

Inquiry  
Of  
Data transmission cost  
Between  
two computers  
using  
modem

*A detailed technical information*

Prepared  
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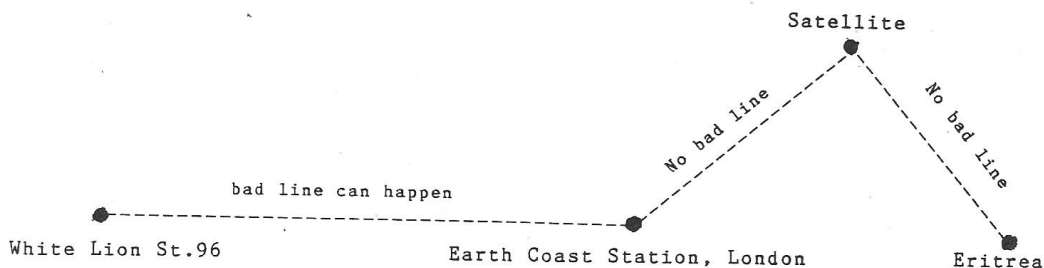
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### INQUIRY REPORT

Reference is made to our telephone discussion yesterday regarding charges for communication between two computers through telephone line using modems.

TBK, The marketing branch of the Norwegian Telecommunication Authority, was contacted for official information and confirmation of the measuring and charging system for such communication. The information given by TBK is that charge is made on the time used for transmission and not on the amount of data transmitted. Ofcourse longer texts will take longer time to transmit but it does not make any difference using the line to talk to people in the other end or to transmit data to a computer. The normal speed is approximately between 6-11 Kb per second. It can be said that 1 Kb is the image size of one letter. It should be noted that there are different types of modems with different speed capacities. A speedy transmission requires a combination of a good quality modem and a good telephone line. If the telephone line is bad the speed is drastically reduced.



There exist a software programme called PK-ZIP. By using this programme one can compress the data file or text to be transmitted by 40-70 % before sending it. This programme is a public domain and is given free.

Regarding requirments to link two or more computers all that is needed is:

- \* Reliable telephone line
- \* Modem
- \* Procomme ( a software programme )
- \* Cables to link computer with telephone

Recommendation It is recommended by TBK to use TELEBIT T2500 modem. TBK has further recommended that all terminals to be linked use the same type of modem. The price of Telebit T2500 is 13.500 Kroner in Norway. And it is available everywhere.

In the course of my inquiry I discovered the requirment of approval by the authorities to use modem. In our case all we may need to do is linking it with the licence obtained to operate the Saturn T. I was also told that transmitting big programmes like Lotus, Symphony, Pascal etc using modem is illegal.

I hope this report is sufficient enough to encourage a quick start of the system. Such communication is cheap, technically easy to operate and difficult to be monitored by a third party.

PC magazine of December 11 has extensive information on modem technology. I am sending you copies by seperate mail.

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SUPPLEMENT TO INQUIRY REPORT CONCERNING MODEM  
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THIS IS A SUPPLEMENT TO MY INQUIRY REPORT DATED THE 8TH OF APRIL 1991. IN THAT REPORT I HAVE INADVERTANTLY MIXED-UP BITES WITH KILOBITES. YOU SHOULD THEREFORE CORRECT THE SENTENCE THAT STATE 1 KB IS THE IMAGE SIZE OF ONE CHARACTER. AFTER MAKING MORE INQUIRY I AM CONVINCED THAT KNOWING ALL THE UNITS IS PARAMOUNT TO HAVE A CLEAR VISION AND TO CALCULATE PRECISELY HOW LONG TIME IT WOULD TAKE TO TRANSMIT A GIVEN TEXT. I HAVE HEREBY LISTED ALL THE UNITS, THEIR SIZE AND RELATION TO EACH OTHER:-

8 BITS = 1 BYTE  
1000 BYTES = 1 KB ( KILOBITE )  
( WHOLE NUMBER ) INTEGER = 2 BYTES  
( A LETTER ) CHARACTER = 4 BYTES  
( DECIMAL EX 1.2 ) = 4 BYTES

BIT/S = B/S = BPS ( IN SOME COUNTRIES IT IS ALSO KNOWN AS BAUD )  
1 CHARACTER = 10 BIT ( INCLUDING START/STOP BIT )  
THEREFORE A MODEM SPEED OF 2400 B/S = 2.4 KB/S = 240 CHARACTER PER SECOND.

BPS = BITS PER SECOND  
KBS = KILOBITE PER SECOND

A STANDARD PAGE IN A WORD PROCESSOR HAS 80 CHARACTERS IN ONE LINE AND 25 LINES. CONSEQUENTLY 1 FULL PAGE WOULD HAVE 2000 CHARACTERS. IT WOULD TAKE 8 SECONDS TO TRANSMIT IT.

SINCE THE SYSTEM OF MODEM TRANSMISSION IS BASED ON A COMBINED MODULATOR AND DEMODULATOR AT EACH END OF TELEPHONE LINE TO CONVERT BINARY DIGITAL INFORMATION TO AUDIO TONE SIGNALS, EMPTY SPACE BETWEEN PARAGRAPHS OR EMPTY HALF LINES IN A TEXT DOES NOT CONSUME TRANSMISSION TIME. IN OTHER WORDS ONLY WRITTEN SIGNS DETERMIN THE SPEED OF THE TRANSMISSION.

TRANSMISSION OF TEXT BETWEEN MODEMS IS DONE IN SERIES OF BLOCKS. 1 BLOCK IS TRANSMITTED AT A TIME FROM SENDER TO RECEIVER. CONSEQUENTLY COMPARISON OF THE BLOCK IN THE SENDER MODEM AND THE RECEIVER MODEM IS DONE. IF THEY ARE NOT IDENTICAL AN AUTOMATIC ERROR CORRECTION COMMAND IS DONE. THIS ERROR CORRECTION FUNCTION CONSUMES TIME BUT IT IS WITHIN A SPLIT OF A SECOND.

REGARDING COMPRESSION OF TEXT TO REDUCE TRANSMISSION TIME IT IS DONE WITH THE HELP OF A SOFTWARE PROGRAMME CALLED PK-ZIP. IT IS COMPRESSED AT THE SENDER MODEM AND DECOMPRESSED AT THE RECEIVER MODEM. HOWEVER NEW VERSION MODEMS HAVE IN-BUILT COMPRESSOR FUNCTION AND DO NOT REQUIRE EXTERNAL PROGRAMME.

COMPARING MODEM TRANSMISSION WITH TELEFAX TRANSMISSION THE ADVANTAGES ARE:

- QUALITY OF TRANSMITTED TEXT IS JUST AS ORIGINAL
- NO DISTORTION
- NO MISSING PAGES
- RECEIVED TEXT CAN BE COMMENTED UPON AND RETURNED
- AUTOMATIC STORAGE OF FILES
- AND ABOVE ALL CHEAP COST

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