COMPUTER NETWORKING IN JAPAN 1985 - ONWARDS
AND HOW BILL GATES' (MICROSOFT) CREATED
THE FAR EAST & PACIFIC MSX STANDARD

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ABSTRACT:

The evolution, development, and imple-
mentation of the Microsoft MSX operating
system in nearly 2 dozen models of micro-
computers now being manufactured in the Far
East and Pacific (FEP) is discussed along
with their impact on packet radio on the
amateur bands primarily in Japan, for the
1985 - onwards, time frame.

INTRODUCTION:

Gridley, here is your trivia question of
the week. Why is Apple to microcomputer
similar to Microsoft to software?

Gotcha coach. They are both the biggest in
their respective fields.

Not really, Gridley. IBM's dividends
exceed Apple's 2 billion dollar annual
sales. Furthermore, there are a number of
software houses that are as large or larger
than Microsoft% $200 million annual sales.
Try again, Gridley. Think back to the 1975
- 1976 era of yesteryear tall masked man.

Aha, you gave me a clue, coach. Both firms
were started by rather young computer buffs
working in garages, dormitory rooms, or the
attic.

Right you are, Gridley. Steve Wozniak and
Steve Jobs at Apple, and Bill Gates and
Paul Allen at Microsoft were the leading
perpetrators - founders, of these two out-
standing firms.

So what does that have to do with the MSX
missile program, coach?

Absolutely nothing, Gridley. The 'MS'
stands for Microsoft and the 'X' stands for
the Microsoft extended Basic interpreter.
MSX is what this short paper is all about,
plus its impact on amateur packet radio in
the Far East and Pacific basin, especially
in Japan.

BY 1979, Microsoft's BASIC interpreter,
first written by Gates and Allen circa
1975/1976, had become the defacto world
standard BASIC, and still is today,
Microsoft's achievements are really too
numerous to mention, but two items
particularly standout. The first and most
obvious is MS DOS, the fundamental PC DOS
disk operating system for the IBM PC. The

The second and not quite so obvious
achievement was the Microsoft "Softcard"
that turned the Apple II' into a real honest
to goodness modern day micro by
substituting the ubiquitous Zilog Z-80
microprocessor for the cheapy 6502
microprocessor with its very limited
instruction set and minimal registers.

In the early 1980's, Bill Gates' foresight
& precognition again came to the fore and
Microsoft, called ASCII Microsoft Ltd. in
Japan, developed the MSX operating system
for microcomputers that utilize the Zilog
Z-80A microprocesor (or its licensed
counterparts manufactured in Japan). The
idea here was an extremely sound one; i.e.,
any microcomputer using the licensed MSX
operating system would have complete
software program compatibily with any other
microcomputer using the licensed MSX
operating system. Beyond software
compatibility, a further goal was to have
completely interchangeable peripherals.

In addition to the usual line printer,
light pen, etc., peripherals, they also
include stereo sound, video disk, and video
cassette, plus optional growth capability
via the MSX DOS (disk operating system) to
use the new 360K byte (formatted) 3 1/2"
floppy disks now being manufactured in
Japan. Microsoft provides the MSX disk
operating system on a chip which is built
into the floppy disk drive adaptor.

FUNDAMENTAL MSX OPERATING SYSTEM SPECS:

Microprocessor	: Z-80A 4 MHz clock
MSX ROM	: 32K bytes standard
MSX RAM	: 32K average - up to 64K
Video control	: Texas Instr. TMS-9918A
Text display	: 32 characters X 24 lines
Graphic display	: 192 X 256 dots 16 colors
Sound generator	: General Instr. AY-3-8910
Audio range	: 8 octaves, 3 tone chord
Peripheral chip	: Intel i8255
Line printer	: Centronics parallel port
Cassette	: 1200 bps low 2400 bps hi

This sure looks like a fun and games
specification to me!

Yes, and no, Gridley. The MSX spec is
aimed at the universal "home computer"
market. Notice we did not say "personal
computer" market as there is a substantial
difference between the two. It is obvious
from the MSX text display specs that it is

designed to work with a standard home television set serving as the video display as 32 characters by 24 lines is the maximum that a standard home TV set's video bandwidth can handle. Video output is to the TV set's video input or via an optional TV channel RF modulator. Analog Red Green Blue (RGB) output is another option.

It is worth noting that the majority of MSX micros offer RAM expansion to 64K bytes, so undoubtedly virtually all of them utilize bank memory switching between ROM and RAM. The ROM may be plugged into the MSX cartridge slots, one or more, on all MSX micros. You should also note that virtually none of the MSX micros include or offer the RS-232 serial interface that the hardware variety of packet radio buff is so fond of using.

Another fascinating aspect of the MSX specification is what ASCII Microsoft Ltd.% Mr. Kazuhiko Nishi terms the "MSX Engine." This fabulous chip, soon to be manufactured by Toshiba combines the functions of the Z-80A microprocessor, the TMS 9918A video control, i8255 peripheral controller, and AY-3-8910 sound generator ALL on a single chip. The price tag is expected to be under $10 when mass **procuction** gets rolling.

MSX MICROCOMPUTER MANUFACTURERS:

Canon   (Japan)
General   (Japan)
Kyocera   **(Japan)**
Victor   (Japan)
Yamaha Nippon Gakki   (Japan)
Mitsubishi Electric   (Japan)
Sony   (Japan)
Pioneer Electronic   (Japan)
Matsushita Electric   (Japan)
Toshiba   (Japan)
Hitachi   (Japan)
Fujitsu   (Japan)
Sanyo Electric   (Japan)
Samsung Electronics   (S. Korea)
Gold Star   (S. Korea)
Daewoo Electronics   (S. Korea)
Limco Products   (Singapore)
Oric Electronic   (Singapore)
Command Module   (Hong Kong)
Radofin Electronics   (Hong Kong)
NOTE:
Another player in the MSX game:
Philips Eindhoven   (Holland)
(UK, France, West Germany soon?)

Prices in US $ for MSX microcomputers vary from a low of about $150 up to a high of **$380,** depending upon options. The **360K** byte 3 **1/2"** disk drives from Sony and Toshiba retail for an additional $330 which will surely decrease as volume goes up. Most of the above manufacturers, except Yamaha's Musical Instruments Division, do NOT plan to market their MSX micros in the U.S. Their major thrust will be in Europe and Japan, with a few targeting the Middle East with Arabic keyboards.

At the end of 1984 there were about **1/2** million MSX micros in use in Japan with the **1985** – 1986 forecast in the **1** to 2 million ballpark for Japan **ALONE.**

Ok coach, I am impressed. Now, **let's** get on with the packet story line which is what this discussion is supposed to be about.

Sorry Gridley, I got carried away by all these fascinating facts and figures.

JAPANESE RADIO AMATEURS 600,000 PLUS:

That's another impressive figure!

Yes indeed Gridley, especially when one considers that the first Japanese **AMSAT** bird with AX.25 packet capability is going to be launched in 1986, plus a number of forward thinking Japanese amateurs are already planning a number of AX.25 protocol packet repeaters for installation beginning the summer of **1985.**

Hmmmmmmmm? Standard 32K plug-in-able ROM? No **RS-232?** Common standard keyboards? Common standard video displays? I have a great idea for the software approach to packet, coach!

Hold your horses, Gridley. We are working on the first dedicated packet ROM cartridge for an MSX micro for our Far East & Pacific distributor in Tokyo. Our 30 page instruction booklet will be translated into Japanese shortly.

S-I-L-E-N-C-E.

Sorry I stole your thunder, Gridley. Here are the rough details of this little joy and delight:

- End user price of the MSX packet cartridge will be the equivalent of $80 U.S.

- Requires 32K RAM which most all MSX micros have or exceed.

- The 1200 baud MSX cartridge has AFSK output to the user's transmitter via **a** cable and plug, a cable and plug for audio input from the user's receiver, and a cable and plug to the user's T/R relay.

- The 300 baud MSX cartridge is identical to the one above except the I/O is for 200 Hz shift on the HF bands.

- All plugs are configured for the **Kenwood,** ICOM, and Yaesu amateur transceivers.

- All features of the Richcraft dash 2 AX.25 protocol software approach are included. Instead of 2 menus, 4 menus are provided due to the 32 characters per line text display. Windows are provided over menus as well as on the

receive mode video display when toggled
ON.

- Only half of the 32K available ROM is
  is used for the packet program and
  ancillary subroutines such as keyboard
  decoding, video display/control, etc.
  As such, there is plenty of room avail-
  able for level 3/layer 3 implementation
  next year.

- The 32K RAM is partitioned into the
  following segments: 12K for processed
  received info frame storage, 12K for
  storing long files to be transmitted,
  4K for packet assembly and disassembly,
  and 4K for variable storage. Those MSX
  micros with 64K RAM memory use the extra
  memory for expanded receive and transmit
  storage.

- Packet in living color is available
  if desired. Only the most frustrated
  art major would find the 16 colors
  inadequate. Zooming windows, color
  identification of TO - FROM - VIA and
  all sorts of Walt Disney animation is
  quite easy to accomplish.

When will we see the first MSX micros in
the U.S.?

They are enroute if not already here
Gridley, but do not look for them in your
local computer wonderland store. The first
MSX manufacturer that has stated publicly
that they will give the U.S. market a try,
is Yamaha who will distribute them through
its Musical Instruments Division. Best
visit your local music store if you want to
see the Yamaha model YIS-503. Pioneer also
plans to test the U.S. market later in 1985
with their model PX-7.

CONCLUSION:

AX.25 protocol packet activity is about to
explode in Japan. The Microsoft MSX
specifications are truly ideal for the
Richcraft software approach to packet radio
and allow operation at any baud rate from
300 on up through 2400 baud at extremely
low cost. Just plug in an MSX packet
cartridge and you are "on the air."

The author's non April 1, 1985 prediction:

"By 1987 there will be as many or more
AX. 25 packet amateur radio stations in
Japan as in the rest of the world
combined."

Many U.S. amateur packet radio buffs will
pooh pooh the MSX micro spec. Undoubtedly
these are the same experts who pooh poohed
Japanese designed and manufactured
automobiles for the U.S. market a number of
years ago,

THE USUAL DISCLAIMER:

All errors and sins of omission are
unintentional and strictly those of the
author. All prognostications and predic-
tions are strictly the author's best
guesses as of December 1984.