

SOUND & COMMUNICATIONS

THE MAGAZINE FOR SYSTEMS INTEGRATORS, CONTRACTORS AND CONSULTANTS

TECHNOLOGY MEANS EFFICIENCY

BY CLARE CLIMACO

**A Thriving
Contracting
Shop
Leverages
Technology
for Efficiency
and Profit.**

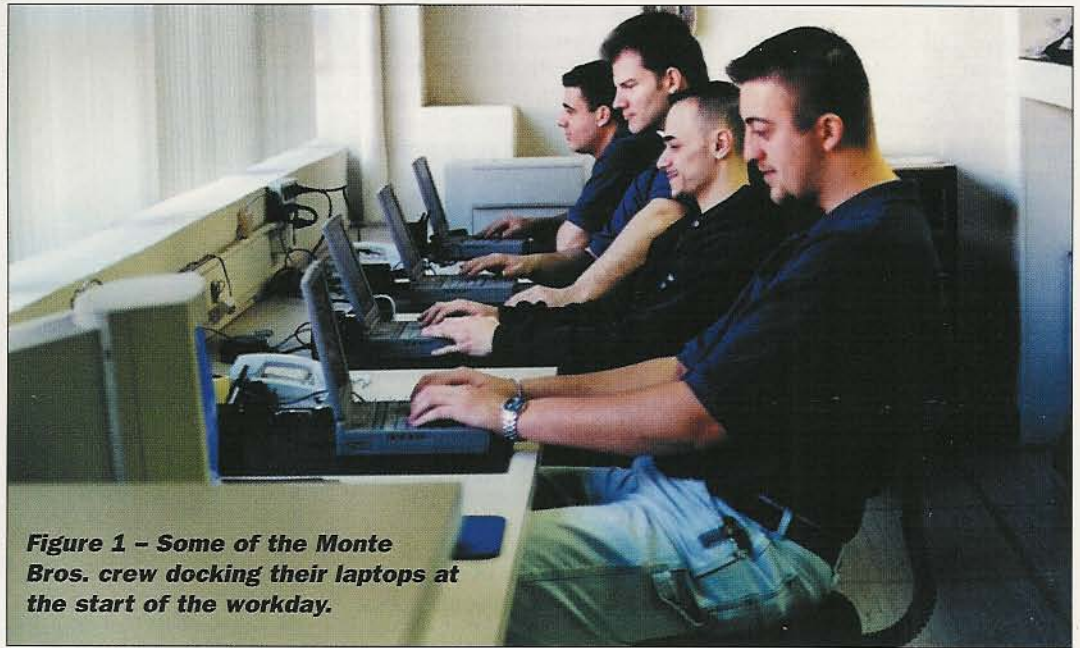


Figure 1 - Some of the Monte Bros. crew docking their laptops at the start of the workday.

Imagine this: A client calls you suspecting that there's a blown loudspeaker in a sound system you recently installed. Before you're off to the job site, you plug in your laptop, download a work order that contains all the information you need - directions to the site, sound system specifications, schematics, equipment lists. In a matter of minutes, you drive off to take care of the problem - no digging through files or stacks of paperwork to find what you need to get the job done.

There's more. Imagine a virtually paper-less office, where everything from RT-60 profiles and signal flow diagrams to payroll files and calendar functions are stored and easily accessible by computer.

Impossible? Not for one New York-based sound contracting firm. Monte Bros. Sound Systems, Inc.

has been designing and installing sound reinforcement systems, mostly for houses of worship, in the New York metropolitan area for more than three decades. The company, owned by Robert Pelepako and Stephen Minozzi, recently spent thousands of dollars to develop a powerful Windows-based network that has streamlined work order processing and a wide variety of administrative functions. The network, which centers around a customized relational database program, redundant file servers and super-fast Internet connections, allows company technicians out in the field to access all critical data related to a job from their laptop.

From DOS to Windows

Creating the network took years of careful planning, time and money. Since the early 1980s,

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Figure 2 – The Monte Bros. fleet lined up and ready to go.

Monte Bros. had been using DB Master, a DOS-based relational database system made by Macon Systems, a software company based in Colorado Springs, Colorado. First, they used DB Master primarily for billing. Over time, working with Macon Systems, Monte Bros. began to expand the program's capabilities by creating custom tables, or master files, to handle everything from the company checking account, purchase orders and inventory to job-specific information such as work orders, floor plans and schematics. Each of these tables shared information and relied on numerous custom-programmed macros that could perform specific calculations and produce reports.

"All files interacted with each other to expedite data processing," Minozzi explains. "For example, typing the account number from the Account List file into an Estimate, would cause critical information from Invoice, Work Order, and RT-60 files to be automatically transferred."

But as Windows operating systems and software began to dominate the PC market, the company knew it was only a matter of time before its old reliable DOS system would become obsolete. "The DOS system was working fine," Minozzi says, "but the many of the manufacturers' software programs that were originally DOS-based eventually switched to a Windows format that required computers equipped with Windows operating systems."

In 1998, the company began planning to make the conversion from the DOS DB Master to the Windows version – a formidable task considering how much it depended on the DOS version for its daily work. The time and cost involved in setting up a new network were major challenges. But the biggest obstacle was transferring data from the DOS server to the Windows server while getting on with everyday work.

"The day-to-day operation of our entire company was dependent on computers," notes Minozzi. "But we viewed this change as an investment in our future and realized that we had to endure some short-term

inconveniences to accomplish our goal."

In order to handle the conversion in-house, the company sent one of its employees to become certified in Window NT Server technology. It purchased the Windows version of DB Master and set up two parallel networks –the DOS Novell network and the Windows NT network–side by side. To run the Windows programs, the company purchased six laptop computers and eleven desktop computers, while continuing to use the DOS system for most of its administrative functions.

One daunting factor in the conversion process was that while all data, field formulas and page formats could be transferred from DOS to Windows, the customized macros and reports would be lost. Because the company relied on those reports for daily work, the final conversion had to take place in one day rather than in segments. Monte Bros. worked closely with Macon Systems' Tim Roden, chief programmer of DB Master, to recreate the custom files and macros in the Windows NT version of DB Master. For months, Minozzi and Roden communicated mostly via e-mail to customize and improve each file. In the meantime, Roden created a macro that would gradually transfer data from the DOS server to the Windows server. The macro ran for 15 minutes every night for nearly two years. To ensure that the data was transferred accurately, files had to be compared and analyzed almost daily. "For example with invoices, we had to print out unpaid invoices from each server to make sure we weren't losing any money in the process. We had to print payroll records and compare them. We had to double-check the formulas and fields in our checkbook program. It was time-consuming and

Figure 3 – The "boardroom" at Monte Bros. headquarters is used for training as well as for customer presentations.



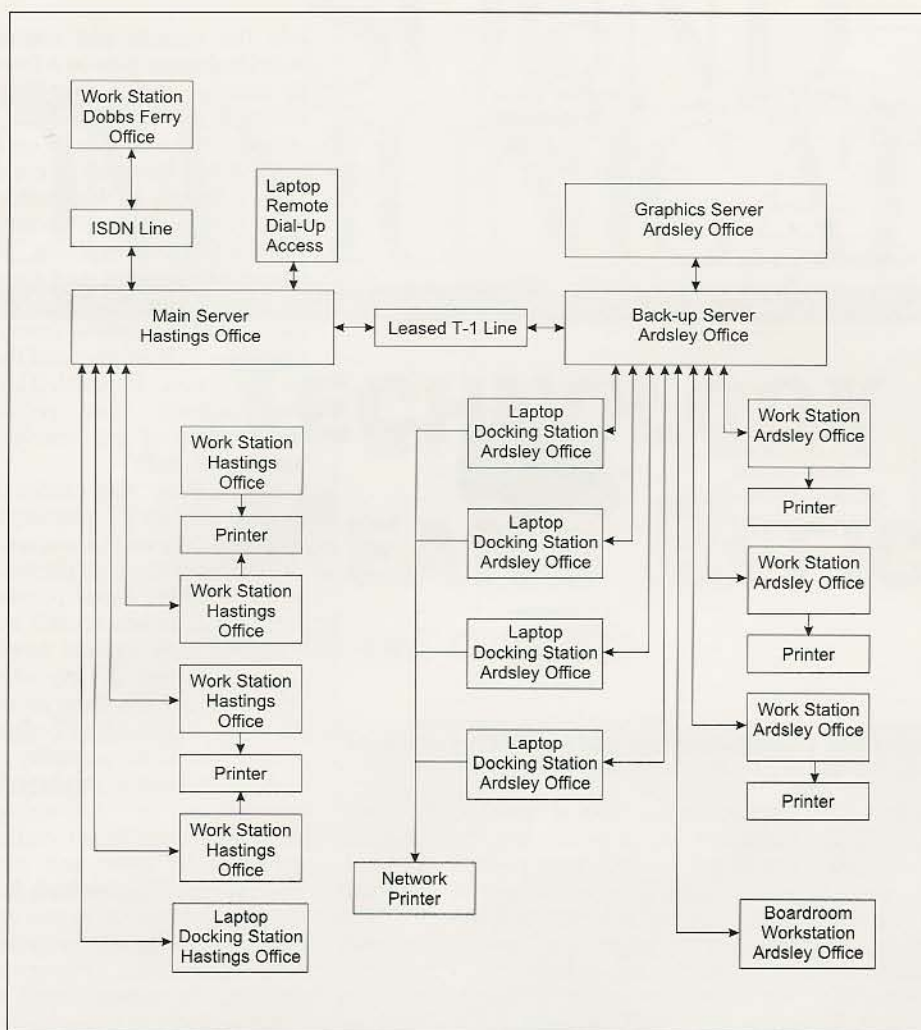
meticulous work."

Finally, the company decided to "bite the bullet" and finish the conversion on a Saturday. The new macros that Roden created would transfer all data from the DOS server to the Windows server for the last time. Time, money and careful planning paid off Monday morning. "Our first reaction was relief that everything at least worked," Minozzi says candidly. "The conversion wasn't perfect and it still needed fine-tuning, but it worked well enough to enable us to continue operating our business."

The advantages of Windows were readily apparent in the daily work. Not only was the Windows operating system simply faster, but employees could share information in DB Master and other application programs, such as Word Perfect and Adobe Photoshop, without compatibility problems and operate the programs with minimal training.

"The consistency, standardization and logical views and icons in the Windows

**Figure 4 -
Block
diagram of
Monte
Bros.
computer
system
and WAN.**



the power to search, compare and analyze the reverberation time profiles for more than 500 houses of worship, auditoria and other installations. Calibrations made by the TEF sound analyzer are input into designated fields on the form and a detailed RT-60 profile is automatically calculated. By entering parameters into various fields, the system can search for similar houses of worship and auditoria that fit the particular profile. "For example, we can find all the churches that have similar RT-60 profiles - from 2 kHz to 5 kHz of less than 1/2 second, from 500 Hz to 1.6 kHz of more than 2 seconds, and from 160 Hz to 400 Hz of more than 2.3 seconds - and pull up related data from those specific locations. Then we can go into Photoshop, type in the phone number of that church and it will pull up the floor plan."

The Work and RT-60 files are among 12 tables that can be accessed from the DB Master main menu. The tables operate by pulling information from other files when prompted by prefixes, codes or information

format enable employees to run multiple programs, without having to study and learn the operating system of each new program, which was the major problem with DOS. Once you learn Windows you can just about operate any reasonably designed program with minimal acclimatization time," Minozzi says.

Comprehensive Capabilities

The Windows NT network centers around a main file server, located in a satellite office in Hastings-on-Hudson, New York. The main server, made up of two redundant computers, is linked via a leased T-1 line to the company's main office in Ardsley, New York. The Ardsley office houses two servers, one for graphics one for back-up. The powerful new network has significantly cut administrative paperwork, giving employees out in the field the ability to access all the information they need to serve a client via computer.

At the beginning of each day, technicians plug the laptops into one of four docking stations at the Ardsley office. New and incomplete work orders and related files are downloaded from the DB Master "Work" file. The work orders contain related information for each job, including job site directions, account information,

schematics and calendar appointments. At the end of the day, technicians quickly and easily upload all the information on the progress of the work order into the file server by simply clicking a button.

"When the technicians leave the office, their laptop computers have all necessary data to accomplish their work in an efficient manner. With DB Master, they can quickly pull up their file and access all critical data on the job - the sound system, floor plans, schematics, microphone locations and models and a history of previous service," Minozzi says.

The work order process highlights the power of the relational nature of the DB Master program. Information is shared among files or tables to minimize data entry and expedite processing. Minozzi explained: "Let's say you have a customer that wants to buy equipment and have it installed. First you would create an invoice that lists the items they want to purchase, quantities and price, and the work to be done on the job. On that invoice, there's a button that says 'Work Order Transfer.' Click on that, and the information from the invoice - the equipment and quantities and any work descriptions - are transferred into a new work order. The work order is sent to the Work file. Technicians download the work orders in the morning."

DB Master has also given Monte Bros.

selected from field drop-down menus. Account List contains general client contact information as well as all the job-specific information, such as sound system components, system design, schematics. Calendar is used to schedule appointments and direct work crews to specific work orders for the day. Calendar also functions as the company's electronic message board for interoffice communication - an employee can type in a message on a coworker's "page." The Estimate table automatically calculates costs for new installation projects. Inventory identifies the source of a piece of equipment in stock and shares all necessary data with other related tables, as well as tracks inventory in stock and inventory necessary to complete current installations. Invoice is used to generate a bill for service and equipment for all accounts and functions as the initial source for a work order. The MonteCheck table functions as the company's electronic checkbook, keeping track of all operating expenses. The checkbook can also be used to generate financial reports for the company's accountants. Rolodex serves as a master address book and includes shipping addresses for any vendors, architects, and related business associates. Payroll accesses employee data from the Rolodex, and automatically calculates employee compensation and deductions. It, too, can be used to generate quarterly payroll reports.

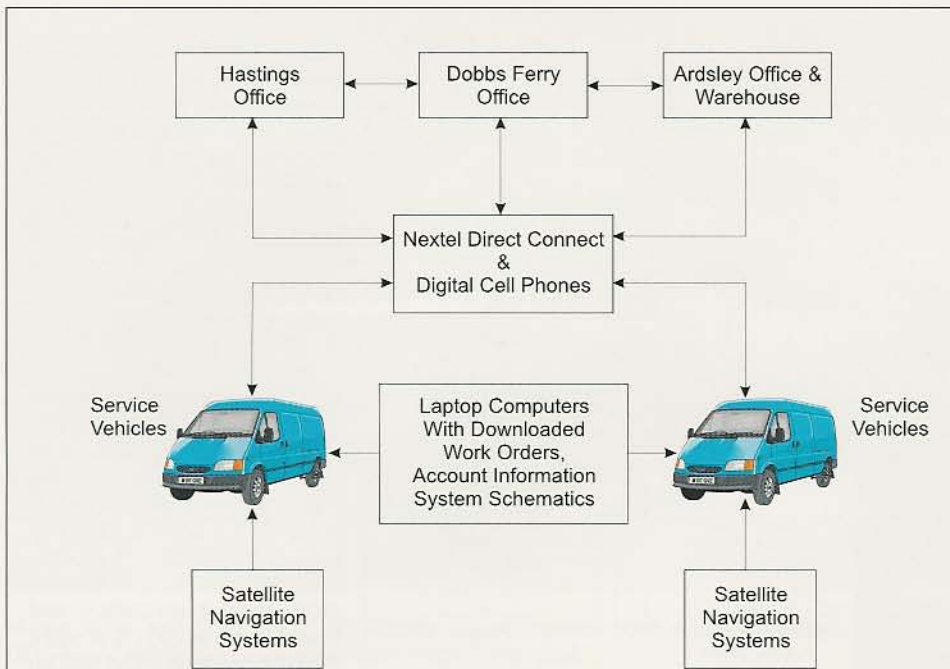


Figure 5 – Block diagram of Monte Bros. communications and navigation systems.

The Purchase table tracks equipment purchases and defines the destination of special orders by referencing individual purchase orders.

The Payroll table along with Cash Register Plus, a special software program supplied by the Bank of New York, has enabled the company to handle payroll electronically, virtually eliminating paperwork and trips to the bank. When an employee logs into his or her computer in the morning and at the end of the workday, the employee's hours are automatically recorded, with the computer system functioning much like an electronic timecard. In the Payroll table, an employee ID number is entered or selected from a drop-down window. When the pay period dates are entered, that employee's hours are

automatically calculated based on their daily login and logout times. Overtime, regular hours and weekly gross pay are tabulated, while Social Security, Medicare, state and local taxes are automatically deducted. The form is then printed out and given to each employee as a pay stub.

Salaries are deposited directly into each employee's bank account via the Bank of New York's Cash Register Plus program. The Internet-accessible program allows an authorized Monte Bros. employee to access customized software on the bank's server with a Secure ID card. The special card, about the size of a credit card, displays a six-digit number that changes every minute and a bar graph that shows how many seconds remain before the number changes. To get

into the system and transfer funds, the individual must type in a five-digit company ID number and a four-digit PIN number followed by the six-digit number that appears on the Secure ID card at the time of login. "This allows us to essentially transfer money directly to the employees' accounts, or to send or transfer money wherever we want," Minozzi explains. "I go to each employee's account, and through automatic repetitives, enter the amount of money to be transferred. At various times, I am required to use our PIN number and the six-digit code on the Secure ID Card. The company and the employee then receive a written confirmation of the transaction from the bank in the mail."

Monte Bros. also carries its "technology means efficiency" philosophy into other aspects of daily work. Company employees use Nextel Direct Connect phones which function as 2-way radios, digital phones and as e-mail receivers. Company service vans and cars are equipped with various satellite navigation systems to get to job sites faster. UPS shipments are also done via online, similar to the Cash Register Plus program, eliminating paperwork and the possibility of error.

Already, the company has seen the investment in technology pay off. Technicians are better equipped to handle service calls faster and more effectively. The powerful networked database system reduces time-intensive and error-prone data entry, providing all employees with up-to-date information. Paperwork has been significantly reduced and, eventually, the company expects to cut office paperwork by up to 80 percent.

"Time is money," Minozzi says. "Our new Windows-based computer software and hardware, digital cell phones, Internet-accessible banking technology and satellite-based navigation systems, they all cost money. But in the end they provide us with more time to *make* money. It's practical to be efficient!"

Figure 6 – Screen for the WORK form.

Figure 7 – Screen for the INVENTORY form.