

BYTE LINES

News and Speculation about Personal Computing

Conducted by Sol Libes

Random Rumors: IBM is rumored to be increasing production of its personal computer system, with 175,000 units expected to be sold before Christmas 1982. IBM will probably soon announce a graphics package and X.25 communications options for the personal computer. . . . Epson America is expected to introduce several video terminals, including one with a flat screen. The rumor is that they will be shown at the NCC (National Computer Conference) in June; look for Sinclair, Sony, and Hitachi to introduce similar products at NCC. Also due at NCC are 80- and 160-megabyte 8-inch Winchester hard-disk drives from Micropolis and 16- and 30-megabyte 5¼-inch Winchesters from Control Data Corp. . . . Reportedly, a 15-inch flat-screen monitor is due from Japan shortly. . . . DEC (Digital Equipment Corporation) is expected to introduce a PDP-8 replacement, a 16-bit version of its recently introduced personal-computer board for the VT-100 terminal, and a complete personal computer. Incidentally, DEC is budgeting \$500 million for research and development, with half going to software development and its 2000-member software development team. . . . Hearsay has it that Centronics is working on a ribbonless dot-matrix printer. . . . NEC (Nippon Electric Company) is supposedly about to introduce two new systems in the U.S., both of which are already on the market in Japan: the PC6000, a consumer-oriented machine, and the PC8800, an 8086-based machine for the

business market. . . . Commodore is said to be working on a new version of the VIC computer for introduction early next year. The unit should have 256K bytes of memory and 80-column black and white or color video display. . . . Look for the upgrade of the Osborne-I to be introduced later this year. It's rumored to have an 80-character-wide display (versus the current 52-column unit), double-density floppy-disk drives, a built-in modem, and a communications package. A significant jump in price will probably accompany it. . . . Toshiba is also expected to introduce into the U.S. a product it's already selling in Japan—a Z80-based system that runs CP/M, T-Basic, and UCSD Pascal.

Random Bits: At the recent Comdex show held for dealers, emphasis changed from the hobbyist to a business orientation, with Apples and TRS-80s all but replaced by integrated business systems. This change should be reflected in computer stores shortly. . . . NEC, Toshiba, and Okidata Corporation are currently supplying samples of 256K-bit dynamic memory devices and expect to start volume delivery in June. These ICs should begin showing up in equipment by the middle of 1983. . . . S D Systems will introduce yet another local-network system called MARS/NET. . . . Mitsubishi is supplying samples of its 5¼-inch Winchester disk drives and half-wide floppy-disk drives; Toshiba is also considering sale of its 5¼-inch Winchester in the U.S. Shugart's half-height 5¼-inch

SA210 floppy-disk drive will make its first appearance in Xerox's new Sabre line of electronic typewriters. . . . WD (Western Digital) is expected to shortly introduce a single-chip Winchester controller that replaces 25 TTL (transistor-transistor logic) parts. Also due from WD is a new floppy-disk drive controller IC that incorporates the data separator, comparator, and write-precompensation circuits missing from current controllers. . . . IBM recently opened its tenth computer store; more are in the works. . . . Seagate has introduced a 6-megabyte, 5¼-inch Winchester with removable media. . . . Emulog of Freemont, California, has introduced a full-feature video terminal with a \$465 list price. . . . HP (Hewlett-Packard) has separated its personal-computer operation from the calculator division and created a Personal Computation Group. HP has also increased dealer discounts on models 80, 85, and 125 systems by as much as 25 percent over previous discounts. . . . Radio Shack has beaten Apple into the 16-bit market with the introduction of its new Model 16, 68000-based microcomputer. For more details on this machine and other new products, see page 40. Radio Shack has also established an online videotex-information data-base system for subscribers in the Forth Worth area.

Unix Royalty Fees Cut: Western Electric recently introduced its Unix System III update which combines Ver-

sion 7 Unix and the PWB (Programmer's Workbench) into a single system. Some enhancements have also been added. They raised the source code license fee to \$43,000 but lowered the distribution deposit from \$50,000 to \$25,000 against royalties. The royalty fees have been reduced to \$100 for a single user and \$250 for systems for 2 to 16 users. (Previously, a license cost \$1500 plus \$250 per user.)

Royalties prepaid under the old rates will not be refunded. Licensees will, in effect, start with a clean slate. Hence, Microsoft will lose the \$200,000 it had prepaid to obtain a discount advantage, an advantage it no longer has.

The reduction in royalty fees removes what has been a significant deterrent for people wishing to use Unix, namely that it was very expensive. This should increase competition among Unix and its look-alikes. More important, it puts Unix in a much better position to compete with other single- and multi-user operating systems such as CP/M-86 and MP/M-86. Microsoft's president, Bill Gates, indicated that despite his unhappiness about the lost royalty payment, the royalty change would help his company sell copies of Xenix, its version of Unix.

Ada Update: Ada is finally becoming available as a working language. Telesoft Incorporated of San Diego, California, released its Ada package for 68000 systems last August, and RR Software of Madison, Wisconsin, in November released Janus, a

version for Z80 computers running CP/M. Both compile subsets of the Ada language. The Telesoft Ada compiler retails at \$2400, while Janus sells for \$250.

The DOD (Department of Defense) holds the trademark on the name "Ada" and stipulates that commercial companies can use the name only if they have or are developing a full-language compiler. To acquire legal access to the name "Ada," a company must submit its product to a DOD Ada-validation office for approval. Validation will ensure that programs written with the compiler will be fully portable between computers. Portability of that type doesn't exist for system-oriented languages such as Pascal, FORTH, and C.

Western Digital, based in Irvine, California, has also demonstrated its microAda and expects to be the first company to submit a complete Ada compiler to the DOD for validation. WD plans to submit it within the next 3 to 4 months. The WD Ada will run only on WD's new PAL 16-bit computer; a WD microAda license will cost \$2000.

SuperSoft Associates of Champaign, Illinois, has demonstrated its Ada compiler for Z80 systems, also expected to be ready for submission to the DOD for validation sometime this year. SuperSoft intends to release Intel 8086/8088, Motorola 68000, and Zilog Z8000 versions, with the Z80 version to sell for under \$300.

Telesoft is developing versions of its Ada compiler to run on the 8086, DEC VAX, and IBM 370 machines. Intel has developed an Ada compiler for its iAPX432 32-bit microcomputer currently running at beta test sites. Intel is preparing to submit the compiler for DOD validation.

And Ethernet's Fate?

A report issued by Strategic Incorporated, a market-research firm in San Jose, California, predicts Xerox Corporation's Ethernet local-area network will be a total failure within two years. According to Strategic's president, Michael Killen, "Xerox is headed for the worst failure in the company's history." He believes that Xerox lacks technological and price advantages, sales force, and customers interested in buying large systems. Further, he contends that Ethernet's baseband approach to local networking will prove inferior over the long haul to the broadband approach taken by Xerox's competitors. He points out that broadband systems are better suited to carry video, heavy voice and data transmissions, among other applications.

In response to the report, Xerox issued the following statement: "Based on the level of customer satisfaction with our existing network installations, the backlog of orders for network products and service, and the interest in Ethernet on the part of major accounts, we are confident that Xerox will be a leading vendor in office automation."

Bell Set to Move Into Computer-Related Markets:

AT&T (American Telephone and Telegraph) is undergoing a major management reorganization to comply with the FCC-required separation of regulated and deregulated activities. As a result, look for the Bell System to become an unbridled competitor in computer-related markets. It will probably begin marketing terminals and business computers soon, competing directly

with companies such as IBM, Wang, Xerox, and DEC in the intelligent-terminal and workstation markets and with Tymnet and Telenet in the communications-processing field. It is unlikely that Bell will compete directly with IBM in the mainframe business.

The Bell System itself presents a large, captive market for computer products. Actually, the Bell System is IBM's biggest customer outside of the U.S. government. Bell is expected to sell business and personal computers through its many Phone Center stores.

AT&T has also agreed to provide CBS (Columbia Broadcasting System) with home-computer terminals, data-entry equipment, and transmission facilities for a joint teletext experiment scheduled to begin this fall in New Jersey.

A National Amateur Computer Society:

The Japan Microcomputer Club is well organized, registers close to 4000 members, and has chapters in every major city in Japan. Hobbyists in England also work together through one central organization, providing an excellent base for the computer industry.

Computer hobbyists have long been the backbone of technological growth, but in the U.S., the hobbyist community is fragmented into several hundred independent clubs. A handful of clubs have over 1000 members, but most include fewer than 100. While some attempts have been made to found a national organization, none has succeeded.

Personal computing as a hobby is a breeding ground for computer professionals of tomorrow. Therefore, it's vital that we organize a national

amateur computer society while we are still the world's technological leader in computing.

CP/M Goes Into Firmware:

Digital Research has signed an agreement with Intel which will allow the latter to sell ROMs encoded with the CP/M-86 operating system. The ROM will also contain timers and some logic; it should be available by mid-year. The ROM is intended for use in a CP/net system where systems containing CP/M in firmware don't have any disk but must communicate with a CP/M or MP/M server.

Intel will also sell CP/M-86 and MP/M-86 on disk for its single-board and 86/330 system. Intel has contracted with Microsoft for its MS-DOS (used on the IBM personal computer). Intel will sell its own RMX-86 DOS and plans to acquire Unix from Western Electric. Hence, Intel users and systems houses will be able to select among a wide variety of operating systems. Intel also expects to market applications software.

Digital Research Buys MT Microsystems:

Digital Research has acquired its second software company in less than three months by purchasing MT MicroSystems Incorporated of San Diego, California, supplier of Pascal/MT. Previously, Digital Research had purchased Compiler Systems Incorporated, supplier of CBasic.

Exxon Buys Out Zilog:

Over the years, Exxon Corporation has moved from a minor investor in Zilog Incorporated, supplier of the Z80, to a major investor, owning

90 percent of the stock. Zilog has bought the remaining 10 percent and will become a wholly owned Exxon subsidiary. One result is that Exxon will no longer be required to break out Zilog's quarterly earnings for shareholders. Zilog, incidentally, has yet to report a profit. In fact, the Exxon Enterprises operation, which includes all of Exxon's electronics subsidiaries, incurred a loss of \$51 million in the first nine months of 1981.

Microprocessor Trends:

Did you know that there are currently 51 different general-purpose microprocessors in production, that 17 are 4-bit devices, 14 are 8-bit devices, 6 are 16-bit devices, 4 are 32-bit devices with 16-bit I/O, 4 are bipolar, and 5 are microframe or special (e.g., Intel iAPX432)? Futher, did you know that seven more have been announced but are not yet in production, and that 42 companies currently manufacture microprocessors?

The microprocessor recently celebrated its tenth birthday. Credit for creating the microprocessor goes to Intel. (See this month's Editorial on page 6.) Ten years ago, the

companies that designed micros were mostly small, freewheeling organizations employing a great deal of ingenuity. Today, it is a totally different ballgame. Most of those early pioneers were either swallowed up by large companies (e.g., Zilog and MOS Technology) or are now very large companies (e.g., Intel, AMD, and National Semiconductor). Furthermore, leadership in design and production appears to be passing to the Japanese.

The microprocessor scene has changed a lot over these ten years. The question now is: what are the current trends and directions of the new micros? First of all, suppliers are making micros easier to program. National and Zilog already have micros with software-in-silicon. They each provide single-chip computers that execute BASIC statements directly in an interpretive mode. Futhermore, Intel is developing one micro with the capability to execute MP/M and another with a sophisticated on-board operating system. Also, there are rumors of a one-chip FORTH computer. There's no doubt that both National and Zilog have been successful with BASIC-processing ICs.

Second, microcomputer ICs are getting more sophisticated, having floating-point capability, multiply/divide functions, enhanced interrupt handling, and the like.

The most glamorous changes will occur in the 16/32 bit micros. All of these devices are getting coprocessors to extend their capabilities into the minicomputer field. Incidentally, Zilog has disclosed that it's working on a 32-bit micro. If the 8-bit unit is a Z80, the 8/16-bit device is a Z800, and the 16-bit micro is the Z8000, what will its 32-bitter be called? You guessed it! The Z80000! Maybe Zilog would be better off calling it the Z8x10⁴.

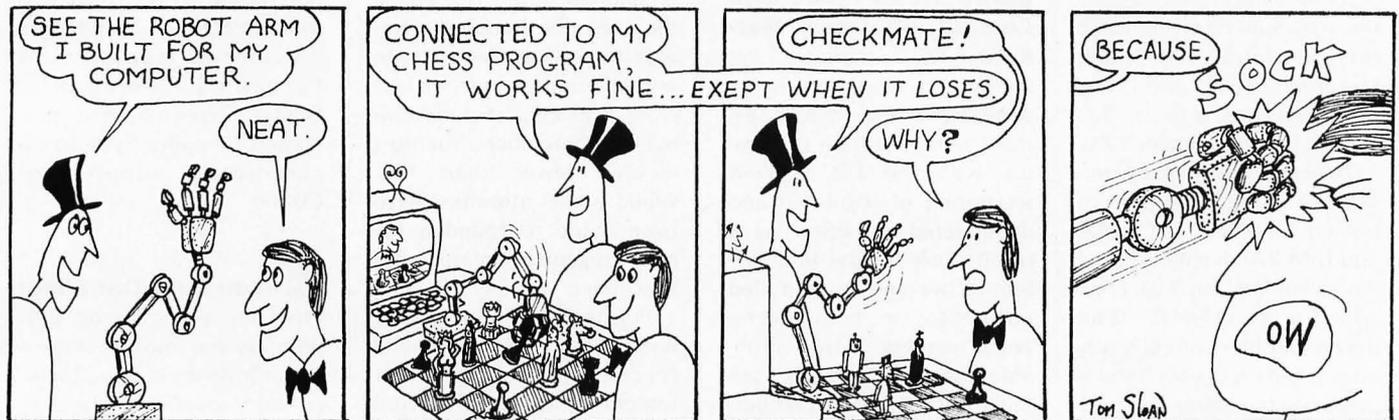
Memory Trends... or, What Is Turbo and Parity?

I occasionally look back with fondness to my first micro. It had 256 bytes of memory and used an Intel 8008. That was only 8 years ago. The next year, I graduated to an Altair 8800 that had an 8080, six printed-circuit cards containing 4K bytes of RAM, an I/O channel, and a huge power supply. How times have changed!

The most significant change

has been in memory. Today the 16K-bit, single-voltage RAMs dominate the marketplace, providing cost savings (mostly by shrinking power-supply requirements), yielding faster operation, and making the 64K-byte computer memory nearly standard. The 64K-bit RAM ICs are just starting to appear, and we find that computer memory sizes of 128K bytes and 256K bytes are becoming more common and will probably become the standard microcomputer memory size by the end of 1983. The 256K-byte RAM chips are now going into production. I expect that by 1985 1 megabyte will probably be the typical microcomputer memory size. Also, as the volumetric memory space decreases, the associated access time decreases, resulting in increased system performance.

Some of the most interesting changes in memory design are improving memory reliability and speed. Memory manufacturers are beginning to introduce multifunction memory systems that perform parity or error-checking and correction functions previously handled by a computer's processor, if they were done at all. In fact, National



Semiconductor has introduced an IC (the DP8400) that performs all the memory error checking and correcting so that the processor is not bothered with this task. Error checking and correction is particularly important with dynamic RAM since these devices are prone to soft (transient) errors due to noise and radio-frequency interference, alpha particles, cosmic rays, and voltage fluctuations.

Manufacturers are also introducing on-board batteries to protect RAM during power failure. With the use of CMOS RAM, an on-board battery can protect data for over a hundred hours, and lithium-iodine batteries have been shown to be able to provide as much as one year of data retention.

The demand for faster computer access to disk drives has generated new cache techniques to reduce seek time and rotational latency delays that account for about 60 percent of throughput bottlenecks. This technique is called the "turbo disk file cache" or "turbo" for short. The turbo eliminates disk seeks to frequently used data by transferring such data to a cache memory (typically 128K bytes) and accessing the data from the cache instead of the disk. The data in the cache is kept current using an algorithm such that the block of data that has gone unaccessed the longest is replaced by the next nearest-in-use block of data. The turbo algorithm considers past use and the probability for future use. Software 2000

Incorporated of Arroyo Grande, California, for example, sells TurboDOS, which it claims runs CP/M software three to five times faster. The company has adapted its software to run on most of the popular S-100 systems, the Xerox 820, TRS-80 Model II, and others.

Quote of the Month: "By the end of the century, analysts predict, computers and information processing will be the world's biggest business after petroleum." *Wall Street Journal*, November 10, 1981.

APOLOGY DUE: I regret that in my November 1981 column I erroneously re-

ported that Canon was marketing the CX-1 computer via distributors responsible for software support. Canon has informed me that it markets the CX-1 directly to dealers and provides software support.

MAIL: I receive a large number of letters each month as a result of this column. If you write to me and wish a response, please include a self-addressed, stamped envelope.

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Mountainside, NJ 07092



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2.2UF 20V 5/11.00	30UF 6V 5/11.00	741C - 35	LM338 - 50	749 - 35	20.000	6.000	6.144	18.000
3.3UF 20V 4/11.00	47UF 20V \$ 85	741 - 50	LM358 - 50	711CH - 40				
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6.8UF 35V 3/11.00	200UF 20V \$ 1.75	8036 - 85	LM332 - 80	CA3018 - 1.95				
14 PIN HEADERS 3/11.00	300 - 45	LM383 - 2.50	CA3078 - 1.50	CA3080 - .95				
16 PIN HEADERS 40	LM336 - 80	LM387 - 1.25	CA3086 - .95	CA3094 - 2.25				
24 PIN HEADERS 75	LM338 - 75	LM553 - 2.25	CA3140 - 1.20	LM2501 - .35				
40 PIN HEADERS 1.40	LM339 - 65	LM555 - .45	LM2501 - .35	LM2501 - .35				
26 PIN EDGEBOARD CONN. 3.95	LF351 - 75	564B - 3.95	LM556A - 1.50	TL062 CP - .95				
26 PIN EDGEBOARD CONN. 2.50	LF353 - 1.25	567 - .85	TL064 CN - 1.50					
20 PIN RIGHT ANGLE CONN. 3.95	LF356 - 1.25							
20 PIN RIGHT ANGLE CONN. 2.25								
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DB 25P male \$2.75	FD1771 19.95	8130 2.50	8834 2.00	81380 2.00	2.000	3.000	5.000	8.000
DB 25S female 3.75	1488 90	8830 2.50	8837 2.00	MM5321 9.50	18.432	3.579	6.000	10.000
HOODS 1.50	1489 1.10	8833 2.50	8838 2.00	MM5369 2.50	20.000	6.000	6.144	18.000
UART's		CPU'S & SUPPORT CHIPS		74LS SERIES				
AY5-1013 - 3.75	8080A - 7.50	8226 - 2.75	8085A - 7.50	8228 - 4.50	74LS00 - 17	74LS93 30	74LS156 - 80	74LS196 - 85
TR1602B - 3.35	8202 - 35.00	8255 - 6.95	AMD 2901 - 8.95	8228 - 4.50	74LS01 - 18	74LS96 55	74LS196 - 80	74LS196 - 85
PT1482B - 3.25	8212 - 2.25	8259 - 6.95	8212 - 2.25	8259 - 6.95	74LS02 - 22	74LS109 38	74LS197 - 85	74LS197 - 85
M8888A - 8.95	8214 - 3.60	9257 (AM9517) - 7.95	8214 - 3.60	9257 (AM9517) - 7.95	74LS03 - 22	74LS109 38	74LS201 - 80	74LS201 - 80
COM2017 - 3.75	8216 - 2.90	Z80A CPU - 12.95	8216 - 2.90	Z80A CPU - 12.95	74LS04 - 22	74LS112 38	74LS202 - 80	74LS202 - 80
C/MOS		8224 - 3.25	Z80A S10 - 12.95	8224 - 3.25	74LS04 - 22	74LS112 38	74LS203 - 80	74LS203 - 80
4001 - 20	4077 - 35	MM5307 - 9.95	8275 - 16.95	8275 - 16.95	74LS05 - 22	74LS113 45	74LS241 - 89	74LS241 - 89
4002 - 20	4081 - 20	8284 (200 NS) - 14.00	2708 - 3.25	2708 - 3.25	74LS06 - 20	74LS113 45	74LS242 - 89	74LS242 - 89
4006 - 65	4081 - 20	2114L-3 - 1.85	2716 + 5V - 6.25	2716 + 5V - 6.25	74LS08 - 20	74LS113 45	74LS243 - 89	74LS243 - 89
4007 - 27	4093 - 60	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS10 - 22	74LS124 59	74LS244 - 110	74LS244 - 110
4008 - 65	4093 - 60	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS10 - 22	74LS124 59	74LS245 - 150	74LS245 - 150
4009 - 45	4501 - 95	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS12 - 22	74LS126 59	74LS247 - 75	74LS247 - 75
4010 - 20	4510 - 65	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS13 - 22	74LS126 59	74LS248 - 110	74LS248 - 110
4011 - 20	4511 - 65	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS14 - 40	74LS136 45	74LS249 - 110	74LS249 - 110
4012 - 20	4514 - 1.40	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS15 - 35	74LS138 48	74LS253 - 55	74LS253 - 55
4013 - 30	4515 - 1.50	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS16 - 35	74LS138 48	74LS254 - 55	74LS254 - 55
4014 - 55	4516 - 75	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS17 - 22	74LS138 48	74LS255 - 55	74LS255 - 55
4015 - 55	4518 - 1.25	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS18 - 18	74LS138 48	74LS256 - 55	74LS256 - 55
4016 - 30	4520 - 70	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS19 - 22	74LS138 48	74LS257 - 115	74LS257 - 115
4017 - 60	4550 - 2.75	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS20 - 28	74LS138 48	74LS258 - 110	74LS258 - 110
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4022 - 80	74C12 - 27	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS25 - 28	74LS138 48	74LS263 - 55	74LS263 - 55
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4043 - 65	74C157 - 1.75	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS48 - 40	74LS138 48	74LS274 - 115	74LS274 - 115
4044 - 50	74C159 - 1.75	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS49 - 40	74LS138 48	74LS275 - 115	74LS275 - 115
4046 - 90	74C161 - 1.15	4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS50 - 40	74LS138 48	74LS276 - 115	74LS276 - 115
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		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS62 - 58	74LS138 48	74LS288 - 110	74LS288 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS63 - 58	74LS138 48	74LS289 - 110	74LS289 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS64 - 58	74LS138 48	74LS290 - 110	74LS290 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS65 - 58	74LS138 48	74LS291 - 110	74LS291 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS66 - 58	74LS138 48	74LS292 - 110	74LS292 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS67 - 58	74LS138 48	74LS293 - 110	74LS293 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS68 - 58	74LS138 48	74LS294 - 110	74LS294 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS69 - 58	74LS138 48	74LS295 - 110	74LS295 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS70 - 58	74LS138 48	74LS296 - 110	74LS296 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS71 - 58	74LS138 48	74LS297 - 110	74LS297 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS72 - 58	74LS138 48	74LS298 - 110	74LS298 - 110
		4116-2 - 1.45	2732 - 16.95	2732 - 16.95	74LS73 - 58	74LS138 48	74LS299 - 110	74LS299 - 110
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