SynQor MAC Terminal Commands

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The MAC external serial port uses 115.2kbaud, 8 data bits, no parity, and one stop bit. Commands can be sent, and output viewed, with any standard terminal emulator. To view user text, set the terminal emulator for local echo. All transmitted commands must be terminated with a line feed character (ASCII 10). The interface is not case sensitive.

The MAC will transmit a prompt "SynQor>" to the terminal after each command. To execute a command, simply transmit the required ASCII text, terminated by a line feed character.

Command Summary

Command	Description
?	Display list of available terminal commands.
ACTRIM x	Adjust AC output voltage over a range of +/- 16000 mVrms or +/- 32000 mVrms.
ALARM DISABLE	Disable audible alarm output. (Updates non-volatile memory.)
ALARM ENABLE	Enable audible alarm output. (Updates non-volatile memory.)
ALARM SILENCE	Silence currently active audible alarms.
ANALOG IN?	Display control board analog signal levels.
ASTART DISABLE	Disable auto-start mode (default factory setting).
ASTART ENABLE	Enable auto-start mode.
BAUDRATE x	Adjust baudrate of serial port.
BS OFF	Disable Battlemode.
BS ON	Enable Battlemode.
CODE?	Output code revision information for internal components.
DEBUG OFF	Disable machine state debug output logging (default factory setting).
DEBUG ON	Enable machine state debug output logging.
DIGITAL IN?	Display state of internal digital inputs of MAC control board.
EMAIL RESTORE	Restore Email alert notifications to factory default settings.
FACTORY RESTORE	Restore communication board to factory default state.
FAN SERVICE	Execute fan service sequence immediately (cycles through fan speed settings).
FAN SET x	Manually set fan speed, x=0 to 4.
FAN STATUS?	Display inputs to fan controller.
FAND DISABLE	Disable execution of fan diagnostics every 24 hours.

SynQor MAC Terminal Commands

Command	Description
FAND ENABLE	Enable execution of fan diagnositcs every 24 hours (default factory setting).
FANS?	Display fan speeds and input voltage.
FOUT 400	Set AC Output frequency to 400 Hz.
FOUT 50	Set AC Output frequency to 50 Hz.
FOUT 60	Set AC Output frequency to 60 Hz.
FOUT LOCK	Lock AC Output frequency to current setting and prohibit future changes.
IMBALANCE IGNORE	Prevent shutdown of input stage due to imbalanced 3-phase inputs.
IMBALANCE OBEY	Allow shutdown of input stage due to imbalanced 3-phase inputs (default factory setting).
INPUTS?	Display status of inputs to MAC system.
MODEL?	Display MAC system model name.
NET RESTORE	Restore network configuration settings to factory defaults.
NETWORK?	Display Ethernet IP address and MAC address.
OUTPUT DISABLE	Shutdown output(s) of MAC system, reverting to standby state.
OUTPUT ENABLE	Enable output(s) of MAC system.
OUTPUTS?	Display status of output(s) from MAC system.
RESTART x	Shutdown output immediately, re-enable output after *x* seconds.
RUNTEST x	Run internal built-in test routine.
SHUTDOWN x	Shutdown output after *x* seconds.
SNMP RESTORE	Restore SNMP configuration to factory defaults.
STARTUP x	Enable outputs after *x* seconds.
SYNCCON OFF	Disable synchronized start / stop / restart behavior.
SYNCCON ON	Enables synchronized start / stop / restart behavior (default factory setting).
SYSTEM DISABLE	Disables the AC output of all systems while running in a multi-unit configuration.
TEMPS?	Display reported temperatures for internal subsystems.
TRAP LOG	Output log of communication board bootup events.

Command Details

Command: ?
Description: Display list of available terminal commands.
Sample Output:
```
SynQor>?
ACTRIM x mV
ALARM DISABLE
ALARM ENABLE
:

SynQor>
```
Discussion: Output response format is a single row for each command available to the user.

Command: ACTRIM x
Description: Adjust AC output voltage over a range of +/- 16000 mVrms or +/- 32000 mVrms.
Sample Output:
```
SynQor>ACTRIM 1000
Flash Updated.

SynQor>
```
Discussion: Command adjusts the AC output voltage +/- 16000 mVrms (for 115 Vac output) or +/- 32000 mVrms (for 230 Vac output). Numerical entry is in mV; ex. "ACTRIM 1000" raises the AC output voltage from its present value by 1000 mV.

Command: ALARM DISABLE
Description: Disable audible alarm output. (Updates non-volatile memory.)
Sample Output:
```
SynQor>ALARM DISABLE
Flash Updated.

SynQor>
```
Discussion: This command will prevent the audible beeper from ever activating for any condition. Setting will be saved in non-volatile memory, and will persist until reversed with the "ALARM ENABLE" command.

Command: ALARM ENABLE
Description: Enable audible alarm output. (Updates non-volatile memory.)
Sample Output:
```
SynQor>ALARM ENABLE
Flash Updated.

SynQor>
```
Discussion: This command will allow the audible beeper to sound during alarm conditions. This is the default factory state. See User Guide, "Fault Conditions" section for a description of audible alarms. The setting will be saved in non-volatile memory, and will persist until reversed with the "ALARM DISABLE" command.

Command: ALARM SILENCE
Description: Silence currently active audible alarms.
Sample Output:
```
SynQor>ALARM SILENCE
Alarms Silenced.

SynQor>
```
Discussion: When there are current active alarms, issuing this command will silence the beeper. New alarm states that occur after the silence command will re-activate the audible beeper. This command is equivalent to holding up the front panel switch during operation, or holding down the front panel switch during standby mode. The beeper generates a brief two-toned signal when the silence command is issued.

Command: ANALOG IN?
Description: Display control board analog signal levels.
Sample Output:
```
SynQor>ANALOG IN?
5V Supply = 4.77 V
Internal Bus = 23.7 V
Fan 1 Voltage = 11.8 V
Bias Input Voltage = 23.7 V
Fan 0 Current = &H025F
Fan 0 Voltage = 12.0 V
Motherboard Temperature = 39 C
Fan 1 Current = &H0260

SynQor>
```
Discussion: Command displays translated values from ADC measurements on MAC control board. No user action based on these outputs should taken.

Command: ASTART DISABLE
Description: Disable auto-start mode (default factory setting).
Sample Output:
```
SynQor>ASTART DISABLE
Flash Updated.

SynQor>
```
Discussion: Command disables auto-start mode. This is the default factory configuration. With auto-start disabled, when the MAC receives AC input power, it will enter standby mode. In standby mode, the terminal interface is active, but the output will not enable until the user takes action to enable the output, either through a terminal command, the front panel switch, or a rear panel I/O signal.

Command: ASTART ENABLE
Description: Enable auto-start mode.
Sample Output:
```
SynQor>ASTART ENABLE
Flash Updated.

SynQor>
```
Discussion: Command enables auto-start mode. In auto-start mode, when the MAC first receives AC input power from an off state, it will automatically enable the output after a brief delay. This is not the default factory setting. Once the auto-start mode is set, it will persist until disabled with the "ASTART DISABLE" command. Note that autostart will only enable the output from a powered down state; if the output disables due to a fault or user action, but input power is still present, the output will not automatically re-enable.

Command: BAUDRATE x
Description: Adjust baudrate of serial port.
Sample Output:
```
SynQor>BAUDRATE 2400
Baud rate updated to <2400>, Power cycle required to apply change.

SynQor>
```
Discussion: Baudrate setting for the terminal interface can be modified; note that the setting does not take effect until input power is removed from the MAC and there is a complete power-on reset. Although the default baudrate of 115200 is recommended, the valid range is as follows:
1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, or 115200.

Command: BS OFF
Description: Disable Battlemode.
Sample Output:
```
SynQor>BS OFF
Battlemode Disengaged.

SynQor>
```
Discussion: Disengages the software battle-mode, reversing the effect of "BS ON" command. If battle-mode is enabled via the digital input pull-down on the rear panel, it cannot be disabled via this command.

Command: BS ON
Description: Enable Battlemode.
Sample Output:
```
SynQor>BS ON
Battlemode Engaged.

SynQor>
```
Discussion: Engages the software battle-mode. Battle-mode disables over-temperature shutdown features of internal modules. Disengage battle-mode with the "BS OFF" command. Battle-mode will be disabled after a power cycle as it is not a non-volatile setting.

Command: CODE?
Description: Output code revision information for internal components.
Sample Output:
```
SynQor>CODE?
AC/DC Rev = 32, 0
DC/AC Rev = &H03EB
Control Rev = 11, 2
Comm Code Rev = 4, 16

SynQor>
```
Discussion: Outputs reported code revision of internal modules.

Command: DEBUG OFF
Description: Disable machine state debug output logging (default factory setting).
Sample Output:
```
SynQor>DEBUG OFF
Flash Updated.

SynQor>
```
Discussion: Command disables the state machine's debug output. This is the default factory setting. This command will reverse the action of the "DEBUG ON" command.

Command: DEBUG ON
Description: Enable machine state debug output logging.
Sample Output:
```
SynQor>DEBUG ON
Flash Updated.

SynQor>
```
Discussion: Command displays state machine's current state for debugging purposes: RUN, DISABLE, STANDBY. These states are displayed when enabling/disabling the AC output, and when entering the system standby state.

Command: DIGITAL IN?
Description: Display state of internal digital inputs of MAC control board.
Sample Output:
```
SynQor>DIGITAL IN?
PFC AC Bad = Low
PFC DC Bad = Low
Front Switch UP = Low
Remote Start = Low
Front Switch DOWN = Low

SynQor>
```
Discussion: Command displays translated values from digital inputs MAC control board. No user action based on these outputs should taken.

Command: EMAIL RESTORE
Description: Restore Email alert notifications to factory default settings.
Sample Output:
```
SynQor>EMAIL RESTORE
Factory Email Defaults Restored.

SynQor>
```
Discussion: Command restores settings for Email alerts to factory defaults (no alerts transmitted). [This command is only available with the Ethernet Option installed.]

Command: FACTORY RESTORE
Description: Restore communication board to factory default state.
Sample Output:
```
SynQor>FACTORY RESTORE

. Factory defaults loaded to user configuration.
. Updated network settings applied.
. Certificate memory erased.
. Launched certificate rebuild task.
. Bootloader image memory erased.
. Bootloader configuration memory erased.
. Trap log memory erased.
Factory Restore Complete.

SynQor>
```
Discussion: The factory restore sets all user configuration settings in the communication board to their factory default states, and also erases non-volatile memory pages which can be updated during the operation of the board. This command does not reset system settings not related to the communication board, for example AC Output Frequency and Auto-Start behavior. [This command is only available in Communication Board Code Rev 6.6 and later.]

Command: FAN SERVICE
Description: Execute fan service sequence immediately (cycles through fan speed settings).
Sample Output:
```
SynQor>FAN SERVICE
Fan service initiated.

SynQor>
```
Discussion: The fan service sequence cycles the fans through their different speed ranges, and compares the measured fan RPM to the factory-new levels. Significant speed degradation will be indicated by a "fan service required" LED on the front panel. Note that the fan service sequence will not slow the fans down below the speed dictated by the internal temperatures. The fan service sequence normally runs automatically after every 24 hours of continuous operation, or more frequently if a fan speed degradation condition is detected.

Command: FAN SET x
Description: Manually set fan speed, x=0 to 4.
Sample Output:
```
SynQor>FAN SET 1
Fan speed set.

SynQor>
```
Discussion: Manually increase the fan speed. Fans will not slow to a speed below that dictated by internal temperatures. Manually setting a higher fan speed will modify the MAC Cooling System Indicator LED as indicated in the User Guide.

Command: FAN STATUS?
Description: Display inputs to fan controller.
Sample Output:
```
SynQor>FAN STATUS?
Current Speed: 1
Last Trigger Up: DC/AC Circuit
Decel Timer: &H0000 &H0000
Var:   value / thresh_down / thresh_up / type
Manual Control: &H0000 / &H0001 / &H0001 / higher value -> speed up
Diag Timer:     &H0095 / &H4382 / &H4381 / higher value -> speed up
AC/DC Circuit:  &H14B8 / &H1430 / &H1610 / higher value -> speed up
DC/AC Circuit:  &H0175 / &H0126 / &H0183 / higher value -> speed up
Controller:     &H0172 / &H0170 / &H01D6 / higher value -> speed up

SynQor>
```
Discussion: Displays inputs and status of the fan speed controller. The Last Trigger Up reflects which input to the controller last caused an increase in the fan speed. The list of fan controller inputs indicates which modules are online and providing triggers to control the fan speed. For each input, the present value is listed, as well as the thresholds applied to that value to cause a trigger to a higher or lower fan speed. Manual Control is the terminal interface and Diag Timer is the interval counter for the fan service sequence. Some outputs may be omitted from the list. For example, if the AC output is disabled, then the corresponding output may not display.

Command: FAND DISABLE
Description: Disable execution of fan diagnostics every 24 hours.
Sample Output:
```
SynQor>FAND DISABLE
Flash Updated.

SynQor>
```
Discussion: Disables automatic execution of the fan diagnostic sequence after every 24 hours of operation. If the fan diagnositic sequence is disabled, a transient fan speed fault may not be cleared automatically.

Command: FAND ENABLE
Description: Enable execution of fan diagnositcs every 24 hours (default factory setting).
Sample Output:
```
SynQor>FAND ENABLE
Flash Updated.

SynQor>
```
Discussion: Allows execution of the fan diagnostics automatically based on internal timing intervals. The fan diagnostics cycle the fan through the various speeds and compares detected fan RPM to factory-new values.

Command: FANS?
Description: Display fan speeds and input voltage.
Sample Output:
```
SynQor>FANS?
Fan0A RPM = 12695
Fan0B RPM = 7618
Fan1A RPM = 12494
Fan1B RPM = 7749
Fan0 Voltage = 12.0 V
Fan1 Voltage = 11.8 V
Fan Status / State = &H2400
Fan Diag Timer = 23:47

SynQor>
```
Discussion: Reports measure fan speed and applied voltage. Each MAC fan module contains two counter-rotating fans (A and B), operating at different speeds.
The Fan Status / State variable provides additional information about the fan status. Fan Status bit decoding:
b15-13: Fan Speed Value from 0-4. In sample, speed b15-13=001, indicating speed 1
b11: Machine Status is Faulted
b10: Machine Status is Running (indicated in sample)
b9: Machine Status is Starting
b8: Machine Status is Standby
b7: Fan Service is Required
b6: Fan Diagnostics Mode Active

The Fan Diag Timer variable displays the time until the next scheduled fan diagnostics routine.

Command: FOUT 400
Description: Set AC Output frequency to 400 Hz.
Sample Output:
```
SynQor>FOUT 400
Flash Updated.

SynQor>
```
Discussion: Command sets MAC AC Output frequency to 400 Hz. WARNING: This setting may damage connected AC loads if the loads are not rated for 400 Hz operation.

Command: FOUT 50
Description: Set AC Output frequency to 50 Hz.
Sample Output:
```
SynQor>FOUT 50
Flash Updated.

SynQor>
```
Discussion: Command sets MAC AC Output frequency to 50 Hz. WARNING: This setting may damage connected AC loads if the loads are not rated for 50 Hz operation.

Command: FOUT 60
Description: Set AC Output frequency to 60 Hz.
Sample Output:
```
SynQor>FOUT 60
Flash Updated.

SynQor>
```
Discussion: Command sets MAC AC Output frequency to 60 Hz. WARNING: This setting may damage connected AC loads if the loads are not rated for 60 Hz operation.

Command: FOUT LOCK
Description: Lock AC Output frequency to current setting and prohibit future changes.
Sample Output:
```
SynQor>FOUT LOCK
Output frequency locked from future changes.

SynQor>
```
Discussion: Command locks the AC Output frequency to the current value. This prevents any changes to the operating AC Output frequency of the system. **WARNING: This setting is not reversible.**

Command: IMBALANCE IGNORE
Description: Prevent shutdown of input stage due to imbalanced 3-phase inputs.
Sample Output:
```
SynQor>IMBALANCE IGNORE
Flash Updated.

SynQor>
```
Discussion: Command prevents input stage from shutting down due to imbalanced 3-phase inputs. This setting is non-volatile. Grossly imbalanced inputs limit the power handling capability of the device, and this setting will only prevent a precautionary shutdown. If the output load exceeds the power handling capability of the converter, the output will collapse and the converter will shut down.

Command: IMBALANCE OBEY
Description: Allow shutdown of input stage due to imbalanced 3-phase inputs (default factory setting).
Sample Output:
```
SynQor>IMBALANCE OBEY
Flash Updated.

SynQor>
```
Discussion: Command allows the input stage to shut down when the input phase-to-phase ripple / imbalance exceeds the preset limits. This setting is non-volatile, and represents the factory default setting.

Command: INPUTS?
Description: Display status of inputs to MAC system.
Sample Output:
```
SynQor>INPUTS?
AC In Vrms-LL = 440.87 V
AC In Frequency = 59.8 Hz
AC/DC Power = 3917 W
Input Rotation = C>B>A
Phase Ripple V = 3.18 V
Fault Register = &H0004
Aux Status = &H0004
Multi-unit Config = &H0003
Non-Volatile Config = &H1D20
Non-Volatile Config1 = &H1000
DC/AC Trim = 0 mV

SynQor>
```
Discussion: Reports status of inputs to MAC system. The Fault Register decoding is as follows:

b14: Remote Shutdown Requested from Back Panel
b13: Remote Start Requested from Back Panel
b12: Front panel Switch Pressed Down (Off)
b10: Software Disable Command
b9: Software Enable Command
b7: AC Output Fault
b6: Internal Bus High
b5: Internal Bus Low
b4: Front Panel Switch Pressed Up (On)
b3: Internal 5V Supply High
b2: Internal 5V Supply Low
b1: Over-Temperature Warning
b0: Over-Temperature Condition

The Non-volatile Config and Config1 registers give the FLASH memory options as follows. Note that bits 0-15 are shown in the Non-Volatile Config register, while bits 16 and up are displayed in the Non-Volatile Config1 register:

b29: Ignore Line Imbalance feature set
b28: MAC Motherboard Detected
b12: AC Output Active
b6: Ungrounded Output Option
b5: AC Output Autostart Enabled
b3: Fan Diagnostics Disabled
b0: Fan Calibration Done

Command: MODEL?
Description: Display MAC system model name.
Sample Output:
```
SynQor>MODEL?
MAC-4000-1U-4TW1R6S-E00

SynQor>
```
Discussion: Command displays the complete model name of the system.

Command: NET RESTORE
Description: Restore network configuration settings to factory defaults.
Sample Output:
```
SynQor>NET RESTORE
Factory Networking Defaults Restored.

SynQor>
```
Discussion: Command restores settings for network configuration to factory defaults. [This command is only available with the Ethernet Option installed.]

Command: NETWORK?
Description: Display Ethernet IP address and MAC address.
Sample Output:
```
SynQor>NETWORK?
IP Address = 192.168.1.1
MAC Address = XX:XX:XX:XX:XX:XX
CAN Box ID = 0
CAN Box Type = &H007F
Master ID = 255
Backup Master ID = 255

SynQor>
```
Discussion: Command displays the device pre-set MAC address and currently active IP address. [This command is only available with the Ethernet Option installed.] The CAN Box ID is relevant for MAC modules current sharing via the CONFIG port.

Command: OUTPUT DISABLE
Description: Shutdown output(s) of MAC system, reverting to standby state.
Sample Output:
```
SynQor>OUTPUT DISABLE
Output Disabled.

SynQor>
```
Discussion: Disables output(s) if currently active. This terminal command is equivalent to holding down the front panel switch.

Command: OUTPUT ENABLE
Description: Enable output(s) of MAC system.
Sample Output:
```
SynQor>OUTPUT ENABLE
Output Enabled.

SynQor>
```
Discussion: Enables output(s). This terminal command is equivalent to pushing the front panel switch upwards.

Command: OUTPUTS?
Description: Display status of output(s) from MAC system.
Sample Output:
```
SynQor>OUTPUTS?
Total Power Out = 3556 W
DC/AC Voltage RMS = 116.30 V
DC/AC Current RMS = 30.929 A
DC/AC Frequency = 60.0 Hz
Fan Status / State = &H2400
BIT Result = <n/a>
Aux Status = &H0004
Last Fault Code = Initial boot

SynQor>
```
Discussion: Reports telemetry data on output(s). The "FANS?" Command description details the Fan Status / State register. The BIT Result variable displays the last result from a built-in test routine, if applicable. The Last Fault Code reports the previous mode of system shutdown. The Aux Status register decoding is as follows:
b4: Battle-Mode Active
b3: RS232 Interface Active
b2: Ethernet Link Active

Command: RESTART x
Description: Shutdown output immediately, re-enable output after x seconds.
Sample Output:
```
SynQor>RESTART 1
Timed reboot started.

SynQor>
```
Discussion: If outputs are enabled, they will be immediately disabled. After the requested delay, outputs will enable. Outputs will enable whether or not they were in an enabled state when the command was first issued. Maximum permissible value for restart time is 10,737,418 seconds, approximately 4 months.

Command: RUNTEST x
Description: Run internal built-in test routine.
Sample Output:
```
SynQor>RUNTEST 3
General System Test Started.
SynQor>Test Complete. Result=&H1002
Test Passed.

SynQor>
```
Discussion: Runs internal built-in test routine. Legal values for x:
x=0 or 2 : Abort test in progress.
x=3 : Run General Systems Test; verifies internal bias voltages, fans, voltage inputs and outputs.

Command: SHUTDOWN x
Description: Shutdown output after x seconds.
Sample Output:
```
SynQor>SHUTDOWN 1
Timed shutdown started.

SynQor>
```
Discussion: Outputs will be disabled after the requested delay time. Maximum permissible value for shutdown delay is 10,737,418 seconds, approximately 4 months.

Command: SNMP RESTORE
Description: Shutdown output after x seconds.
Sample Output:
```
SynQor>SNMP RESTORE
Factory SNMP Defaults Restored.

SynQor>
```
Discussion: Command restores SNMP configuration to factory defaults (SNMP disabled). [This command is only available with the Ethernet Option installed.]

Command: STARTUP x
Description: Enable outputs after x seconds.
Sample Output:
```
SynQor>STARTUP 1
Timed startup begun.

SynQor>
```
Discussion: Outputs will be enabled after the requested delay time. Maximum permissible value for enable delay is 10,737,418 seconds, approximately 4 months.

Command: SYNCCON OFF
Description: Disable synchronized start / stop / restart behavior.
Sample Output:
```
SynQor>SYNCCON OFF
Module will not synchronize On/Off/Restart via CONFIG port.

SynQor>
```
Discussion: Disables synchronized start, stop, and restart behavior between multiple MAC devices interconnected via the CONFIG port.

Command: SYNCCON ON
Description: Enables synchronized start / stop / restart behavior (default factory setting).
Sample Output:
```
SynQor>SYNCCON ON
Module will synchronize On/Off/Restart via CONFIG port.

SynQor>
```
Discussion: Enables synchronized start, stop, and restart behavior between multiple MAC devices interconnected via the CONFIG port. This is the factory default condition. This setting can be overridden either by the "SYNCCON OFF" command, or an external jumper on a CONFIG port pin.

Command: SYSTEM DISABLE
Description: Disables the AC output of all systems while running in a multi-unit configuration.
Sample Output:
```
SynQor>SYSTEM DISABLE
Coordinated system shutdown initiated.

SynQor>
```
Discussion: Disables the AC output of multiple MAC devices interconnected via the CONFIG port, in a parallel or multi-phase configuration.

Command: TEMPS?
Description: Display reported temperatures for internal subsystems.
Sample Output:
```
SynQor>TEMPS?
AC/DC Temperature = 59 C
DC/AC Temperature = 71 C
Control Brd Temp = 41 C

SynQor>
```

Discussion: Displays measured temperature for installed components, with a resolution of 1 °C.

Command: TRAP LOG
Description: Output log of communication board bootup events.
Sample Output:
```
SynQor>TRAP LOG
Bootup, RCON: &H0083 Addr: &H5A188559 Time: Mar 28, 2018 14:00:10 UTC
Bootup, RCON: &H0083 Addr: &H4A188759 Time: Mar 28, 2018 15:17:10 UTC
Bootup, RCON: &H0083 Addr: &H4A188759 Time: Mar 28, 2018 15:19:12 UTC
Bootup, RCON: &H0083 Addr: &H42188759 Time: Mar 29, 2018 10:33:17 UTC

SynQor>
```

Discussion: Displays a list of bootup or reset events on the MAC Ethernet communication board. The displayed timestamp relies on an SNTP time being available within 10 seconds of the boot event; if it is not available, 1/1/1970 will be displayed, as above. The boot log is only provided for factory debugging of potential issues.

Information Subject to Change Without Notice