VSD unit faults occur within 90 minutes, the unit will be locked out on the last fault. A VSD lockout condition requires a manual reset using the system switches. Both system switches must be cycled OFF and ON to clear a VSD unit lockout fault. If a unit safety is in effect, the message will be displayed to the operator when the STATUS key is pressed.