

Systems & Services Division
Johnson Controls, Inc.

Monitoring The Field

August, 1981
Vol. 25, No. 8

JC/85/40 Release 2 Software "hits the street"

More than 150 sets of JC/85/40 release 2 software have been shipped to the field within a three-week time period. This large volume shipment of software is a record achievement for Johnson Controls, and probably for the industry.

Understanding Software; Page 4

The highlight of the release is the color-graphics package which is the best in the industry, based on initial field feedback. Color-graphics enables the system operator to interactively define graphic displays at a color CRT while the system is fully operational.

Congratulations are in order for all groups who contributed to this release and to the field organization for selling, engineering and commissioning systems at a record rate.



Just like fine wine, "we will ship no software before its time," said Neil DeVries and Jim Botic from BAS Development, Milwaukee, to Jeff Kraft and Bill Lydon, of Sales and Marketing, respectively.

Tax Bill Could Spur Conservation Investments

Two provisions in President Reagan's tax cut bill are expected to facilitate investment in energy-efficient equipment and construction by commercial and industrial energy users. The overall thrust of the legislation is to help American business spend more on the vital task of rebuilding productive facilities.

The Accelerated Cost Recovery System (ACRS), a provision of the bill, will allow users to depreciate new construction in 15 years instead of the 30 to 40 years standard before passage of the new bill.

The ACRS also reduces the widely varied depreciation periods on capital investments for energy conservation — including insulation, new energy-efficient equipment and energy manage-

ment systems — to a single five-year standard.

However, energy management systems, insulation, and other energy conservation investments *in new buildings* are considered part of the building under the ACRS, and therefore, fall under the 15-year depreciation rather than the five-year depreciation.

A second provision on investment tax credits is expected to encourage retrofit projects for energy conservation *in old buildings* by increasing the credits from a unified 10 percent to a three-tiered, 15 to 25 percent credit schedule, depending on the age of a building.

The new bill establishes four categories of equipment that can be depreciated in three, five, ten or 15 years.

One of the categories includes all sorts of energy-conserving equipment for retrofit as well as energy management systems that will be depreciable in five years.

Questions relating to the tax bill and implications to your customers should be directed to your local Johnson Controls Financial Services (JCFS) representative, or to Richard Walker, Milwaukee Marketing M-14, phone (414) 277-4881.

Inside this issue

ATC Product Changes, p. 3
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Vancouver electrician wins top honors

Claude Nobauer, an electrician for the Vancouver office, recently received the top apprenticeship award in a class of 200 in the Province of British Columbia.

Claude began apprenticeship training in 1977 and completed the six-month course at the top of his class. He then began his apprenticeship to complete requirements to become a journeyman electrician.

During the next three years he completed electrical and electronics courses at school and gained the practical experience of construction techniques. The second and third years were spent with Johnson Controls learning the controls business. While Claude was attending school, his average grade never fell below 95%. He is now a full-time employee for Johnson Controls Ltd. in Vancouver, working both in construction and service.



From left to right are, Bill Woodill, president of C.H.E. Williams, the sponsoring contractor; Claude Nobauer, and Cliff Rundgren, business manager of International Brotherhood of Electrical Workers Local 213. The award included a check for \$750.00.

Grants, costs hasten hospital energy conservation efforts

Hospitals and health care facilities are beginning to increase their investments in energy conservation — particularly in such areas as energy management systems custom-tailored to suit the particular constraints that these institutions must work under and efficiency improvements in heating, ventilating and air conditioning equipment.

This interest, inhibited in the past by relatively low energy costs and by hospitals' "third-party reimbursement" arrangements, seems to be awakening due to the availability of federal grants and increased energy costs (see May, 1981 MTF, page 2).

HCC Picks Johnson

One energy management system that will be 50 percent funded by DOE

Nation's largest signs with Johnson Controls

Exxon Corp., the largest corporation in the nation, has signed a contract with the Union branch office. The contract, for more than \$1 million, is for installation of automatic temperature controls and a JC/85/40 building automation system in Exxon's new computer sciences and services facility in Floram Park, New Jersey.

grants is to be installed at Metropolitan Hospital, one of 17 hospitals under the jurisdiction of New York City's Health and Hospitals Corp. HCC will spend \$225,000 at Metropolitan Hospital to replace a Johnson Controls T-6000 with a JC/85/40.

SSD participates in U.A. instructor training program

Alan Zajac of the SSD Training and Education department represented Johnson Controls at the UA instructor training program conducted at Purdue University August 1 to 6. The program is sponsored annually by the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the US and Canada.



Al and his counterpart from Honeywell taught the pneumatic controls course to UA instructors, who will in turn use their knowledge to train UA journeymen and apprentices. Approximately 55 different courses are offered during the one-week training session.

Agreement set for office equipment

Branch personnel who are responsible for recommending and purchasing office equipment should be aware of a new national agreement that has been set up for us. Sales memo 354 (6-18-81 to all U.S. branch managers) outlines our agreement that will enable each branch to purchase Monroe business equipment at reduced prices.

Monitoring The Field

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Managing Editor, Mary Beth McKibbin

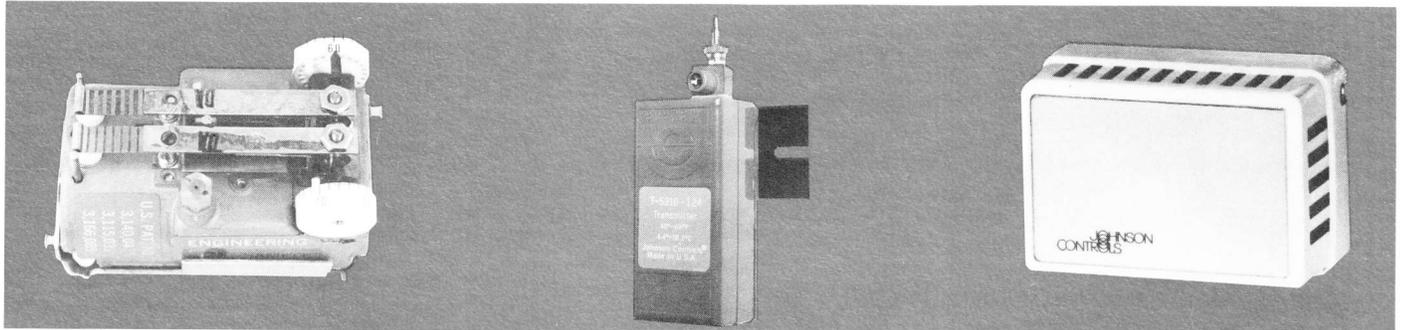
Contributing Editors: Joe Bartoletti, TABS; Lou Davit, Installation/Engineering; Dale Hawley, Service; John Levenhagen, Counterline; Patricia Ludwig, BAS; Terry Meinholdt, APS; Bob Stahl, ATC; Diane Wagner, Quality Assurance; Richard Walker, Federal Energy Programs.

Letters may be addressed to the Managing Editor, *Monitoring The Field*, Johnson Controls, P.O. Box 423, Milwaukee, WI 53201.

JOHNSON
CONTROLS

Product changes announced by ATC Engineering

A guide to improvements in the ATC product line



Individual set point dials for heating and cooling will be featured in a new dead-band thermostat.

The **T-4052 dead-band Energy Manager Thermostat** is being greatly improved. A new dead-band pressure regulator will allow easier field adjustment for a more positive dead-band pressure. The new thermostat will have two set point dials, one for heating and one for cooling, with numbers for the actual set points. The difference between the two readings will be the dead-band range. A customer not satisfied with the dead-band range can change either set point without affecting the other set point. A new code number, **T-4054**, will be assigned.

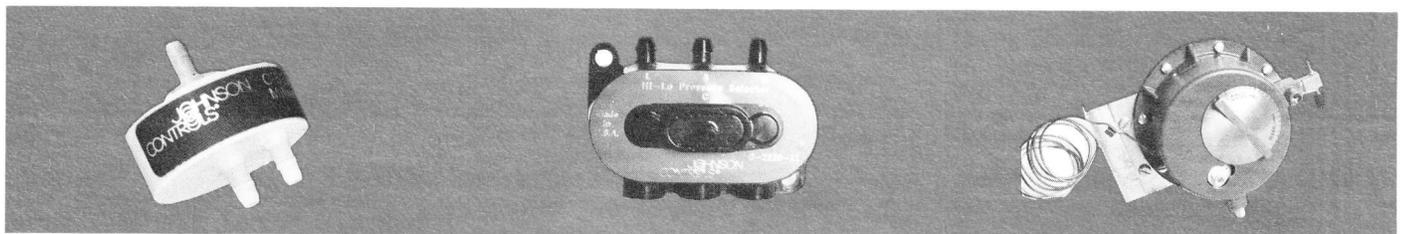
Computerized factory calibration of the T-5210 remote bulb transmitter should make field recalibration unnecessary.

The **T-5210 Remote Bulb Transmitter** is being redesigned to include a hypodermic needle test connection, ball control port and new feedback lever assembly. Along with these changes, computerized calibration techniques should provide a transmitter with better than 2% linearity.

"Day" set point changes can be made on the redesigned day-night thermostat without effecting the "night" set point.

The **T-4502 and T-4512 Day-Night Thermostats** will no longer be available with a cam on the 20 psi or night portion of the dial and cam assembly. This change will allow the customer to change the "day" set point without affecting the "night" set point. When these changes are made, new code numbers will be assigned:

T-4502 will become **T-4504**
T-4512 will become **T-4514**



Improved bonding and smaller air connections will be incorporated into the redesign of the C-5226 signal transmitter.

The **C-5226 Signal Transmitter** is being redesigned to eliminate two of the most often mentioned complaints from the field: components coming apart because of bonding problems, and oscillation or "singing" at various output pressures. In the redesigned product, the size of the C-5226 will remain the same, but the air connections will be made smaller, from 1/4" to 5/32" spigots.

The input connection on the C-2220 high-low pressure selector will be made smaller.

The **C-2220 High-Low Pressure Selector** has experienced some of the same problems as the C-5226. The C-2220 bonding process will be changed, the input connection from the controller will be made smaller, to 5/32", the same as the C-5226 improvements. A new diaphragm design also eliminates diaphragm pull-out and leakage problems.

A remote bulb dead-band thermostat is a new product to be available around mid-1982.

The **T-3102 Remote Bulb dead-band Energy Manager Thermostat** is a new device scheduled for release to the field. It will be similar in appearance to the T-3100 thermostat. Features of the new T-3102 are fixed sensitivity, adjustable dead-band pressure, and adjustable heating and cooling set points, which will be visible from outside the cover.

Ed. note: Some of the product modifications mentioned here will be available beginning in the coming months, with others becoming available next year. Do not sell or promise them, or give availability dates, until you receive more specific information from Milwaukee.

What is Software?

Software is the name given to the instructions or programming that tells our computer (a Texas Instruments 990/10) how to bring about energy conservation in buildings. Although software is composed of a great many individual instructions, or lines of code, it cannot be shipped to the field one line at a time. Thus, it is "lumped" into releases.

The Program

The computer programs (software) must be defined to instruct the computer exactly what to do to accomplish a function. The computer recognizes general instructions such as add, subtract, multiply, divide and other more complex instructions. These instructions are used by the software design engineer to direct the computer to perform functions for some application.

Some companies utilize the Texas Instruments computer for various applications such as accounting, industrial control, and scientific problem-solving. Johnson Controls software design engineers write programs that perform the functions required in a Building Automation System, specifically the JC/85/40. The "Optimal Run Time" feature is an example of a function defined in the software. The current JC/85/40 system has more than **two million** lines of instructions.

To many of us, "software" is just a word that we hear and read about quite often at Johnson Controls. To help translate from "computerese" into English, the BAS Development Group and Bill Lydon, BAS Marketing, have prepared this condensed explanation.

The Release

The various programs are put together for a software release. Although it might be nice to ship each feature to the field when it is developed and available, that is not practical or economical. The various features must be made to work together properly in a



Marty Krygiel, software design engineer, is working at one of the terminals connected to our on-line program development system (computer).

system. This process is called "integration."

The job of integrating new features into an existing software system and of assuring the quality of that total system is a demanding and complex one. Therefore, to consolidate the burden of integrating and testing, software features are released in groups.

The Package

Finally, software, while basically information, must be packaged in a usable form. In the JC/85/40, software is shipped as coded instructions recorded on a disk pack.



To make the system fully functional, customers or Johnson Controls field personnel must add the unique data base associated with each customer's building. This data base is a set of added information typed into the JC/85/40 to specify the nature and function of each element of the building being controlled and monitored by the system.

Still sound complicated? It is. But fortunately, Johnson Controls has a skilled group of dedicated professionals who design the software and solve the problems.

Manufacturing-Engineering effort boosts BAS product delivery

On July 20, the Manufacturing-Engineering department of the Building Automation Systems group initiated a 30-day program of process, product and production review aimed at increasing the flow of BAS projects to the field. All Milwaukee departments are cooperating in this intense effort to remove internal obstacles.

The manufacturing engineers have each been given a red vest to wear while in the Production department so they can be easily identified as part of the program. In this manner, factory and staff departments recognize them and give them top priority. The success of this program will result in more timely shipments of BAS products to the field as component parts become available from vendors beginning in September.



THE REDVESTS ARE COMING: Members of the BAS Manufacturing-Engineering department are highly visible in their red vests. George Jacobi, director of BAS, is shown at the left. The function of a manufacturing-engineering group is to provide tooling, production process and test capability for the manufacture of a given product.

Product Application

PIC POINTS you should know

• Several branches have **SENT THEIR CUSTOMERS** a copy of the January, 1981 issue of *Monitoring The Field* (which introduced PIC), along with the PIC publication, 1183. These branches report **INCREASED CUSTOMER INTEREST** after reading of the benefits of the PIC system.

• A **REVIEW** of the **ROBERTSHAW** "Pneumodular" system spec was distributed to all sales personnel, including service (see memo of 6-25-81) . . . **COMPARISON WITH PIC** includes explanations of how we accomplish each function in their spec. A list of our jobs where PIC will be installed was also distributed.

• If you have a scratched ENC-1000 cabinet . . . **TOUCH-UP PAINT IS AVAILABLE** . . . white pumice touch-up paint in a 10 oz. aerosol can (code number ACC-102-0) is listed on standard equipment sheet CM-14.

The paint will match the original finish of the ENC-1000 cabinets and doors.

• Do you need **TUBING CLEARANCE** behind the PIC-1000-100 rough-in mounting rack? The rack is designed to be installed in a variety of cabinets. To maintain versatility, it is necessary to have universal mounting feet . . . feet that cause the rack to stand away from the back of the cabinet by two different dimensions. They are mounted at the factory with the least amount of clearance. When mounting the rack into an ENC-1000 cabinet, the feet can be changed to the greater stand-off dimension, allowing more clearance for routing tubing behind the rack. This also brings the PIC indication faceplate closer to the front of the ENC-1000 for better visibility through a clear front door.

Name change for single building EMS

The SBEMS small building energy management system (introduced in MTF, June 1981) has been assigned a name more in keeping with other systems in our BAS product line. Now known as the **Power Perfect 5000** (PP-5500), it fills the gap in our BAS product line between the Power Perfect 1000-8 and the JC/85/10, and allows us to bid successfully against our

competitors, especially the Honeywell W-7000 and Barber-Colman MICRO-8000.

Information about ordering, pricing, and terms and conditions was distributed as **Page E-14** of the Branch Purchasing Directory. Diversified Technology (the manufacturer) is responsible for product support. For marketing and application support, contact Mike Bonfiglio, Field Engineering, Milwaukee, 4792.

Videotape training film #134 is now available from the regional offices in US, Canada and International. The tape covers PP-5000 hardware, applications, functions and features. Toronto has a demonstration unit available for Canada branches.

Air Flow Controls - How Much Accuracy Can We Afford?

Watch for this article in the August issue of *Heating/Piping/Air Conditioning* magazine. Authored by Bob Tisdale of Field Engineering, Milwaukee, the article illustrates that our competitors cannot justify their "industrial" controls economically or otherwise. To obtain a copy, contact Bob Tisdale.

Renegatizing . . .

Lee Fiegel, Johnson Controls director of corporate planning, entered a contest where the rules stated, "use 13 buzzwords in a 30-words-or-less sentence." Here is his entry, which won an honorable mention:

"To **FINALIZE** a **VIABLE SCENARIO**, we must **CLEARLY PRIORITIZE** the **INPUT** and **ORIENT** it on an **ONGOING** basis so as to **OPTIMIZE**, no, **MAXIMIZE** the **HANDS-ON INTERFACE** for every **PARAMETER**."

When asked for the translation, Lee said, "I think it means the **OPPOSITE** of **PRODUCTIVITY**."

JC/85/10 earns UL approval

The JC/85/10 building automation system has been approved by Underwriters' Laboratories, Inc. for "listing" as a BAS signaling system (not to be confused with fire and security approval).

This UL certification, which requires that the unit pass stringent tests, is important to Johnson Controls because many state and local codes require that only UL listed equipment be installed. The approval will enhance our ability to sell in cities like Los Angeles, New York and Chicago.

Mechanic's input results in thermostat redesign

The redesign of the T-4052 to a T-4054 two-dial dead-band Energy Manager thermostat (see Page 3) uses the same principals as an idea submitted by **Jim Bradley**, a mechanic for the **Union, New Jersey** branch office.

Jim has worked as a mechanic for the Union office for more than 30 years. He submitted his idea about a year ago and it has been in the works since then. With the current emphasis on energy conservation, the timing was perfect. Congratulations, Jim.

Why new code numbers?

Have you every wondered why Milwaukee assigns a new code number to a product that appears to have merely been redesigned? (An example is the T-4052 dead-band thermostat that is being redesigned and assigned the new code number T-4054, as stated on Page 3).

There is a very logical reason for the new code number assignment. When major redesign changes alter the operation of an instrument, the new code number will prevent stock (both Georgetown and in the branch) from being mixed up. This is important because the old and new versions of a device usually function differently, and the code numbers tell them apart.



Dick Bobincheck, JC/85/10 product manager from BAS Marketing, affixed the first UL label to a JC/85/10 unit. All units shipped after August 15th will have the UL label.

Service Notes

The SSD policy on **pricing of non-Johnson material** invoiced through the **Repair Billing** system is intended to establish uniform repair billing procedures throughout all branch offices . . . see sales memo 355 (6-25-81) for policy statement, including examples.

* * *

Which **ACCOUNTING SYSTEM** should be used to process a branch project? Criteria for selecting one of the three systems are listed in sales memo 310-F (7-22-81). The **Contract Information System**, **CPM-Management Information System** and **Repair Billing System** all report volume and gross profit by salesperson.

* * *

The **Tech Tip Calendar** for October, 1981 features a method for using the blue Johnson Controls allen head screwdriver to push barbed fittings into plastic tubing. **Make sure you have these screwdrivers in stock when your customers ask for them.** To order, see Page 19 of Publication 2053, "Sales Promotion Material."

* * *

Authorized Service Representative wallet cards are available at no charge from Marketing Communications. To order (on Form 814), specify Form 4808.



Samples of three **BUSINESS CARD STYLES** available to Johnson Controls SSD employes have been sent to each branch manager (see letter dated June 15, 1981). **The new cards incorporate raised lettering.**

* * *

Back to basics . . . "Basics of Pneumatic Controls and Systems" is the title of a three-part article series discussing **pneumatic components, applications, and basic control systems.** Submitted by John Levenhagen, SDD market manager of ATC products, the series is currently appearing in *Service Reporter*, a monthly publication for sales, service and installing contractors in our industry.

* * *

Survey/order forms for STEAM TRAPS are available to our branches at no charge from State Supply Company in St. Paul, Minnesota. To obtain the Johnson Controls "personalized" forms (pads of 25 sheets) call Lloyd Nelson at State Supply, (612) 774-5985.

* * *

A report from the Food Institute, an organization representing retail and wholesale **food outlets**, indicates that there is a short-term (five-year) market opportunity for energy management needs in their field. A key concern seemed to be the lack of service in the products they have bought — a **strength for Johnson Controls.** Keep this market opportunity in mind, both in **Service** and **TABS.**

EBM Tip of the Month

Market research studies indicate that when hospital review boards are eliminated early in 1982, there should be a surge in hospital construction. The Federal Health Department estimates that the building boom could amount to billions of dollars. *This construction would be very important to our EBM (existing building market) sales efforts.*

The current market research opinion is that new hospital construction may continue to inch downward as the government moves to cut Medicare support. Some of this loss could be offset as restrictive regional review boards are abolished and more freedom to build new and remodel old facilities becomes a reality.

Training survey sent to field mechanics

Ken Oakleaf, recently appointed supervisor of HVAC service training, has sent a survey questionnaire to all U.S. and Canada field mechanics. The survey is intended to serve as an introduction to this new area of our training program, and it is also structured to give mechanics an input into planning of future courses that will be offered. Any field mechanic who has not received a survey should contact his branch manager.



COUNTERLINE CATALOGS ARRIVE — ALL 29 TONS OF THEM

Personnel from the Catalog Service group in Marketing Communications, Milwaukee are shown with a portion of the shipment of the 1981 Counterline Catalogs when they arrived from the printer. From left are, Cheri Fink; Julie Stencil; Ruth Neeb; Ruby Nelson, Janis Tate; Jim Martin (shipping); Ruth Bischoff; Steve Pendergast, and Bill Bowman.

Product Flexibility *and* SERVICE Sell EMS for Johnson Controls

The *Energy User News* magazine recently surveyed 900 energy management system (EMS) owners to determine their feelings about energy management systems and the companies that supply them.

Those who rated Johnson Controls and Texas Instruments systems as "excellent" often cited these products — which are usually more complex systems — as being very flexible in their operations and able to do several specified functions.

Support service, an important criteria cited by nearly all users, took on still greater importance with Johnson Controls system owners. Both the Johnson Controls and Texas Instruments energy management systems got high marks in this area.

The following is excerpted from *Energy User News*, August 10, 1981.

JOHNSON CONTROLS: FLEXIBLE, READY

Johnson Controls, headquartered in Milwaukee, was the second highest ranked EMS company in the survey's high recognition category. Johnson Controls users who rated the company "excellent" consistently cited their systems' flexibility and the service the company provides as reasons for the high ratings.

Abbott Laboratories, a diversified pharmaceutical company, has four Johnson Controls energy management systems. It has two JC/80s: one at its corporate headquarters in Abbott Park, Ill., and the other at a plant in

Puerto Rico. It also has two JC/85s: one at a rubber plant in Ashland, Ohio, and the other at a plant under construction in Rocky Mount, N.C.

W. L. Patrick, an energy manager at Abbott, said the \$450,000 JC/80 at corporate headquarters is saving the 1.5-million square-foot facility \$300,000 a year in energy costs, mainly by duty-cycling HVAC equipment.

"Johnson provides us with turnkey operations," Patrick said. "And they don't argue when we say this particular load isn't satisfying us. The company comes in and fixes it."

The Johnson Controls EMS installed at TRW Inc.'s Electronics and Defense Division in Redondo Beach, Calif., was chosen for its flexibility. Most of the energy savings — like the 20 percent reduction in electric use in 1978 during the first full year that the EMS ran — resulted from duty-cycling and holiday scheduling the numerous pieces of HVAC equipment.

The supervisor of maintenance at the 3-million square-foot TRW plant estimated that the Johnson Controls system saved the company \$120,000 the first year it operated.

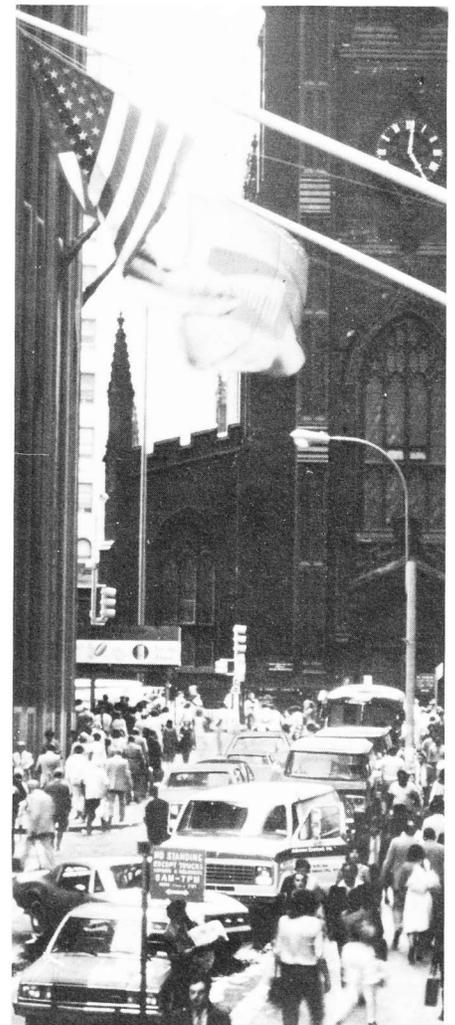
* * *

Many users credited their successful EMS experiences to the homework they did before shopping for a system, to the quality of the product they eventually selected, **and the service support provided by its vendor.**

Johnson Controls: "We're everywhere"

When a person is first introduced to a Johnson Controls employee, very often the response is, "I've seen your trucks." The vitality and discipline of our company is conveyed by more than 3500 of our vehicles and what they represent — people at work for others. Operate your service vehicle with pride. You are the moving symbols of Johnson Controls.

Cover Photo
Johnson Controls Annual Report, 1980



Wall Street, There's no other place like it. But as on thousands of other streets around the world, Johnson Controls is there helping to make energy use more efficient in transportation, buildings and industry.

Service Coordinators Seminar



THE MIDWEST REGION was well represented at the annual Service Coordinators' Seminar held in Milwaukee during the week of July 20-24. From left are, Jeff Dobis, Chicago South; Ruth Schemell, Sioux Falls; Debbie Johnson, Moline; Bob Pagliasotti, Midwest regional service sales manager; Bob Smith, Cedar Rapids; Peggy Trojanowski, Duluth, and Sandy Lee, Chicago.

Around Johnson

Columbus employee wins car



Sue Donohoe and her daughter with their 1981 Chevette

Sue Donohoe, engineering secretary in the Columbus, Ohio branch, is the proud new owner of an "American Mercedes" (Chevrolet Chevette). Sue won the automobile as a home viewer participant on a TV game show. She figured out the third in a series of clues that were scheduled to con-

tinue each night for a week or more. Sue says she examined each clue from all angles "just like I learned from the application engineers in the branch." She was the only participant to even come close to guessing correctly. Here are the clues she analyzed to win the car.



PCRO SPARES NO EXPENSE FOR STAFF ACCOMMODATIONS. Actually, this photo shows John Taylor, Pacific Coast regional technical supervisor, borrowing the house used by Burgie, the "guard dog" for the job site trailer at the MGM Grand Hotel in Las Vegas. John is one of the regional personnel who have been on the MGM job site since February.

#1) 25-8=17. The numbers in the license plate add up to 17.

#2) 140 paces from a dead end. She figured the location might be a parking lot near a cemetery. She waited until ten o'clock at night when most of the cars were gone from a lot where thousands park each day. She found a white car but was still not sure it was a car she was looking for.

#3) The opposite of black and not too heavy. To finish this rhyme, look for a "..." The third clue was the clincher, a white Chevy, probably medium or small sized.

The photo below shows Sue when she appeared on the TV show to claim her prize.



Russ Rogers, senior draftsman in the Dallas/Ft Worth branch, used this ingenious approach to tell co-workers about the birth of his son. (MTF appreciates the compliment, Russ.)

SYSTEMS & SERVICES DIV.
ROGERS CONTROLS INF.

Mothering

The Field

JULY 18, 1981

ROGERS CONTROLS

ANNOUNCES: THE LATEST
BREAKTHROUGH IN PACKAGED UNITS

THE BEST IN THE BUSINESS TAKES SEVERAL HOURS OF HARD WORK TO PRODUCE. AFTER NINE MONTHS OF PATIENT WAITING, THE MEMBERS OF ROGERS CONTROLS, INFAMILY ARE PLEASED TO ANNOUNCE THE ARRIVAL OF ONE OF THE GREATEST MASTERPIECES CREATED BY THE HAND OF GOD.

AFTER LONG HOURS OF TESTING AT IRVING COMMUNITY HOSPITAL IN IRVING, TEXAS, THIS UNIT PROVED EFFECTIVE. ALL INVOLVED WERE VERY PLEASED WITH ITS PERFORMANCE.

BECAUSE OF ITS UNIQUE DESIGN AND EXTRAORDINARY DETAIL, THIS ITEM WOULD BE IMPOSSIBLE TO PUT INTO MASS PRODUCTION. SINCE THIS ITEM WILL NOT BE PLACED ON THE MARKET, THE PRESIDENT AND VICE-PRESIDENT OF ROGERS CONTROLS, INF., RUSS AND LIZ ROGERS, WILL MAINTAIN THE PROTOTYPE AT THEIR HOME OFFICE IN IRVING, TEXAS FOR EXTENSIVE STUDY AND DEVELOPMENT.

DESIGN SPECIFICATIONS:

WEIGHT: 7 POUNDS, 15 OUNCES

LENGTH: 21½ INCHES

OFFICIAL TEST DATE: JULY 18, 1981

TIME: 9:47 P.M.

LOVINGLY NAMED: BENJAMIN ERIC