FEEDBACK

The OFFICIAL Newsletter of the

Georgian Bay Amateur Radio Club Inc.

VE3OSR 146.940 -

Sept 1997

GBARC Meetings:
4th Tuesday of each month except July and August at the Owen Sound Yatch Club 7:30 P.M.

Breakfast Meetings:
2nd and last Saturday of each month at the ROCKFORD ESSO 9:00 AM.

Information: Write to GBARC Box 113, Owen Sound, N4K5P1
Packet is found on 145.630 under the call of VE3IJD

I would like to take this opportunity to welcome everyone back from the summer things we all like to do. I hope summer was enjoyable for all. In this issue I have included an article on fixing your PC's written by brad VE3RHJ, which was one of the topics for tech night. My thanks to Brad.

Also in this issue, Mir , your questions answered, which was plucked off packet and an article on lightning.

I will be adding columns of technical interest, club history, coming events contests, and club activities. I will also be looking for Ham related news from around the world. If you would like to contribute anything, please forward it to me.

Bulletin Editor John VA3JRF

Well hello again...

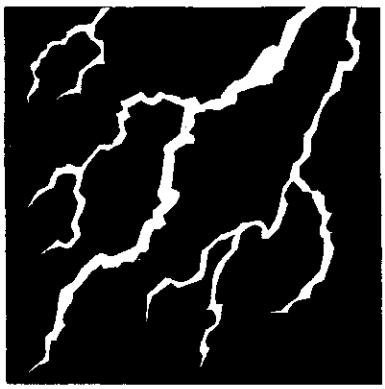
Its time again to get into the ham spirit for another year. The fall is almost on us as of the weekend and its time to get those new antennas up and tested...

Hope all of the members have had a good summer and have had all the hot dogs, potato salads and refreshments your poor old bodies could take. I have had a very busy summer with the new business that John VA3JRF and myself started. Being all over southern Ontario and being away through the summer, John and I have not had a whole lot of time to play with radio. Hoping to be able to do a little more radio this fall...

Well what I would like to say is thank you to all the exec and committee members from last year for the time and efforts they put into the club and to welcome the new members and peoples that have jumped into the different job positions this year. There was a lot of work put into different club functions by a few members (and you know who you are), that a very special thank you goes out to. With out these special people there would be a club with no function. THANK YOU AGAIN.

The next meeting is coming up soon, and I will likely see you there. The new exec have had a meeting already and there is a few changes being made to the club meetings. So hope to see you there and to all the club functions...

73 for now
Bob VE3XOX



Natures lightshow

Lightning is a form of visible electric discharge between rain clouds or between a rain cloud and the earth . The discharge is seen in the form of a brilliant arc, sometimes several kilometers long, stretching between the discharge points. The discharge also sets up a sound wave that is heard as thunder.

The Electrical Charge

How thunderclouds become charged is not fully understood, but most thunderclouds are negatively charged at the base and positively charged at the top. The various hypotheses that explain how the polarization occurs may be divided into two categories: those that require ice and those that do not. Most meteorologists believe, however, that ice is a necessary factor, because lightning is not usually observed until ice has formed in the upper layers of thunderclouds. Experiments have shown that when dilute solutions of water are frozen the ice gains a negative charge but the water retains a positive charge. If, after freezing has started, rising air tears small droplets of water away from the frozen particles, the droplets are concentrated in the upper part of the cloud and the larger ice particles fall toward the base. On the other hand, experiments have also shown that large, swiftly falling drops of water become negatively charged whereas small, slowly falling drops become positively charged. The polarization of a thundercloud may thus be due to the rates at which large and small raindrops fall. However formed, the negative charge at the base of the cloud induces a positive charge on the earth beneath it, which acts as the second plate of a huge capacitor. When the electrical potential between two clouds or between a cloud and the earth reaches a sufficiently high value (about 10,000 V per cm or about 25,000 V per in), the air becomes ionized along a narrow path and a lightning flash results. Many meteorologists believe that this is how a negative charge is carried to the ground and the total negative charge of the surface of the earth is maintained.

A new theory, suggesting that the electrical polarization in a thundercloud may cause precipitation rather than be a consequence of it, postulates that the electrical potential existing between the ionosphere—the highest layer of the atmosphere—and the earth initiates the polarization in a thundercloud. According to this theory, the upward flow of warm air through a thundercloud carries with it positively charged particles. These accumulate at the top of the cloud and attract negative charges from the ionosphere. The negative charges are carried to the base of the cloud by powerful downdrafts at the periphery of the cloud, thus preventing oppositely charged particles from neutralizing each other. Perhaps 90 percent of all strokes from cloud to ground are negative; the remainder are positive flashes. Rarely, strokes may move from ground to cloud, particularly from mountain peaks and from tall objects such as radio towers.

Studies with high-speed cameras have shown that most lightning flashes are

multiple events, consisting of as many as 42 main "strokes," each of which is preceded by a "leader" stroke. All strokes follow an initial ionized path, which may be branched, along with the current flows. The average interval between successive lightning strokes is 0.02 sec and the average flash lasts 0.25 sec. Because the duration of one powerful stroke is no more than 0.0002 sec, the intervals between strokes account for most of the duration of a lightning "flash." So-called sheet lightning is simply the reflection of an ordinary lightning flash on clouds. Ball lightning is a rare phenomenon in which the discharge takes the form of a slowly moving, luminous ball that sometimes explodes and sometimes simply decays.

A possible new class of lightning has been discovered, consisting of two types of lightning associated with severe thunderstorms. Both types occur far above the cloud layer and are extremely rare. The first, called a red sprite, is a red burst that lasts only a few thousandths of a second and can be many kilometers wide. Red sprites appear all at once and rise to heights of about 50 to 90 km (30 to 50 mi) above the cloud layer. The second type, a blue jet, is a blue, cone-shaped burst. Blue jets appear to travel upward at speeds of up to 100 km/h (60 mph), and they rise to heights of about 20 to 50 km (10 to 30 mi) above the cloud layer. These bursts were first photographed in 1989 in Minnesota by American physicist John R. Winckiyer.

Protective Measures

Buildings are protected from lightning by providing them with metallic lightning rods extending to the ground from a point above the highest part of the roof. These rods form a low-resistance path for the lightning discharge and prevent it from traveling through the structure itself. Power lines and radio sets with external aerials are protected against lightning by lightning arresters that consist of a small gas-filled gap between the line and ground wire. This gap offers a high resistance to ordinary voltages, but a lightning discharge, which has a potential of tens of millions of volts, causes the gas in the gap to ionize, providing a low-resistance path to earth for this discharge.

Three common and erroneous ideas about lightning ought to be mentioned. One is that lightning never strikes twice in the same place. Photographic evidence shows that skyscrapers and other tall structures may be struck many times in the course of a single storm. A second idea is that the safest place to stay in a thunderstorm is under a tall tree. Trees, because of their height, are apt to be struck by lightning and are, therefore, actually dangerous during violent electric storms. The safest places for a person outdoors in a thunderstorm are inside a metal-bodied car or lying flat on the ground in the open. A third misconception is that lightning is always clearly associated with thunder. Observers who listen for thunder as a cue may miss up to 40 percent of lightning strokes.

In the U.S. about 100 persons are killed and many injured by lightning each year, more than by tornadoes or hurricanes. Forty percent of all farm fires and 75,000 forest fires a year are started by lightning. Lightning is not all bad, however. The soil is enriched with nitrogen that is released from the atmosphere by lightning and carried to the ground by raindrops. Some scientists believe that lightning may have been a key element in the origin of life on earth, creating from simple elements complex chemical compounds that gave rise to living matter.

ABOUT MIR

Mir, the Russian space station, has been in space since February 1986. The word 'Mir' is usually translated in to English as 'peace', but also means 'world' or 'an autonomous community'. A popular Russian greeting is 'Mir o Mir' - Peace on Earth. In 1988 a handheld amateur radio was added to Mir for crew recreational use, and it's been a popular activity. Many other pieces of amateur radio hardware have followed, and Mir now has an extremely impressive ham station. Ham radio is a popular activity for many of the Mir crewmembers, and there's additional interest with a full-time American presence aboard Mir. The Mir Amateur Radio EXperiment (MAREX) has turned out to be one of Mir's most visible activities, and an enjoyable leisure time activity - both for the cosmonauts and the hams who have the opportunity to talk to them.

Who are the key parties responsible for Mir's amateur radio activities?

The head of the MAREX (Mir Amateur Radio EXperiment) is Sergei Samburov, RV3DR. His official title is Chief of Cosmonaut Amateur Radio Department, RSC Energia. Boris Stepanov, RU3AX, is the Soyuz Radioyubitelej Rosii president, the organization for Russian amateur radio operators. R3K.

International amateur radio groups in Germany and Austria have provided some of the hardware and other forms of assistance.

The Mir International Amateur Radio EXperiment (MIREX) was formed to handle prescheduled Mir school contacts. The head of MIREX operations in the U.S. is Dr. Dave Larsen N6CO/K6MIR (ex N6JLH). G. Miles Mann, WF1F, is the US Activities Manager and also assists in scheduling contacts worldwide.

It's important to note that the MAREX activities are _NOT_ identical to the SAREX (Shuttle Amateur Radio Experiment). However the MAREX and SAREX teams do work together in many cases. For example the SAREX team gives amateur radio training to the American cosmonauts, and schools with SAREXg the summer for daylight savings. The official sleep period for Mir's crew is 23:00 to 8:00 DMT, which equates to 20:00 to 5:00 UT. It's important to note that this is just the official sleep period, some cosmonauts get by on much less sleep.

My simple trick is to use my satellite tracking program's terminator indicator (the line which indicates sunrise/sunset). If Moscow is in the daylight portion of the world the crew is _probably_ awake. If Moscow is near the terminator then the crew is probably in their presleep/postsleep time (or whatever the Russian terms are) and more likely to be available on the radio. It isn't perfectly accurate, but it's simple.

The NASA headquarters worldwide web page http://www.osf.hq.nasa.gov/mir/ has a history of each cosmonaut crew which has occupied Mir.

Biographies of these astronauts and cosmonauts connected with the joint U.S. - Russian programs can be found at the Johnson Space Center web page http://www.jsc.nasa.gov/Bios/.

How was it legal for Dr. Norm Thagard and Dr. Shannon Lucid to use Mir's amateur radio, even though they didn't have valid U.S. amateur licenses during their stays aboard Mir?

The Russian amateur radio regulations permit anybody who is a member of an amateur radio club to use that club's station, whether or not they have their own call sign. Mir is considered a 'club' and the Russian government has granted any person aboard Mir the privilege to use the amateur radio equipment with the club call sign R0MIR.

It's important to note that any person aboard Mir, whether they use a Russian call sign or a call sign from their own country, is bound by the Russian radio regulations since they are in Russian territory.

The MAREX team and SAREX Working Group have obtained special waivers to the third party regulations for the U.S. astronauts aboard Mir to talk to friends and students. However these waivers are only in effect for the period of an individual astronaut's stay aboard Mir. Once a new U.S. astronaut arrives the entire approval process for the waiver has to be gone through again. The waiver only applies to the U.S. astronaut aboard Mir, not the Russian cosmonauts or any guest visitors. These

rules apply to all U.S. licensed amateur operators. In other countries check with your local radio authorities about third-party agreements with amateur radio operators on Russian soil.

It's the goal of the SAREX Working Group and MAREX team to ultimately try to get a blanket third party rule for any ham space travelers but this has not been achievable yet. The AMSAT Bulletins include notices whenever third-party agreements applicable to Mir change.

Which American astronauts are scheduled to spend long duration stays aboard Mir, and what are their call signs?

(Dates from launch through landing. Projected dates for upcoming Mir astronauts)

Astronaut	Launch	Landing	Call sign	Time In Space
Norm Thagard	1	03/14/95	07/07/95	R0MIR 115 days
Shannon Lucid	2	03/22/96	09/26/96	R0MIR 188 days
John Blaha	3	09/16/96	01/21/97	KC5TZQ 127 days
Jerry Linenger	4	01/12/97	05/24/97	KC5HBR 132 days
Mike Foale	5	05/15/97	09/27/97	KB5UAC 135 days
Wendy Lawrence	6	09/18/97	01/24/98	KC5KII 128 days
Dave Wolf	7	01/15/98	06/07/98	KC5VPF 143 days
			TOTAL	969 days

How can I determine when Mir's going to be over my location and when the cosmonauts are available?

Finding out when Mir is going to be over your horizon is fairly easy if you've got almost any personal computer. There are dozens of satellite tracking programs which predict when a satellite will be over your location. The AMSAT Worldwide Web site http://www.amsat.org/amsat/ftpsoft.html includes satellite tracking programs for a variety of different computers.

A tracking program is only as good as its data. The classic 'Keplerians' are the six mathematical values which determine a spacecraft's orbit around the Earth. In practice there are additional values which are required because the Earth isn't a perfect sphere, and other anomalies. There are many different web sites, FTP locations, and automatic E-mail servers which will provide up-to-date keps.

Predicting when the cosmonauts are going to be available is a different story. The most likely times to find the crew on the radio are during their free periods when they wake up and before they go to sleep, during meals, or on weekends or holidays. Cosmonaut work days are much less structured than the precise minute-by-minute timeline which shuttle crews use. So cosmonauts have a bit of flexibility in when they take their rest breaks and other free periods. If a cosmonaut wants to be on the radio to talk to a particular person then it's easy enough for them to adapt their schedules. Some cosmonauts will adjust their schedules to try to get some free time while they're making favorable passes over areas of the world where they've got a special interest (e.g. U.S. cosmonauts often try to be at the radio over U.S. passes, especially ones which go over the Johnson Space Center in Houston Texas).

The simple solution is to listen to the downlink frequency, and if you hear a cosmonaut's voice - then it's a good bet that they're using the radio!

Where can I obtain the latest Keplerian elements (keps) for Mir, and how often should I update them?

One of the best sources of Keplerian elements is the Celestial BBS web site at http://www.grove.net/~tkelso/NORAD/elements/mir.txt Note that this site actually includes separate elements for each of Mir's modules - even though they're all physically connected! The easiest system is just use the keps for the Mir core module.

AMSAT members who are subscribed to the Keplerian elements mailing list receive the keps automatically on a weekly basis. During shuttle missions the shuttle's elements are sent out fairly often.

As a rule I tend to update my Mir keps about once a week. Mir is a fairly stable spacecraft and only maneuvers occasionally. However it is useful to update your keps as soon as practical after any major maneuvers (e.g.orbital altitude adjustments). While older keps will still be fairly accurate after the maneuver, they'll gradually get more and more inaccurate over time. On flights when the shuttle

docks with Mir it changes its orbit several times as part of the rendezvous sequence. For those flights it's highly desirable to update your keps after each orbital maneuver.

What are the current frequencies for Mir's primary amateur radio equipment?

Mir's radio is set for 145.985 Mhz when over most of the world, but will be on 145.800 (-600) when over parts of Europe.

Ideas are very much like children - your own are wonderful.

Always, in each new generation, there is a tendency to think that the problem, whatever one is up for discussion, is either new or much worse than it was in earlier days.

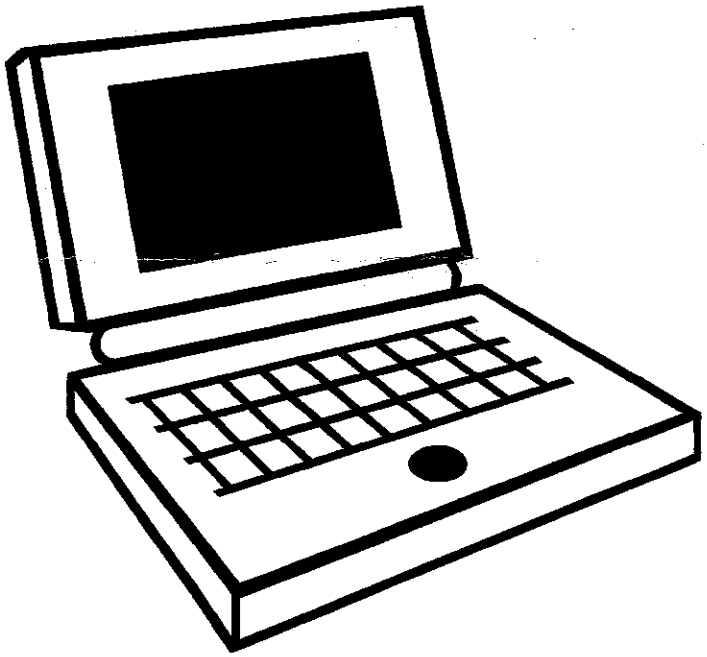
J.O.T.A.
Frequemcies

Band	SSB PHONE	CW(Morse code)
80 metre	3.740 Mhz or 3.940 Mhz	3.590 Mhz
40 metre	7.090 Mhz	7.030 Mhz
20 metre	14.290 Mhz	14.070 Mhz
17metre	18.140 Mhz	10.080 Mhz
15metre	21.360 Mhz	21.140 Mhz
12metre	24.910 Mhz	24.910 Mhz

Dates and Times October 18th. And October 19th. Starts at 00:01 local time Saturday ens 23:59 local Sunday. We will need your help to teach the next generation about Amateur Radio.
73
Robert "First Port of OWASCO Scouts"

On Sunday Sept. 14, the Terry Fox Run was held in Owen Sound. Again this year club members offered their communication skills to making the run safer. Thanks to all who volunteered.

E-mail addresses for gbarc members



GBARC: gbarc@sbbs.gryn.org
VA3KMS: techie@bmts.com
VE3IJD: mcdonald@bmts.com
VE3RHJ: bj@headwaters.com
VE3XOX: ve3xox@sbbs.gryn.org
VA3JRF: va3jrf@bmts.com

Coming events

Contests

Date: 06-07-97 Time: 15:29:22

I've totalled the logs, and the Georgian Bay ARC (operating VE3OST, class 3A) will be claiming 2506 points for Field Day '97.

- 354 CW contacts x 2 points each,
- 395 phone contacts x 1 point each,
- x2 for using 150 watts or less on all transmitters, = 2206 points.

We also claim 300 points for 100% emergency power on all three rigs.

73, Brad VE3RHJ

GBARC history

This is a spot I would like to fill with little tid bits dealing with the history of the club. I would like to receive anything which could tell about meetings, contests, humorous happenings (tasteful please), special events and memories .

Canwarn and ARES

On August 15, 1997 at about 7:30 in the William's Lake area a tornado touched down causing damage and personal injury. This was the second tornado in the area in less than two years. Again there were injuries resulting in people being hospitalized. Only luck has prevented any deaths.

This year's tornado crossed over lasts year's tornado's path through William's lake, tossing two cottages and their residents into the middle of the lake. Rob Howard, owner of one of the tossed cottages had lost his garage in last year's tornado.

Some items that have caused some concern to myself are; the fact that there were no warnings issued from Environment Canada for our area, there was also a lack of any Canwarn nets in the area directly after the tornado had been spotted by an amateur radio oerator.

It took ten or fifteen minutes before Canwarn was brought up and there was no ARES response after the Canwarn net stepped down. After the touchdown of the tornado it occurred to me that maybe having an up and running Canwarn link might be a "not too bad idea". It might also be a good idea to get our Ares system tuned up so we are prepared for these devastating events. Both these public services are vital in times of severe weather and with a strong volunteer staffing from our amateur population, club members and non-members alike we could make these services work.

Two Metre net Sced

Sept.25 VE3RHJ	Nov. 6 VE3MWU
Oct. 2 VE3BY	Nov. 13 VA3STS
Oct. 9 VE3DXE	Nov. 20 VA3KMS
Oct. 16 VA3WPJ	Nov. 27 VE3RHJ
Oct. 23 VE3ENS	Dec. 4 VE3BY
Oct. 30 VE3IOD	Dec. 11 VE3DXE

TOOLS USED

(your computer may not require all of these)

medium straight screwdriver
medium Philips screwdriver
Torx screwdriver (Compaq)
needle-nose pliers
canister or shop vac (blower)

known-good VGA monitor
known-good AT keyboard
AT-to-PS/2 keyboard adapter
known good floppy drive
known good hard drive
POST card
Pocket PC Reference book

DISKS (5.25" and 3.5")
head cleaning disks
blank, formatted floppy disks
bootable DOS floppy with
FORMAT and FDISK
QAPlus or Checkit program
Disk Manager program
Generic SETUP program
Compaq Setup disk
Compaq System
Configuration disk
DOS installation disks

Bringing Up a PC: a summary

by Brad Rodriguez, VE3RHJ

1. Connect **Power Supply, Motherboard, Video Card, Video Monitor**
   - No display - any of the above could be defective.
     - Test power supply with voltmeter.
     - Test video monitor on good system, OR use a known-good monitor.
     - Test video card by using a known-good card, OR try card on good system.
     - Test motherboard with POST (Power On Self Test) card.
   - RAM error - replace RAM if possible, or discard motherboard.
   - Keyboard fault - this is normal, proceed to step 2.
   - Options wrong or not set - this is normal, and will be fixed in step 7.
2. Connect **Keyboard**
   - Keyboard fault - could be bad motherboard, bad keyboard, or wrong keyboard.
     - Test with known good keyboard, OR test keyboard on good system.
     - *Note* XT requires XT keyboard; AT/386/486/etc. requires AT keyboard.
     - If keyboard is correct and good, probably a bad motherboard. *(RARE)*
   - Disk controller fault - this is normal, proceed to step 3.
3. Connect **Floppy Disk Controller, Floppy Drive**
   - Disk fault - could be cable, terminator, drive, controller, or motherboard.
     - Check cable red stripe to pin 1, both ends.
     - Check floppy drive connected *after* twist in cable.
     - Older floppy drives may require a terminator resistor-pack...check.
     - XT controller card may require DIP switch setting...check.

Make sure you have a floppy disk inserted and the door closed.
Test with known good floppy drive, OR test floppy drive on good system.
Try known good controller card, OR try controller card on good system.
CMOS RAM information may be incorrect; look for ROM SETUP utility.
Test everything (including cables) on known-good system.
If everything ok, probably a bad motherboard.

"Not a system disk" - see step 4.

4. Boot from **DOS floppy disk**

"Not a system disk" - could be wrong disk, bad disk, or disk read errors.
Disk must be a *bootable* DOS disk -- try another disk.
Try to boot this disk in a known-good system.
If disk OK, probably bad floppy drive or controller; diagnose as in step 3.

5. (Optional) Run PC test program such as Checkit or QAPlus.

Test motherboard, memory, video, keyboard, and floppy drive.

6. Connect **Hard Disk Controller, Hard Drive**

Write down cylinders/heads/sectors information for CMOS setup.

7. Setup **CMOS RAM** (*not* on XTs; only for AT/386/486/etc.)

SETUP program may be in BIOS or on floppy disk (manufacturer's or generic)
Specify date & time, memory, floppy and hard disk drives, video, options.
Turn off computer, wait a few minutes, turn back on, and check setup options.

Setup options not saved - could be bad RAM, dead battery, or discharged battery
Check lithium battery with voltmeter, or replace and try again
NiCad battery requires charging; leave computer on overnight and try again
Test RAM: set options, reboot with power on, and check options
Defective battery - replace; defective RAM - discard motherboard

8. Test hard drive by typing **DIR C:↵**

Directory information displayed - skip to step 13.
"Invalid drive specification" - could be CMOS RAM error, unformatted drive,
bad drive or controller, bad cable, or defective motherboard.
Proceed to step 9 for low-level formatting and/or diagnosis.

9. Low-level format (*only* MFM or RLL hard drives)

Use Disk Manager, Checkit, QAPlus, or SETUP program.

"No drive present" - could be CMOS RAM error, bad drive or controller, bad cable, or defective motherboard.

Check CMOS RAM has correct drive information.

Check that drive cables are installed correctly.

Use Disk Manager, Checkit or QAPlus to test controller.

Try a known-good drive and controller card.

10. Partition hard drive with **FDISK**

Create DOS partition to use cylinder numbers 0 to highest #.

Make this the active partition.

11. High-level format

HARD DISK CABLES

MFM and RLL drives have two cables: 34-wire and 20 wire, with card edge connectors at one end. *Warning*: the 34-wire cable closely resembles, *but is not the same as*, a floppy drive cable. (The twist is different.)

IDE drives have a 40-wire cable with pin socket ("IDC socket" or "header") connectors.

SCSI drives have a 50-wire cable.

Reboot from floppy and type **FORMAT C: /S**↵

INSTALLING THE OPERATING SYSTEM

DOS 4 and later, and all versions of Windows, install automatically from floppy disk...just insert the install disk and boot the computer. For older versions of DOS:

select C: drive,	**C:** ↵
make a DOS directory,	**MD \DOS**↵
copy files from floppy,	**COPY A:*.* \DOS** ↵
set PATH	**PATH C:\DOS**↵

Normally you will put the PATH command in the AUTOEXEC.BAT file.

Test hard drive by typing **DIR C:** ↵

"Invalid drive specification" - could be CMOS RAM error, bad drive/controller/cable/motherboard, or bad partition.

Diagnose hard drive as in step 9.

Use Disk Manager, Checkit, or QAPlus to test drive.

Check partition info with FDISK

12. Install operating system (see sidebar)

13. Boot from hard disk.

"Not a system disk" -

Check with FDISK that partition is bootable.

Check CMOS RAM information for drive C:.

Boot from floppy and reinstall system with **SYS C:** ↵

(*Note:* on DOS 4 and earlier this erases the hard drive!)

14. Install Multi I/O (Serial/Parallel) Card, other cards as desired.