COMMITMENT

A Publication Dedicated to Quality in the Equipment Products Group

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What's in a name?

by Tony La Pine
Director, Quality Assurance

We chose to name this new publication *Commitment* to signify the importance of quality in the daily performance of our jobs in the Equipment Products Group. Each of us, whatever our specific duties, must be committed to providing customers with products and services deserving of the name Memorex.

Our company was founded by a few people with the idea of making and selling a product capable of "Memory Excellence." Today, 16 years later, 8,000 people are actively pursuing quality, a commitment that has brought us to a position of leadership in the information industry.

Occasionally we hear it said that a respect for quality is an old-fashioned view, gone the way of the individual craftsman. The modern corporation, goes the complaint, eliminates the opportunity for a personal commitment to excellence. At Memorex, we recognize that notion as the cop-out it really is.

La Pine

We believe that there is nothing outdated about love of quality—and love is the right word. Everyone admires a job well done, and at some time or other, dreams of accomplishing excellence in some field.

The pursuit of excellence is not just the responsibility of engineers and inspectors. Each of us, by performing to the best of our ability, by striving to attain our personal goal of excellence, contributes to the entity the world identifies as Memorex.

Our reputation for offering the highest quality products and service and conducting business with integrity is as important to us individually as it is to our organization. For as Memorex continues to provide outstanding value to customers, thanks to the excellence *designed in, built in* and *maintained in* our products, the greater are the opportunities for personal and organizational growth.

When we know our work is important and our performance exceptional, we can sense that pride which can't be measured in dollars and cents. This is the kind of personal identification that moves serious craftsmen to sign their work.

Additionally, there is that pride of association that is experienced when we tell others, "I work for Memorex," knowing that the company's good reputation ultimately comes from its people.

As EPG's "quality publication," *Commitment* intends to focus on our dedication to personal integrity in work. We welcome your reactions to the publication. If you have any story ideas or comments, please send them to the editor at MS 12-39.

The turnaround and progress at Memorex, as President Bob Wilson has shown us, was made possible by the actions of employees, motivated by the attitude that they, singly and as a team, can achieve difficult goals. The commitment to quality performance in our daily activities is the surest way we can build an even brighter future.

THIS IS A QUALITY ATTITUDE?—*There's more to packaging engineering than cardboard and tape. For story, turn to page 3.*

Also in this issue

Do good work? EPG wants to find you

In order to formally recognize individuals whose work reflects a high quality consciousness, the Quality Awareness organization has initiated an awards program in Santa Clara for "Outstanding Quality Performers."

Each month supervisors will nominate those employees they believe have made an extra effort, in the course of their daily activities, to assure quality products and service. A three-member board of QA personnel will review all the nominations and select five "Outstanding Quality Performers." The winners' names will be announced by the 15th of the following month.

The first five winners were announced Septemer 26; more than 80 EPG employees were nominated for the honor.

Candidates are expected from all areas of activity, including (But not limited to): order entry, clerical work, training, assembly, drafting, and inspection.

Outstanding Quality Performers will receive certificates and personalized pen and pencil sets. Posters with their pictures and plaques engraved with their names will be displayed in all EPG Santa Clara areas. Every quarter President Robert Wilson will host a luncheon for the winners, and at the end of the first 12 months of the program, one of these winners will be named "Quality Excellent Employee" of the year.

Information on the program and supervisors' nomination forms are available from Dick Burris, ext. 1150, or Bob Erickson, ext. 2457.

Q stands for Quality and it's everyone's concern

This "Q" is the new symbol for EPG Quality Assurance. It's being used on all promotional materials for the Quality Performers Program.

Test engineers Jim McGill, Larry McCracken, and Jim Carson examine the new 3650 head tester they developed.

Imaginative technology for 3650

Test engineers make science fiction a fact

Working on testing systems for the 3650 program must sometimes feel like being part of a science fiction story. The difference is that, while such stories are unabashed fantasy, the systems being developed by enterprising Memorex test engineers are very real indeed.

Vince Carter, Manager, Test Equipment, can't keep his excitement contained over the new head tester masterminded by three of his engineering staff. "This new tester is probably more advanced than any other in the entire field, at any company," he says.

It took Jim McGill, Jim Carson, and Larry McCracken eight months from their first idea for the new head tester to design and build it. In contrast to the machines it is replacing, it is fully automatic. The operator simply mounts the head assembly on the test fixture, presses the start button, and the head moves into position. An internal self test then takes place and a message is printed out, telling the operator to enter the serial number, date, and arm type. Thereafter, the test is run on its own, and test data is printed out for each head, along with applicable pass/fail information.

"This way," says Larry McCracken, "it's impossible to find out, a month too late, that the calibration has been off all that time. Because of the self-text printout, if a problem occurs, maintenance knows exactly what's malfunctioning and can get to it right away."

"We've taken every possible failure into account," Larry adds. "Whenever something went wrong with our plans, we added another error message to the system. Nothing can happen without the tester telling us why."

According to Carter, all the old head testers were "far more subjective. The operator had to enter the readout in a log and compute the test data on a calculator." The old machines also had to be constantly calibrated.

"This tester is fast, and it has a short down time," McCracken adds. "This means improved quality, not just in terms of the heads being tested, but in throughput as well."

The team has planned a data reduction system in which all the testers will input data to a floppy disc to determine their yields and evaluate the entire test process.

Now that this tester has been fully developed, the same technology can be applied to other systems. "We know what was wrong with this one," says Carter, "and hopefully we'll know what's wrong with the others." So McCracken, Carson and McGill are splitting up to work on other projects.

Dimitri Scherlizin, another enterprising test engineer, has developed a new flying height tester to measure slider clearance (flying height) for both the 3650 and 601 system. Like the head tester, this new system is fully automatic.

It operates on the basis of Newton's color rings, a principle heretofore used only in R&D situations. White light passing through different mediums (in this case, glass and air) breaks up into bands of different colors. This is the same thing that happens when an oil slick on a wet road reflects varied hues.

"It used to be that the test operator had to measure widths of stripes relayed by the machine," Vince Carter explains, "but the new color band system never varies. All that has to be done now is match up the colors reflected by the disc to a pre-set value—so much for pink, so much for orange, etc.

"Another disadvantage of the old testers is that they only measured to 40-50 microinches. But the error factor on this new machine is only *one* microinch!"

Scherlizin's new tester not only measures height, it also describes the attitude, or angle, of the slider or head. "The reflected color bands are either perpendicular or diagonal," Dimitri explains, "and the degree of the diagonal reveals the attitude of the slider."

Vince Carter expresses pride in his group of young engineers. "The mix of expertise from the old-timers and innovation from the new has been very productive," he says. "The cooperation we've had from manufacturing and R&D personnel has given these energetic young men an opportunity to conceptualize, design, and take responsibility for their work."

And that is another important aspect of Memorex quality. Working together to make what once seemed to be "science fiction" part of an ordinary working day reflects an attitude about quality that is special to our products and services.

New equipment speeds PCB evaluation

Memorex is getting invaluable assistance in printed circuit board testing efforts from the developments of two vendors of automated test equipment who are as committed to quality and cooperation as we are.

Faultfinders, Inc., of Latham, N.Y., has delivered a PCB test system already in operation on boards for the 550 flexible disc drive. Although it is an "in-circuit" analog tester similar to the previous Fixit machines, it offers a number of improvements.

The new computerized system is faster, easier to operate, and offers more flexibility than the older models, according to John Bado, Test Engineering Manager for Automated PCB Testing. "The Fixit required a punched tape program that could only handle one test at a time, but the new system with its special software, allows us to access test programs and locate faults much faster. It also has a unique limited digital test capability designed to Memorex Test Engineering specifications."

A second PCB tester, manufactured by Computer Automation, Inc. (CAI) of Irvine, California, will be installed soon. Bado says this large-capacity system "uses a computer program to simulate a perfect PCB and to develop fault isolation diagnostics that direct the operator in probing the PCB to locate the fault."

Both of the new testers are, in Bado's view, state-of-the-art systems. They feature minicomputer control, disc drive program loading and storage, and human-engineered panels and controls. In addition, the software is designed to minimize operator intervention during testing and debugging.

They also utilize "bed of nails" test fixtures, so called because of the multiple spring-loaded pins used to contact

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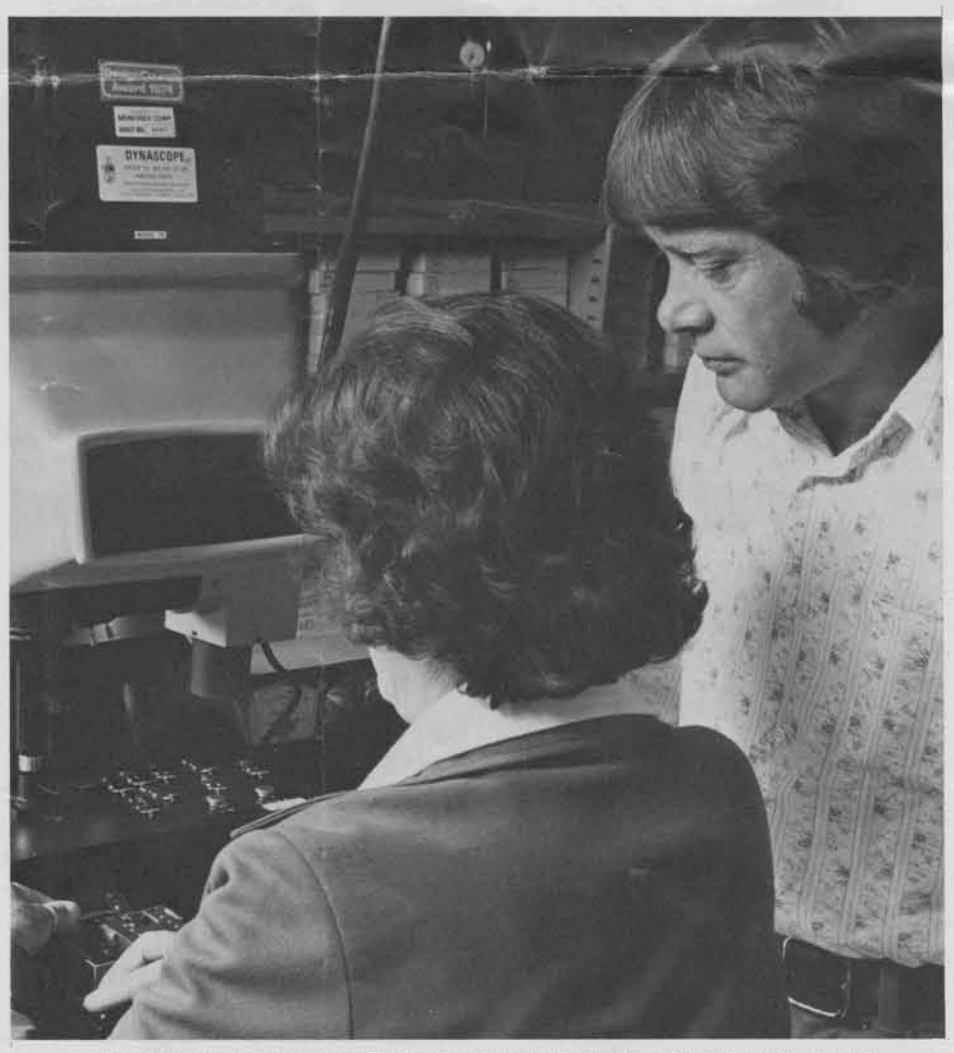

Dimitri Scherlizin directs demonstration of his flying height tester.

(continued from page 2)

internal PCB test points. With this improved accessibility, the test sequence is shorter, and it takes less time to find a given number of faults. "We really eliminate a lot of manual probing steps with this technique," explained Bado.

Good as they are, both new systems will probably receive further enhancements from Test Engineering. Both have IEEE buses that will permit the addition of programmable commercial test instruments such as pulse generators, wave-form analyzers, and counters.

The new equipment reflects the emphasis on high quality that can only result in improved reliability. John sums it up: "With the implementation of the CAI and Faultfinder systems, Memorex will be right up front when it comes to state-of-the-art. But more important, it will provide us with the tools necessary to meet and, at times, exceed our competition."

Inspector finds quality's the same in any language

"Part of being an inspector," says Cindy Mohl, "must be having good common sense and using it. I'm proud to be an inspector."

An A-level Quality Assurance Inspector, Cindy started with Memorex eight years ago as a PCB assembler. For the past five years she has inspected boards in all phases of their manufacture.

Last fall Cindy was invited to spend two weeks at the Memorex plant in Nogales, Mexico, training inspectors and assemblers.

"At first the work was hard because of the language factor," Mohl reports. "We had to explain, and then what we said would be translated into Spanish.

Cindy Mohl

But the workers were very friendly and eager to learn.

"For me the highlight of the trip was getting to meet the people and seeing how they work and live.

"I think the three of us who made the trip did a good job," she reflects. There had been some talk of bringing the Nogales inspectors to Santa Clara for further training, but their work improved immediately and the exchange was forgotten.

"When I left, my trainees gave me a big bouquet of red carnations," Cindy says. "I was deeply moved.

"If I had a choice between working in quality or in manufacturing," says Cindy, "I'd still want to work in quality. I rely on my own judgment and have a high level of responsibility. It makes me feel I'm making an important contribution and that's very satisfying."

Memorex and quality are obviously synonymous to Cindy. "It's a good company, and I'm proud to be part of it," she says. "I feel I get out of it what I put into it."

Take a peck of polyethylene and a pint of TLC

What Packaging promises, it delivers

The city was Detroit (or maybe Chicago). The data processing center of a large midwestern bank was eagerly awaiting the delivery of its new Memorex 3675 disc drives. Down on the street a van pulled up to the delivery entrance. The truckers heaved, tugged, pushed, and pulled the large packages down inclined ramps, then up other ramps into the building. An hour or so later the packages arrived at the data center.

Someone noticed that the packaging was coming apart. He hurried over to inspect more closely. *Aha! The machine must be damaged.* Before long, the DP manager concluded that the machines had been delivered in nonoperable condition.

Called long distance about this problem, Jim Stimson, EPG's only packaging engineer, suggested that the system be tested. It was, and turned out to be in perfect working condition.

"That happens a lot," Stimson remarks. "The package takes the brunt of all the carrier's mistakes and may get there looking pretty bad. But if the machines work, the packaging has done its job."

It was Stimson who, in cooperation with Radiant Engineering Co., developed Memorex's distinctive Shrink-Pak. "We're the only company in the electronics industry using this concept," he says.

'Carriers tell us we have the most elegant packaging they've ever seen.'

First implemented in 1970 for the 660 product group, the polyethylene Shrink-Pak secures the product in protective corrugated packaging. It also adds outer protection from environmental conditions by retarding humidity changes inside the package. "It's not really a barrier," Jim explains, "it's a breathing material that does allow air circulation."

The Shrink-Pak itself consists of an over-sized, 8-mil thick polyethylene bag which is draped over the entire unit in its corrugated packaging. A conveyor dolly moves the machine into a 325° oven for about eight seconds. The heat shrinks the bag down tight over the entire package, strengthening the polyethylene in the process and securing the corrugated packaging to the product. The entire procedure takes 30 seconds, compared to 10 minutes for the formerly used banding method.

Stimson thinks one of the most important features of the Shrink-Pak is what he calls "the psychological factor." The plastic paneling on the machines is visible through the transparent polyethylene. The carriers can see the product and tend to be more careful when handling it. "This way," says Jim, "a quality attitude toward the condition of the product is maintained right to the customer's door. What's more, the black-and-white Memorex logo and packaging are also visible; it's attractive and in its own way, enhances the quality of Memorex products. We've had comments from carriers that we have the most elegant and protective packaging they've seen."

Packaging Engineer Jim Stimson displays drop test methodology. If products survive this treatment, it's a good bet they'll survive shipment to a customer.

'Believe me, we've completely destroyed some of those machines.'

According to Stimson, insurmountable problems can be encountered if product design efforts are not closely coordinated with packaging. "Unless the product gets to the customer intact and working well, everyone's efforts have been wasted," he says.

For this reason, "we've developed a corporate engineering standard clearly defining what the product will be exposed to." Each new product is subjected to an elaborate battery of on-site tests for such conditions as vibration and shock. "If it passes these tests," says Stimson, "we design the packaging and run the same tests on the packaged machine. We also run a shipping test where we actually ship it to a specified destination, then bring it back and inspect it. This assures us that the product will be received in operable condition. Believe me, we've completely destroyed some of those machines."

Jim Stimson is gratified that Memorex engineers are becoming more aware of environmental problems. "When a product is delivered in damaged condition," he says, "it's my responsibility. In the past I was sometimes the last to learn that there were shipping problems. That's no longer true.

"Design engineering is now aware that the machines have to be structurally sound to withstand the shipping environment. Cooperation and planning ahead are our keys to quality."

Puzzle Solution

A. Fill in the words defined below:

1. The pleasurable feeling of having done an excellent job: P L E A S U R E
2. Dedication of one's efforts to a worthwhile task: C O M M I T M E N T
3. Caution; concern; prudence: C A R E
4. Effectiveness in producing results: E F F I C I E N C Y
5. Uniting of the efforts of several people to achieve common goals: C O O P E R A T I O N

B. Take the letters in the squares, in order, then the letters in the circles, and finally the letter in the triangle, and fill them in below, to see the *results* of these five words:

P E R F O R M A N C E
1 2 3 4 5 1 2 3 4 5 5

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Consider the lowly melon thumper

There's no escaping QA decisions, says Prof Heldt

How long does it take you to get to work in the morning? How many miles per gallon does your car get on the way?

According to John J. Heldt, Quality Assurance Staff Engineer, we all think in quality terms every day. "These are statistics in action," explains "Big John." Everyone, he claims, uses quality assurance methods every day. "You've seen Joe Carccione, the produce expert, on TV. He's always talking about the methods used by little old ladies to test the fruit for flavor and freshness. Well, that too, is a demonstration of quality methods."

John has been in quality work for more than 20 years. He has worked for such companies as RCA Whirlpool, General Dynamics, and Lockheed. He holds a BSEE degree from the University of Evansville, Indiana, an MSEE from Southern Methodist, and a Ph.D. from Sussex College, England.

"There are two kinds of quality," Heldt explains, "*design* quality and *built-in* quality." Design quality represents a higher cost to the customer because extra features are included in the original concept. For instance, a Cadillac offers higher *design* quality than a Chevrolet.

"For *built-in* quality," John says, "good workmanship is the key. The consumer gets a better product because it is built right, and he gets it at a lower price because it is built right the first time!"

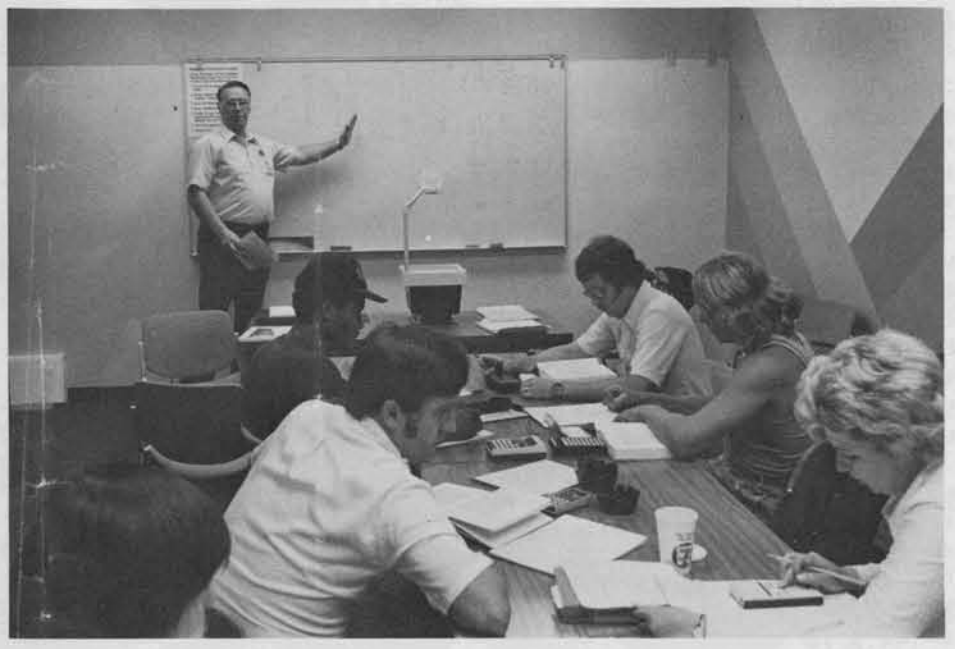
In order to insure this economical quality approach, John uses statistics as a tool. "It's important to compare the cost of a quality assurance function against the overall result," he says. "How can we best spend our quality dollars to improve the quality of the product? We sometimes forget that a trade-off is often economical. If it's cheaper to check for errors at another station, we have to make use of that fact, too. I think cost and quality are always tied together."

As an illustration, John offers the case of the Polaris missile. The goal was to increase reliability to its highest point, but the higher the reliability was raised, the less increase was obtained for each dollar spent.

"There is a point where it costs like sin to strive for higher reliability," according to Heldt. "The Polaris trade-off was reached when they realized that they could build two missiles of lower reliability at about the same cost as one of the original design and that the probability of success would be substantially higher if the two missiles were launched in place of one missile of higher reliability."

John is quick to stress the responsibility of the worker on the floor in the economy/reliability scheme. "The man who is doing the job has to be the first inspector in line," he says. "We get the best quality by doing it right the first time. Anyone who says, 'I haven't got enough time to do the job,' should remember that we always have enough time to do it over again if it's wrong. We have to.

"I believe the average guy wants to do a good job. If he doesn't have the right tools or parts or procedures to do a good job, he has to keep pushing management to support him."



John Heldt makes a point in a lecture to one of his De Anza College classes.

How do you do this? John's suggestions include not being afraid to question the procedure or the product. "There's no such thing as a 'dumb' question," he says. "The dumbest question is the one that's never asked. If you don't have the whole picture straight, make me clarify it. If you think a value is inaccurate or a direction is misapplied, make sure it gets straightened out."

John stresses that, rather than trying to make the system work with some method of their own fashion, people should come back to management "and make us change the procedure."

A Request for Action (RFA) form can be initiated by anyone in the corporation outside the engineering departments. Engineering is required to respond, in writing, to your RFA, not only with a yes or no, but with a serious analysis, including the cost impact of the action to be taken.

John devotes much of his spare time to advancing the quality of the quality engineer. Four hours a week he teaches a quality class for De Anza College in Cupertino. He has also been instrumental in developing a Quality Control "Certificate of Proficiency" program.

There is little doubt that Big John Heldt has committed himself to raising the level of excellence, both in his job at Memorex and in his profession. He has contributed articles to *Quality* magazine and to *Quality Progress*, published by the American Society for Quality Control. In preparing his courses at De Anza, he has written a textbook, a syllabus, and a simulation game.

"The point to all of this," Big John sums up, "is that a better product for our customer will increase the quality in all our lives. That's really what it's all about."

And now for a practical degree

Local colleges offer QC programs

Big John Heldt is extremely proud of his involvement in De Anza College's Quality Control program. (He helped bring De Anza classes to Memorex.) The curriculum offers an Associate of Arts degree with a "Certificate of Proficiency" in Quality Control.

This fall Heldt is teaching a course in Statistical Concepts and Techniques, a De Anza class which meets at Memorex. Other courses offered include Reliability Management, Governmental Requirements, Quality Engineering, and Quality Systems Audit.

Besides De Anza, three other area community colleges offer programs in QC. These schools are Ohlone, West Valley, and San Jose City Colleges. Anyone who does not reside in De Anza's district can enroll in quality courses by obtaining a release from his or her local district. It is usually possible to transfer AA or bachelor's degree units toward the QC program degree and certificate. For information, contact the admissions office of your local community college or John Heldt, ext. 3663.

QUALIT

Quality costs money, but mistakes cost more.

How's your quality quotient?

This puzzle was created by Don Ravey, Senior Procedures Analyst. In addition to word scrambles like these, Don also writes crosswords, word search grids, and other stumpers. ***Commitment*** *has asked Don to submit a different type of puzzle for each issue of the paper.* *For the solution, turn to page 3.*

A. Fill in the words defined below:

The pleasurable feeling of having done an excellent job: 1. □○____

Dedication of one's efforts to a worthwhile task: 2. ___○_____□___

Caution; concern; prudence: 3. _○□__

Effectiveness in producing results: 4. _□_____○___

Uniting of the efforts of several people to achieve common goals: 5. ○_□_△_____

B. Take the letters in the squares, in order, then the letters in the circles, and finally the letter in the triangle, and fill them in below, to see the *results* of these five words:

□□□□□○○○○○△

1 2 3 4 5 1 2 3 4 5 5

C. Hints:

1. Are you proud of your work? 2. Do you commit yourself to do the best possible job? 3. Are you careful at work? 4. Do you do your job efficiently? 5. Do you cooperate with Memorex co-workers in getting the job done right?