Y2K: OVERVIEW AND SUMMER 1998 STATUS REPORT
THE YEAR 2000-DATE CRISIS

Friday evening, December 31, 1999, will be the night to be dreaded. Many businessmen will go to bed with a heavy heart, some with thoughts of financial terror.

At 12 midnight on January 1, 2000, large numbers of the world's main frame computers will either begin feeding out gibberish or will shut down entirely.

You and I have heard about this "Y2K" problem for several years now. I have recently checked into it—and it really does exist. Perhaps some of the problems will be fixed in time, but it is now certain that a sizeable number will not.

Here is how one individual describes the situation:

"**We've got a problem. It may be the biggest problem that the modern world has ever faced.** I think it is . . Tens of millions—possibly hundreds of millions—of pre-programmed computer chips will begin to shut down the systems they automatically control. This will create a nightmare for every area of life, every region of the industrialized world.

"**It's called the year 2000 problem. It's also called the millennium bug, Y2K, and millennium time bomb.**"—*Gary North, "The Year 2000 Problem: The Year the Earth Stands Still," in "Y2K" Links and Forums.*

"Y2K" is short for "Year 2000." The Y2K problem seems too fantastic to seem true, so this report will primarily consist of quotations from authorities who are experts in their fields.

As this is written, there is in hand **a 17-page report by one of the leading financial houses in**

> This situation is serious enough that, as your pastor, I am giving you a detailed report. It is the duty of the minister to protect the welfare of his flock, and I take my work seriously.
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> At the present time, we cannot know how serious the crisis will be at the change of the century. Aside from U.S. and foreign government operations, and overseas businesses, everything may turn out better than initially feared. But of this we can have no certainty until the century ends.

New York City: *J.P. Morgan Securities, Inc.* It is devastating. Listen to this; it was written in the summer 1997:

"**We believe the Year 2000 problem will be the single most significant event in the information technology services industry over the next few years and will likely have a lasting effect on the industry into the next millennium** . .

"Awareness has grown significantly, but action [to solve the problem] has been slow. Refusing to believe that cost estimates for complying with Year 2000 requirements can really be so huge, **many corporate executives seem to be in a state of denial.** But guess what? **The true costs will almost certainly be even higher than current estimates, and that's not even the worst news!**

"**It is becoming clear that the cost of satisfying Year 2000 requirements will be significantly larger than anyone thought, with some companies spending hundreds of millions of dollars.** These expenses will be a major influence on shaping corporate budgets (and not just technology budgets) for the next several years.

"Cost is not the largest problem, however—**time and people are the scarcest resources.** Compliance will represent a reasonably close call for everyone, but corporate and governmental entities not yet currently mobilized and actively working on the problem are already in deep trouble.

"We expect triage will be the key during most of 1997, as corporate executives organize resources to address their top-priority problems and seek expedient methods of addressing less critical ones. Options include replacing, repairing, or retiring (including outsourcing) systems and businesses that are noncompliant.

"**Governments worldwide and international corporations appear to be even further behind than U.S. companies.** Despite an aggressive schedule laid out by the Office of Management and Budget, **the U.S. Federal Government has made little progress in actually addressing the problem.**

"Meanwhile, **the European Community** is proceeding on its merry way in moving to a single currency (the *euro*), **seemingly unaware** of the additional formidable systems challenges."—*William D. Rabin and Terrence P. Tierney, J.P. Morgan Securities, Inc. Equity Research Department, "Industry Analysis: The*

Year 2000 Problem," May 15, 1997, New York.

Yes, the Y2K crisis is real and, as this is written, it is less than a year and a half away. Consider this: Chase Manhattan Bank said in a routine filing that **it planned to spend $250 million on the problem over the next three years, to fix its 200 million lines of code (200 million for that one company alone!).** That business organization is not alone: AMR (parent of American Airlines), Hughes electronics, and a number of other leading firms have announced they plan to each spend over $100 million to fix the problem in their companies. **But the experts consistently predict that these estimates are far less than what the actual costs will be.**

Visa and Mastercard have asked member banks to hold off issuing cards that expire in 2000 or beyond because some of the transaction processing systems cannot handle them. **Both groups have threatened to fine banks that are not Year 2000 compliant. The situation is expected to get worse.**

Coopers and Lybrand estimates that **an average-sized company with 8,000 uncorrected programs—or 12 million lines of code—would have to change the data reference in one out of every 50 lines. To greatly add to the problem, they declare that virtually every line of code will have to be tested.**

Dr. Edward Yardeni, a financial consultant to the top firms in America, has prepared a 21-page report which we have. He is chief economist at Deutsche Morgan Grenfell. His report was written this month (June 10, 1998). Here is the opening paragraph:

"**The Year 2000 Problem (Y2K) is a very serious threat to the U.S. economy. Indeed, it is bound to disrupt the entire global economy. If the disruptions are significant and widespread, then a global recession is possible. Currently, I believe there is a 60% chance of such a worldwide recession**, which could last at least 12 months starting in January 2000 and could be at least as severe as the 1973-1974 global recession. That downturn was caused by the OPEC oil crisis, which is a useful analogy for thinking about the potential economic consequences of Y2K. Just as oil is a vital resource for our global economy, so is information. If the supply information is disrupted, many economic activities will be impaired, if not entirely halted."—*Dr. Edward Yardeni, Year 2000 Recession? Monograph.*

Yardeni then goes on to explain in some detail how he gradually moved his 1997 estimate of a 30% likelihood of recession—up to 60% in mid-1998, after studying various business and government reports. He concludes his careful assessment with these words:

"OMB [the U.S. Office of Management and Budget] released its fourth progress report on March 10, 1998, for the three-month period ended February 15, 1998. **After studying it very carefully, I concluded that there is an increasing chance that vital government services will be delayed, disrupted, impaired, and curtailed in 2000. This precarious situation implies that foreign governments, as well as many business organizations around the world may fail to meet the deadline too.**

"Therefore, I raised the odds of a severe global recession to 60% on March 16, 1998 . .

"The recession could begin before January 1, 2000, perhaps during the second half of 1999, if the public becomes alarmed and takes precautions. If stock prices fall sharply in 1999, in anticipation of a recession in 2000, the resulting loss in confidence could

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PREPARING—OR NOT PREPARING—FOR THE CRISIS

While our trust is in God, fear is in the hearts of some. There are very intelligent, knowledgeable people who are panicked over the computer crisis.

"Just south of Silicon Valley, where he toiled for many years as a computer engineer, Tim May is spending his retirement in the picturesque hills of Corralitos, California. But he's not there simply for the view. May believes his spot in this rich agricultural and fishing area might spare him the hardships of a famine ushered in with the new millennium, and he's ordering gold coins and laying in food in bulk just to be sure. He's also buying weapons, adding regularly to his growing gun collection. In the coming months, says May, more and more Americans are going to realize that 'we aren't going to make the deadline.'

"The deadline? Some sort of cultish prophecy, perhaps? Nope. **He's talking about the famous Year 2000 computer bug, or Y2K, as the acronym-happy computer industry has dubbed it. On Jan. 1, 2000, May and many other software experts believe, millions of computer systems could go haywire, shutting down life as we know it and turning our information age into a digitally dysfunctional society.** Electric and phone service could be lost. Banks and supermarkets shuttered. Life savings could vanish and lives be imperiled.

"Really? No, not really. Well, not likely anyway. But that hasn't slowed the mounting angst over the Year 2000 glitch, particularly on the internet, where the mix of technical savvy and suspicion is proving to be the perfect outlet for dire predictions. **'I've never seen such hysterical projections, and I lived through the paranoia of the 1960s,'** says Nicholas Zvegintozov, president of Software Management Network, a Los Altos, California, company specializing in software maintenance."—*Time, June 15, 1998.*

cause consumers to retrench in 1999 [stop making unnecessary purchases, as well as sell their stock] and trigger a recession sooner as well. **It could start in 1999 if bankers cause a credit crunch by refusing to lend to companies that are most at risk of failing in 2000.** If these companies are not bailed out by their key vendors or customers, they might start failing next year."—*Ibid.*

As source for the concluding two sentences in the above paragraph, Yardeni cites an article in a leading banking journal *(Jay Golter and Paloma Hawry, "What Every Loan Officer Needs to Know about the Year 2000 Computer, But Doesn't Know How to Ask," in FDIC Banking Review, March 1998).*

If such experts as these believe that an economic crisis is looming, who are we to question it? Read this:

"Edward Goldberg, executive vice president of operations, services and technology for Merrill Lynch, warned in mid-April 1998, that his company "just won't do business" with any other broker or vendor that doesn't pass industrywide Y2K testing that began during the summer of 1998. His comment, reported by Reuters (April 15, 1998), suggests that **Y2K-compliant companies may start to join together in Y2K fortresses and shut out businesses that are not expected to be ready for the century date change. Such a fortressing trend could very well cause a recession in 1999 if the Y2K barbarians are left to die outside the fortress wall.**"—*Ibid.*

On June 19, 1998, Dick Millers, an economist, wrote this:

"I base this curve on deJager's prediction that **companies must start Y2K remediation by 1997-11-07**

WHEN COMPUTERS GIVE WRONG SIGNALS

It can be dangerous when computer chips fail at the turn of the millennium. It could start a war.

In 1980, **a computer-chip failure** at Norad—the U.S. command post in Colorado for assessing nuclear attacks—generated a false alarm of an all-out Soviet missile attack.

As recently as 1995, an American research rocket sent up off the coast of Norway to study the aurora borealis **triggered Russian computer chips**—and so alarmed the Russians that, for the first time in their history, they activated the nuclear suitcase that accompanies the president. See Brian Hall, *"Overkill Is Not Dead," The New York Times, March 15, 1998.* The article suggests that, despite the end of the Cold War, the United States and Russia still have missiles aimed at each other, and can instantly retarget those that do not have a current forwarding address.

[November 7, 1997] at the latest to have any hope of fixing their critical systems. If they started a year earlier than that, they could fix both the critical and noncritical ones. I presume that even noncritical systems are there for business reasons and that, if they are not fixed, it will have a negative effect on earnings. **Since January 1997 is the last possible moment to start and fix everything, there is trouble ahead** . .

"The costs of fixing and testing old software may well exceed the costs of replacements, **if only time was available**. Further, if the Y2K effort [by an organization] is doomed to fail anyhow, then last minute spending just helps deceive investors and creditors into false optimism longer, and may push the time of liquidation sales into a buyer's market period."—*Dick Mills, "Schedule of Y2K Remediation: a Statistical Approach."*

Gary North says it this way:

"**Everything is tied together by computers. If the computers go down or can no longer be trusted, everything falls apart.** And it matters not a whit to the computers whether we accept this fact or not. They do what they've been programmed to do. **They've been programmed to recognize 2000 as 1900. (Uncorrected PC architecture DOS and Windows-based desktop computers will revert back either to 1980 or 1984.** They can be corrected briefly; but, as soon as a PC is turned off, the correction dies. It will reboot to 1980 or 1984.)"—*Gary North, "The Year 2000 Problem."*

The current Microsoft Windows operating systems will function correctly when the century changes. However, **many, programs written for Windows are Y2K defective. Your accounting package may be no good in a year and a half.**

Can the Y2K problem really be so bad? Here is a simplified explanation, by **Jay Golter and Paloma Hawry. Golter is a financial analyst in the Federal Deposit Insurance Corporation's Division of Research and Statistics. Hawry is a manager at the Actoras Consulting Group in Schaumburg, IL.** The article in *FDIC Banking Review,* quoted earlier, was later expanded into a 27-page analysis, a copy of which I have. Consider this:

"Early computer programmers worked around a variety of constraints imposed by the emerging technology. Two of the biggest constraints were the usable memory of the machines and the costs of storing data.

"One technique used to circumvent these limitations was to represent dates with an implied century. For example, a date field holding the value "01/01/56" meant "January 1, 1956" not "1856" or "2056." Use of this convention reduced the amount of storage required and improved processing speeds. For the few applications in which valid dates could span a century (for example, birth dates for the general population in which some people are 1 year old and others may be 101 years old), the specific date fields would be expanded accordingly . . **The technique of represent-**

ing years with two digits was also used when the microchips that are embedded in many kinds of machinery and equipment were hard-coded. Other programming shortcuts, as well, were applied to dates in ways that can create problems by the end of the century."—*Jay Golter and Paloma Hawry, "Circles of Risk."*

Here is the picture, from another standpoint:

"The bug at the center of the Year 2000 mess is fairly simple. **In what's proving to be a ludicrously short-sighted shortcut, many system programmers set aside only two digits to denote the year in dates**, as in 06/15/98 rather than 06/15/1998. Trouble is, when the computer's clock strikes 2000, the math can get screwy. Date-based equations like 98 - [minus] 97 = 1 become 00 - 97 = -97. That can prompt some computers to do the wrong thing and stop others from doing anything at all."—*Time, June 15, 1998.*

These dates were used for the beginning, intermediary and terminal dates, as well as time span periods—for government, businesses, and all kinds of equipment. Here is but one example of what can happen:

"**A system that orders replacements for a particular part every five years might record that a part was last installed on June 1, 1992.** On June 1, 1997, the system would calculate that "97/06/01" - "92/06/01" represented five years and that the part needed replacing. In the year 2000 however, the system might conclude that the part was -97 years old ("00/01/01" - "97/06/01" equals -97 years). **How the computer would then proceed would depend on how the programming instructions had been written.** Some systems might recognize the calculated age as invalid, and generate a report listing such occurrences for further investigation. Other systems might leave the replacement parts unordered, since they would never have reached a calculated age of five years. In the second case, the part would eventually wear out and fail. **Depending on the function of the part and the machinery it belonged to, this failure could result in the production of defective merchandise, significant downtime while the defective part was identified and a replacement was ordered and installed, or, in the worst case, serious injury or loss of life** if the part was essential to the safe operation of the equipment."—*Golter and Hawry, Circles of Risk.*

We might wonder how foolish those people were back there, that they did this. Did they not realize a terrible crisis would occur at the end of the century as a result of their dating abbreviation? All they left out was "19"; yet, what a terrible problem the civilized world now faces because of it. **Golter and**

Hawry tell us that, 20 and 30 years ago, the programmers and their managers knew that changes would have to be made—but they assumed later programmers would do so. Instead, everyone remained in the "omit 19" rut—into the 1990s!

"To the extent that the eventual consequences of using date shortcuts were contemplated during the 1960s and the 1970s, it was believed that the underlying programs would be replaced well before the century changed and that if they were not, there would be plenty of time to correct the problem. Unfortunately, this attitude endured long enough so that **some software written even as late as the 1990s contains the same date problems, and some equipment being sold today will malfunction in the next couple of years.** But with the century now drawing to a close, the time left in which to correct this problem is rapidly shrinking."—*Ibid.*

Well, what is involved in solving the problem; that is, getting the computer programs operating correctly? One alternative is slow, painstaking work modifying every program; the other is to discard the faulty programs and start over again. **But throwing out the bad programs would mean disaster on an even greater scale. So much information, of every possible kind, is already stored—and keyed to the older, faulty programs.**

So what does the slow, painstaking correctional route involve? Hard work, over a number of years, by a small army of expensive programmers. **The problem here is that many firms did not start soon enough to clean up their programs; every line has to be checked and tested. The testing part alone is time consuming; and, last but not least, there are not enough programmers available to do the job!**

"In most cases, modifying any part of a program that has date problems is not especially difficult. **What is difficult and what makes Year 2000 remediation programs especially challenging and time-consuming is the need to (1) find all of the places where date problems might lead a program to miscalculate or terminate; (2) coordinate the repair of each part of the overall system so that no one repair interferes with the operations of the other parts of the system; (3) test the repair by using data that accurately mimics the other parts of the system**, and (4) complete the project without granting any time extensions."—*Ibid.*

The cost of doing this will be fabulous!

"Scanning for date logic, modifying code, and, especially, testing the revisions as units and as parts of an integrated system, as needed to bring a large scale system into date compliance is time-consuming and

therefore expensive. **The estimate used by many firms to budget for the conversion project has been $1.00 per line of code. But, as the shortage of programmers qualified to work on the problem intensifies, remediation costs will rise.**"—*Ibid.*

Multiply one dollar per line of code by all the lines of code which need to be corrected. It is estimated that there are not millions, but billions of lines of code which need checking, correction, and testing!

But, even if all that were done—because there was enough time, money, and programmers to do it,— Golter and Paloma Hawry declare that problems would still result. As but one example, they cite the fact that **much of the modern equipment in the home, office, factory, or on the train, airplane, etc., contains "imbedded" computer chips. The equipment will not operate properly without them, yet it may be too difficult to replace the chips in all that equipment!** In many cases, the chips are imbedded too solidly to be changed.

But, not only must there be enough time, money, and programmers to do the job,—there must also be the incentive. **Oddly enough, many firms have been remarkably slow to start doing anything about the problem. The top-level managers, who have to make such expensive decisions, know they will retire soon—and they want to keep their stockholders happy with the profits coming in** while they are in charge. (They are rewarded handsomely with big salaries for doing so.)

"Our first response when we hear this news is denial. Most people stay in denial, including the business managers whose companies are totally vulnerable to computer failure. This is why the problem will not be fixed. Everyone in authority will deny that time has run out to get this fixed, right up until December 31, 1999. They are paid to deny this."—*Gary North, "The Year 2000 Problem."*

North is somewhat extravagant in his gloom and doom pronouncements, yet there is truth in his analysis. **Because of this "peace in our time" attitude, many firms started trying to solve the problem just a little too late. As a result, to one extent or another, they may be caught in the January 2000** business crisis.

"There are grim reports that corporate America isn't taking the Y2K task seriously enough, a danger that will be highlighted this week at Senate subcommittee hearings. **The Senators will be told that an examination of recent Securities and Exchange Commission filings found that 60% of the U.S.'s biggest companies had not completed the first step of assessing whether their systems are ready for the new century—much less begun fixing the problems.** "That's a disturbing percentage at this late date," says Steven Hock, president of Triaxsys Research, which studied the SEC filings."—*Time, June 15, 1998.*

The 27-page *"Circles of Risk,"* by Golter and Hawry, is one of the most exhaustive analyses of the problem and how it will affect the nation and the world. **Let us briefly summarize these six ever-widening circles:**

The first circle consists of core information systems. This would be the software which runs the computers. Functions likely to be automated (and thus subject to Y2K problems) would include payroll and benefit administration, inventory management, accounting, accounts payable and receivable processing, scheduling of staff, production, deliveries, or repair.

To date, most of the Y2K correctional work has been in this field. As mentioned earlier, each line of code must be checked, modified when necessary, tested, and replaced as needed. Every important component of the systems must be checked.

But the firm may also be relying on the giant computers, called "mainframes" (which they either own or lease space on).

"In some cases, the hardware on which important applications run will itself be unable to process data after the 20th century. For example, IBM has announced that it will not provide upgrades to system 360 mainframes (1970 technology). Some of these platforms may still be in operation at firms that were unsuccessful in converting to newer equipment. **Replacing a mainframe platform is rarely an easy proposition because some of the software running on the old system may be incompatible with the new system**, requiring that new application software be purchased or created. "—*Golter and Hawry, "Circles of Risk."*

There are very serious problems involved in upgrading older mainframes, because updating the computer language in them will involve very serious hurdles which are too technical to discuss here.

Many COTS (commercial off the shelf software), which is now for sale in computer stores, contains the same "omit 19" as did all the older programming! Beware! You may have a problem in your own computer! Year 2000 patches or upgrades for many COTS applications have not yet been released. The difficulty of testing and installing will increase with the number of modifications that the in-house staff has developed.

The second circle of risk involves networks, workstations, and PCs. This includes e-mail and functions which enable files to be electronically shared in-house.

The third circle consists of third-party data exchanges, in which businesses exchange a lot of information with other offices or firms elsewhere. Examples of this would include filing reports with the IRS, ordering or receiving credit reports, ACH transactions, and cash management reports.

A significant problem here involves programs in someone else's computer, which you "data exchange" to, which are not "compliant"; that is, have not been updated to function correctly after the year 2000 begins. Their lack of updating can cause you serious problems.

"Even if only a small percentage fail, the resulting disruptions are bound to cause some trouble, and worse if the minority of noncompliant Y2K systems have an adverse Domino Effect on compliant ones . .

"**In other words, the sum total of all interdependent computer systems must all be compliant.** *The network is the computer.* A problem is one system could trigger a Domino effect, which poses a great risk to all who fail to test whether their local compliant system is compatible with their global network. **The networks that must function perfectly—at the risk of partial or even total failure include: (1) electrical power systems, (2) telecommunications, (3) transportation, (4) manufacturing, (5) retail and wholesale distribution, (6) finance and banking, (7) government services and administration (including taxation), (8) military defense, and (9) international trade.**"—*Dr. Edward Yardini, "Year 2000 Recession?"*

The fourth circle of risk involves plant facili-

DATES TO WATCH OUT FOR

"January 1, 2000, is not the only date in the near future that may disrupt data-processing systems. Other dates that could cause disruptions are the following:

"**January 1, 1999: one-year look-ahead date into the next century**—Many computer programs process data by looking forward one year and counting dates back from that point. If such systems have two-digit date problems that are not corrected in time, they may begin to malfunction or fail at the start of 1999.

"**August 22, 1999, GPS Rollover**—The Global Positioning System is a constellation of 24 low-orbiting satellites that continually signal data that can be used to determine the exact location of any receiver on the surface of the earth. The data are also used by some systems to establish the exact time of day for transaction logging. The clocks on this system report as the number of weeks since the launch of the system in 1980. On August 22, 1999, this counter will overflow and return to 0000 (as would happen on the odometer of a car that traveled 1 million miles). At that point some systems, of equipment, that use the GPS signals may malfunction. Among the vulnerable devices are some cellular telephones, devices that track the location of freight shipments, and some navigational equipment. However, many manufacturers of such devices have built their products to handle the rollover period correctly.

"**September 9, 1999 (abbreviated as 9/9/99)**—A common programming device was to enter 9999 as a signal that a stack of data had reached its end. This signal may sometimes have programmed on date fields, with the result that the date 9/9/99 will have a special and unintended meaning in a program. Although the incidence of 1/1/2000 problems appears to be much greater than that of 9/9/99 problems, systems should be checked for each.

"**February 29, 2000, the Uncommon Leap Year**—The year 2000 is divisible by four and is a leap year. However, years divisible by 100 are not leap years (1900 was not) unless they are divisible by 400 (2400 will by another leap year). Some programmers did not know about the hundred-year rule when they wrote their original codes, and those programs will run fine in 2000. Some programmers knew about the hundred-year rule, but not about the four-hundred-year rule, and their programs are likely to fail.

"**December 31, 2000 (366th Day of Uncommon Leap Year)**—Some programs operate by counting the days in the year. If the writers of these programs were unaware of the uncommon-leap-year situation, their systems may not fail until December 31, 2000, the (unexpected) 366th day of the year."—*Golter and Hawry, "Circles of Risk."*

ties and equipment. **As mentioned earlier, this would include pieces of equipment**, including telephone switchboards, security systems, etc. Some manufacturing processes rely on **control systems that receive time-stamped data from sensors, which analyze elapsed time and send a message to do something at a certain time. This type of computer procedure is used in millions of units in the Western world. In much of it, the "19" is missing.**

"**To determine in advance which machinery will be impaired, an organization has to know how the machinery was designed**, and what the specifications of the embedded microprocessors are. **However, many organizations are having great difficulty uncovering this important information.**"—*Ibid.*

The potential problems here involve not only industry, transportation, communication, and government, but also various types of health care.

"The potential failure of embedded microprocessors could expose some organizations to even greater risks than those they face if data-processing systems malfunction. For example, **much of the equipment used in a hospital, including patient monitors, automatic drug-dosing devices, MRI and CAT scan equipment may rely on embedded technology. Failure of equipment could result in serious injury or death.** But hospitals are not the only firms that may face great risks from the failures of equipment. For example, in Bhopal, India, in December 1994, an estimated 6,000 people died when a valve in a Union Carbide Chemical factory malfunctioned. **Many plants that use or produce similarly dangerous chemicals rely on "smart technology" to monitor and control the process, and some of these may be vulnerable to Year 2000 malfunctions.**"—*Golter and Hawry, "Circles of Risk."*

There are billions of microchip systems embedded in all kinds of appliances, equipment, security systems, processing and manufacturing plants, medical devices, and numerous other vital applications. It will be interesting to see what happens in a year and a half.

The fifth circle of risk involves business part-ners. **Many business firms closely interact with others. In addition, many organizations are dependent on third parties which provide services**, such as maintenance, telecommunications, electricity, water, etc. A flaw in the computers of one would seriously injure the others. All the computers must work right at the change of the millennium or everyone involved will suffer. **"Just-in-time inventory" systems rely heavily on ordering and receiving a few parts to build or ship out a product. The Y2K problem will seriously affect such operations.**

The sixth circle of risk involves general economic repercussions to the nation and the world.
Capers Jones, in his study, *"The Global Economic Impact of the Year 2000 Software Problem,"* estimated that 1% of large firms will go bankrupt as a result of the crisis. Regarding mid-size firms, we are told:

"There are about 30,000 companies in the mid-size range [which have 1,000 to 10,000 employees] in the United States, and a 5% to 7% business failure rate would mean that **from 1,500 to about 2,100 companies might close or file for bankruptcy as a result of the year 2000 problem.** This is a significant problem and it is an open question as to whether the impact of the year 2000 problem is severe enough to trigger a recession."—*Ibid.*

In addition, **we should not forget government services, such as traffic lights, subway systems, etc.** But we will save comment on local, state, and federal government preparedness till later in this report.

Yardeni advises that **those firms in recent years which have merged to form still larger corporations could be especially hard-hit by Y2K.** There are so many problems attendant in merging large companies, that the new entity is far less likely to have made the changes needed for December 31, 1999.

Let us now overview which organizations, as of mid-1998, are getting ready and which ones are in deep trouble:

BOTH TRIVIAL AND OVERWHELMING

"The Year 2000 Problem is both trivial and overwhelming at the same time. Unless fixed soon, almost all older main frame computer software systems, many PCs and software programs, and millions (perhaps billions) of embedded semiconductor chips potentially could crash on January 1, 2000, simply because the new year will appear as '00' in the standard two-digit year field and will be read erroneously as 1900 . .

"The problem is time. All the money in the world will not stop January 1, 2000, from arriving at the rate of 3,600 seconds per hour. There is not enough time to fix and test all the systems, with billions of lines of software code around the world, that need to be fixed. Many businesses, governments, and organizations have become aware of the Year 2000 Problem only recently and may simply run out of time."—*Dr. Edward Yardini, "Year 2000 Recession?"*

MAJOR TYPES OF U.S. BUSINESSES

"*Power companies:* Many of the most dire Y2K scenarios are predicated on the assumption that the glitch will KO the country's electric utilities, turning out not only your lights but everything from the pumps at the gas station to the Slurpee machine at the 7-eleven. It's a plausible theory. The conventional and nuclear power plants that produce our electricity are all controlled to some degree—usually a large degree—by computers, and some of the suspect programs are etched directly onto silicon chips, making them even harder to find and fix. **Some utilities have only recently begun the process of ferreting out potentially weak links in their delivery systems. Worse, since most utilities are linked to one another in gridlike fashion, there could be a domino effect, turning local failures into regional blackouts.** But there are reasons to believe that blackouts may be averted or, at worse, short-lived. **Most of the larger utility companies have shifted their Y2K efforts into high gear and are speeding their repairs by sharing their findings through an online clearinghouse** set up by the Electric Power Research Institute. The utilities are also under regulatory pressure. The Department of Energy has set a July 1 deadline for power companies to provide assurances that Year 2000 problems will be remedied in time.

"The real assurance, however, may be that many utilities aren't counting on complete success. Rather, most plan to have extra people and manual work-arounds in place for critical systems, according to Jon Arnold, chief technology officer at the Edison Electric Institute, which represents the public utilities that generate more than three-quarters of the country's electricity. 'People forget that the electric utilities have equipment failures and outages all the time,' says Arnold. He acknowledges that 'it's not going to be a typical New Year's Eve' in 1999. But he adds, Y2K 'is not like a storm or a random failure. We know this one is coming.' "—*Time, June 15, 1998.*

"*Telephones:* **AT&T, for one, says it will have fixed and tested most of its heavy computerized network by the end of this year**, and will spend next year making sure its systems work with upgraded gear at other phone companies."—*Ibid.*

"*Banking:* **Many in the numbers-laden banking and securities industries have been pouring money and manpower into the Y2K problem for two or three years.** Their megamergers notwithstanding, Citibank and NationsBank each say they will be done with their internal fixes this year, and are scheduling tests to make sure money can flow through the Federal Reserve. The Securities Industry Association, meanwhile, has scheduled a Year 2000 'dress rehearsal'

next month for its members, who handle about 90% of the trading volume in the U.S., with a full-blown readiness test scheduled for March 1999."—*Ibid.*

"*Groceries:* **'Trucks will be rolling on Jan. 1, 2000,'** insists Bill James, a vice president at the Grocery Manufactures of America, which represents large food- and consumer-product makers such as Kellogg and Procter and Gamble. James fully expects some computers to crash, but he points out that there's typically a 15- to 20-day supply of food in the distribution pipeline, which should cover any short-term shortages."—*Ibid.*

"*Medical care:* **There are the thousands of far-flung clinics, labs, and pharmacies that need to check their equipment. 'I do believe there are going to be some unnecessary deaths,'** says Ackerman. But even here the anxiety may outstrip reality. Tests suggest that **only a small percentage of medical devices could be impacted by the date change, and fewer still will directly affect patient care.**"—*Ibid.*

According to the latest information, there are no date-sensitive computer chips in pacemakers, defibrillators, or elevators.

Here is the latest report from *Newsweek,* which obtained this data from the Gartner Group:

"The U.S. health-care industry lags far behind other organizations in terms of its preparations for the Millennium Bug.

"16% of all companies surveyed have not yet started any preparations for the year 2000.

"37% of health-care organizations surveyed have not yet started preparing for the Millennium Problem.

"83% of U.S. health-care organizations are not for profit, and therefore have limited Y2K resources.

"2-3% of their net operating budgets goes to information technology, half the average company share."—*Newsweek, June 29, 1998.*

U.S. FEDERAL GOVERNMENT

When we consider the government, we run into problems, serious problems. And they will affect you. Not only our government, but governments all over the world are not prepared for the coming crisis.

The *Financial Times,* for January 13, 1998, reported that **60 leading business executives had just drafted a statement which was delivered to President Bill Clinton and the prime ministers of Britain and Canada—pleading with them to solve the problem!**

"We fear that governments lag in assessing and addressing the problem," the statement said. It warned that **disruptions could extend to** "delays in welfare

payments, **the triggering of financial chaos by a breakdown in revenue collection and debt management, and malfunctions in the air traffic control and defense systems.**"

I did not say that—60 top executives said it. And they said it only a few months ago! A crisis is looming for the governments. Among the 60 corporate leaders who signed the statement were the CEOs of Lloyds TSB Banking Group, British Aerospace, BAT Industries, Ford Motor Company, Thames Water, Bechtel Group, Unilever, Bombardier, and Texas Instruments.

This was the first time that a group of leading business executives had openly sounded the Y2K alarm. They did it out of desperation. They have far more information than we have on the extent of the crisis in the governments of the world.

Here is a statement from the research department of J.P. Morgan Securities, a leading U.S. investment house in New York City:

"**U.S. Federal Government: Condition is critical. In our opinion, the U.S. government is at least one year behind U.S. corporations. [!]** We consider the official estimate of $2.3 billion to fix the problem to be laughable, and we believe the cost will almost certainly increase substantially as more thorough assessments are completed. **The General Accounting Office has estimated $20-30 billion in total Federal costs, which may still be low**, although it is probably more accurate. In either case, progress has been slow by continuing bureaucracy, archaic technology, and competing priorities. **There are significant concerns that the government will not be able to fully address the problem by 2000.**"—*J.P. Morgan Research Department, "The Year 2000 Problem."*

Well, are you ready for it? **Here is the report card on the U.S. Government, as of June 1998.** *It is going to get a failing grade. And all America will be the loser:*

"There are two little black clocks in **John Koskinen's office inside the White House complex**. They display not the time of day but how much time is left until the Year 2000. Time is something Koskinen desperately needs more of. He's in charge of making sure the U.S. government's computers don't crash come Jan. 1, 2000.

"Koskinen's task is not just daunting; it's impossible. **The feds own roughly one-quarter of all the computers in the U.S. The Pentagon alone has about 1.5 million machines—and it keeps discovering more. At last count, at least 4,500 of the government's most vital systems still needed to be repaired.** And the studied silence of President Clinton and Vice President Gore on the subject isn't making it easier to raise the alarm. **'This is not a technical problem,' Koskinen says. Right. It's a people problem: getting top bureaucrats to listen to him.**

"**So far it hasn't worked.** Last week Representative Steve Horn, perhaps the most Y2K-savvy Congressman, gave Uncle Sam's software failing grades. 'Under Koskinen,' the California Republican growled in a voice that could give anyone what-if nightmares. Government performance has fallen from a D minus to an F.'

"**At current debugging rates, 13 of the 24 largest agencies won't have fixed their most crucial computers in time. Among them:**

"*The Federal Aviation Administration:* **The FAA has plans to ground planes if its air-traffic system isn't repaired—and it may have to carry them out. The government's own accountants complained earlier this year that 'at its present rate, the FAA will not make it.'**

"*The Department of Transportation:* **The DOT, meanwhile, flunked Horn's report card for its laughably poor efforts to overhaul its 630 most critical systems, which the agency says will be complete, oh, by sometime in 2004.** Still, FAA Y2K chief Ray Long insists that air traffic is a top priority, and 'there's no doubt in my mind that we're going to meet our [Year 2000] deadlines.'

"*Department of Defense:* During Bill Curtis' 27-year career as a military computer programmer, he wrote more than a few lines of code that were century-insensitive. 'I made decisions that we could use two digits for the date,' he confesses. Now, as the head of the Department of Defense's Y2K office, Curtis is in charge of fixing his own—and everyone else's—software problems. It's a job nobody else wanted. **Although the Pentagon began Y2K planning in 1995, repairs of the most vital computer systems were only 9% complete this spring. The F-15 and the Navy's Tomahawk missile are two of 34 as yet undebugged weapons systems cited in a report scheduled to be released this week. When pressed, Curtis admits that**

even the military's most 'mission critical' systems—perhaps 2,800 in all—won't be ready in time. Officials insist that America's nuclear arsenal is more or less fail-safe, which means that if the computer systems go haywire, the missiles won't launch. **Whether the same is true of Russia's nukes is an open question.**

"*Internal Revenue Service:* The good news is that **the IRS may not be able to process your tax returns.** The bad news is that it won't be handing out refunds either. Since last fall, says newly installed Commissioner Charles Rossotti, the agency has upped estimates of its Y2K costs repeatedly, from $250 million to $850 million to more than $1 billion. **It fell behind its own deadline of having 66 of its 127 most vital systems fixed by January 1998, and still hasn't finished deciding which minicomputers, file servers, and PCs need debugging.**

"*Financial Management Service:* Even if the IRS gets fixed, Social Security, Medicare, Medicaid, and veteran benefit checks come from the Treasury Department's Financial Management Service, **a little-known agency through which almost all the government's payments and collections flow. It's in poor shape. As of March, FMS hadn't finished even the preliminary step of deciding which systems needed to be repaired.**

"**What nobody, not even Koskinen, knows is how bad the crash will be.** So why doesn't he press the panic button during speeches and interviews? 'Would we do better if I stood up tomorrow and said this is a national crisis?' He asks in reply. Probably not. But it might get the bureaucrats' attention."—*Time, June 15, 1998.*

The IRS alone has 100 million lines of code in 50,000 applications to correct! It has assigned 300 programmers to do the job. That is more than 333,000 lines of code per programmer.

U.S. STATE AND LOCAL GOVERNMENTS

Here is what J.P. Morgan says about the status of U.S. state and local governments:

"***State and Local Governments:*** Condition is critical. Although often overlooked by industry estimates, state and local governments are at serious risk for Year 2000 nightmares. According to the General Office, only 25% of state and local governments will be ready by 2000. The national Association of State Information Resource Executives' Year 2000 working group surveyed the states and found some disturbing results:

"1. **Only 30% of state chief information officers said that their states were in the implementation or testing stage of the Year 2000 fixes and only 54% even know how many lines of code need converting. One-quarter do not have an estimated completion date, and 45% had not completed a cost estimate.**

"2. **New York has budgeted only $50 million for Year 2000 compliance, which the director of the state's task force described as 'nowhere near what we will need.'** A few other states have also set aside budget dollars, mostly in the low tens of millions range."—*Ibid.*

CANADA

We have three reports on the dangerous situation in Canada:

A FEW ARE SOUNDING THE ALARM

On **January 12, 1997**, Senator Daniel Patrick Moynihan (D-NY) introduced a bill in the Senate to establish a bipartisan national commission to confront the Year 2000 Problem. The preamble warned, **"A devastating computer problem will have extreme negative economic and national security consequences in the year 2000 and in subsequent years, unless the Federal government addresses and remedies that problem."**

On **November 10, 1997**, Senator Bob Bennett (R-Ut) introduced a bill in the Senate to require greater Y2K disclosure by publicly traded companies. In his press release, the Senator said, **"The Year 2000 Problem lies at the heart of our economy . . To delay our efforts to address this problem is to be inexcusably reckless."**

In a **March 4, 1998,** press release, Representative Stephen Horn (R-CA) said, **"It is increasingly clear that a large number of federal computer systems simply will not be prepared for the date change on December 31, 1999."**

At a **March 18, 1998,** meeting of a House committee she chairs, Representative Constance A. Morella (R-MD) said, "As we ring in the 21st century, **we will be ushering in the mother of all computer glitches—one which could cripple critical government functions** . ."

As noted elsewhere in this report, in the **April 22, 1998,** issue of the *Wall Street Journal*, IRS Commissioner Charles Rossotti said, **"If we don't fix the century-date problem, we will have a situation scarier than the average disaster movie you might see on a Sunday night."**

In a **May 15, 1998,** memorandum addressed to members of Congress, Steve Forbes wrote this:

"**The Year 2000 (Y2K) computer crisis is now upon us and the federal government is even more woefully unprepared than the rest of society. The implications are ominous. Medicare, the IRS, the Federal Aviation Administration, and other basic agencies are operating on utterly out-of-date technology."**

"**During September 1997, 14 of Canada's top chief executive officers accepted an invitation by John Manley, the Minister of Industry, to form a Task Force Year 2000.** (They are from BCE Inc., Canadian Tire corporation Limited, Royal Bank of Canada, Cargill Limited, Crown Life Insurance, Chrysler Canada Ltd., Nova Scotia Power Inc., Canadian Institute of Chartered Accountants, Domtar Inc., Petro-Canada, Stentor Resource Centre Inc., Canadian Federation of Independent Business, IBM Canada Limited, and Pacer Dome.) The group's mandate was to assess Canada's Y2K risks and to advise how to reduce those risks.

They were scheduled to prepare a report by the end of May 1998. But they became so alarmed about the lack of preparation that they issued it in early February instead (*A Call for Action: Report of Task Force Year 2000,* February 1988).

"In the report, Canada's top executives warn:

" 'There is little doubt that **some firms will go out of business because they have waited too long to start the repair work or because they will have been unable to allocate sufficient funds** . . At the same time, inter-industry linkages guarantee that the pain suffered by firms that are not prepared for the Year 2000 will be inflicted on their upstream and downstream business partners. In this regard, **Canada's state of preparedness is very dependent on the United States**, given its extensive linkage with the large US-based corporations.'

"**In the fall of 1997, Statistics Canada surveyed 2,000 Canadian businesses with more than five employees and covering all economic sectors, except government, education, and health.** The findings were reported in the Task Force Year 2000 report:

"1) **Although more than 90% of businesses are aware of Y2K, only about 50% appear to have taken actions to address the challenge. Only one firm in 10 had a formal action plan.**

"2) **Only 13% of the executives aware of 2YK had asked their business partners about their state of readiness.**

"3) **In the key transportation, communication,**

EVEN IF —

"Even if everyone on our small planet did fix Y2K except for a few key U.S. government agencies, a global recession would still be a plausible scenario. After all, the federal government accounts for a great deal of U.S. economic activity, which, in turn, accounts for a great deal of global economic activity. U.S. federal, state, and local government spending accounts for 17.5% of real GDP [gross domestic product]. This percentage is even higher for most other countries around the world."—*Dr. Edward Yardeni, "Year 2000 Recession?"*

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and utilities sector, half of the large firms surveyed had not taken formal action to address Y2K.** Yet these firms are often mission critical to the national or economical economy.

"4) **Only a third of the primary industries sector had taken any action. This suggests that the whole supply chain is at risk.**"—*Dr. Edward Yardeni, "Year 2000 Recession?"*

The following report is dated June 19, 1998:

"Canada's Parliament is now on summer holiday until October. This four-month break comes at a time when the Year 2000 Problem is finally getting increased national media attention.

"During this summer break for Canadian politicians, no debate will ensue in the House of Commons regarding Year 2000. **The government's committee on industry will delay sittings and its next report, and the Canadian public will be left in the dark on the reality of the government's status on Year 2000 repairs.** The media will have to rely on other means of obtaining information on government Year 2000 status.

"Unlike any other situation that has threatened a country's ability to operate, this issue has a firm timeline; and traditional delays, such as summer break, will be eliminated for people that are fixing the problem and their frustrations may fall on deaf ears.

"**All is not well regarding Canada's status on Year 2000 on both the federal and provincial levels.** Some recent announcements of interest include:

"Canada's Chief Information Officer, Paul Rummell has quit his position and will be going back to the private sector. Rummell was considered the federal government's technology czar. **The official word is that his job was complete. This begs to question why he was appointed for a three year period, served 18 months while the federal government could only claim 40% complete of its mission critical systems.**"—*Bill Syrros, "Report on Canada."*

BRITAIN AND AUSTRALIA

Here is J.P. Morgan's analysis of how well Britain, Canada, and Australia are preparing for the century change. (The multiple question marks, just below, are theirs.)

"Condition [of Britain, Canada, and Australia]: ???? (**Probably worse than 'critical'**). Beyond anecdotal evidence, it is very difficult to get information on the efforts of individual countries to address the Year 2000 problem. **Increasing costs, differing technical bases, and varying awareness all contribute to a broad range of confusion about the problem and ways of fixing it. Generally, awareness in most of the developed world seems somewhat lower than in the United States, with the exceptions of Europe and India.** Several datapoints follow:

"1. **Although the United Kingdom is generally considered to be a little ahead of the rest of Europe, the U.K. Department of Trade and Industry estimates that only 10% of U.K. companies have**

undertaken a systems audit as a first step in fixing the potential bug.

"2. British Telecommunications has earmarked more than 200 million pounds (approximately $326 million) to fix the problem and plans to employ up to 1,000 programmers to repair more than 300 million lines of code.

"3. The Australian Minister of Science and Technology has estimated the cost in that country to range from $1.5 billion to $3.0 billion.

"4. The British Ministry of Defense has estimated that over $230 million will have to be spent to upgrade the internal guidance systems of its weapons systems, including everything from the Royal Navy's Trident missiles to the Royal Air Force's Paveway guided bombs, to prevent these systems from becoming obsolete."—*J.P. Morgan Research Department, "The Year 2000 Problem."*

The following three news clips come from Britain, and were published in a London newspaper:

"**The government is drawing up urgent plans to prevent a millennium nightmare in which the start of 2000 is marked by power failures, flight problems and hospital disasters triggered by mass computer malfunction.**"

"Two cabinet committees have been set up to deal with the problem; one is to commission a study on whether power supplies and other utilities will fail, causing traffic gridlock and problems inside hospitals."

"**Another minister admitted there was a question mark over whether the authorities or airlines would ground aircraft on the evening of the millennium, saying: 'You won't catch me flying on the new year in 2000.'** "—*Dr. Edward Yardeni, "Year 2000 Recession?"*

FINAL APPEALS BY YARDENI

So we are faced with a crisis. Many computers will be fixed. Many more will not. It will be interesting to see what happens when the end of the century rolls around.

Dr. Edward Yardeni, chief economist at Deutsche Morgan Grenfell, appeals to governments and businesses to accept the fact that we are on the edge of a crisis—and work vigorously to solve it.

His 21-page report, written this month *(June 10, 1998),* is as up-to-date as the *Time* article. After a brief, pointed, list of reasons why the economic situation is dangerous now and for the next decade, because of the Asian financial crisis, **Dr. Yardeni concludes that this problem, compounded by the Y2K crisis, could thrust America into a serious recession or worse.**

"**Let's stop pretending that Y2K isn't a major threat to our way of life. There is too much at stake for such uninformed wishful thinking. Perhaps, the time has come to act as though we are preparing for a war.** This may seem extreme and unnecessary. However, if we prepare for plausible worst-case Y2K scenarios, then perhaps we can avoid at least some of them."—*Dr. Edward Yardini, "Year 2000 Recession?"*

"**The editors of the *Wall Street Journal* clearly showed that they understand the gravity of Y2K by publishing my keynote speech to the Year 2000 Roundtable at the Bank for International Settlements in Basle, Switzerland,** in their May 4, 1998, issue. In my speech, I said that I am a Y2K alarmist. However, I am definitely not a doomsayer.

"**My goal in sounding the alarm is to increase awareness of the enormous risks that are lurking in Y2K. Unfortunately, doomsday scenarios are in the realm of the possible, especially if we fail to seriously assess the risks immediately.** However, it is not too late, in my opinion. We can still take actions to avert them . .

"If you think I'm an alarmist about Y2K, consider the following from the Commish himself. Yes, **here is what the Commissioner of the IRS told** the *Wall Street Journal* **(April 22, 1998) about Y2K:**

'**There's no point in sugarcoating the problem. If we don't fix the century-date problem, we will have a situation scarier than the average disaster movie you might see on a Sunday night. Twenty-one months from now, there could be 90 million taxpayers who won't get their refunds, and 95% of the revenue stream of the United States could be jeopardized.**'

"If you think I am overly alarmed, consider this: **When asked about Y2K, Ralph J. Szgenda, the chief information officer of General Motors, told** *Fortune* **(April 27, 1998) that there are 'catastrophic problems'** in every GM plant. I called the reporter to verify this shockingly blunt quote and was informed that the word 'catastrophic' was repeated several times during the interview with GM's top IT man. (**In 1997, when Chrysler Corp. turned all the clocks to December 31, 1999, at its Sterling Heights Assembly Plant, the security system shut down and wouldn't let anybody out.**)— *Detroit Free Press, April* 23, 1998."— *Ibid [italics his].*

Surely, we have been warned to be cautious in these last days. Satan will devise many ways to entangle us in difficulties, so we cannot do the work which God has assigned us individually. It is our prayer that this information may help you avoid needless problems in the days ahead. — *vf*