White Paper

Preface

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Statement of Intent

American Services Resources desires to provide and install a "COMPUTERIZED MANAGEMENT SYSTEM", more recently referred to applications for Support Automation Technology (SAT) using Code Avoidance Technology (CAT) for development and deployments that includes various application software packages to accommodate the customer. Application modules to complement the existing operational concerns or a new installation are discussed in this White Paper response presentation and described herein. This White Paper series is created after reviewing several requests for information (RFI), request for quotation (RFQ), request for proposal (RFP) and request for bid (RFB). Collecting data on questions and specifications from requests proposed to American Services Resources has prompted American Services Resources to write in several forms, narratives, multi-level questions and answers, direct answer questions, and charted responses. American Services Resources has elected to provide this White Paper to clarify questions and eliminate the duplication of efforts. Standard and specialized computer hardware and operating systems will be required for the MMM software program series "Computerized Management System". Installation assistance from key customer personnel will provide solutions to the already installed base of operations. Data conversion is a specialty that American Services Resources has been doing since 1980. Data conversion from the existing data files can be reviewed during installation and later imported according to the implementation schedule. Training of the customers personnel will be an on-going process to maintain continuity. Ongoing software support and maintenance is critical to the success of the computerized management system. American Services Resources has multiple levels of customer support both on-site and remotely.

Applications that are included in this White Paper series for a "Computerized Management System" have been expanded beyond the original intent of the Master Maintenance Management software program series. While typically over the last few years the industry has named various vertical applications as computerized asset management system, computerized maintenance management system, computerized facility management system, computerized equipment management system, computerized support system, and others identifying the application required to meet the needs of the particular company, American Services Resources has designed a computerized management system that now provides for multi-discipline activities for equipment, facilities, support services, help desk, field services, and other services where people and assets are important to a company. This "Computerized Management System" is aimed at the automated support industry that is now emerging company wide in America. More recently, the companies are now demanding control from a central point called "Mission Control" where a team of coordinators direct service from a department of specialized crews, trades and professionals to solve problems for multi-discipline activities. Therefore, this "CMS" is aimed at solving equipment, assets, and software application problems for those disciplines mentioned herein.

Executive Summary

The Master Maintenance Management (MMM) software program series is an application for support automation technology where users deal with assets, personnel, vendors, work orders, inventory, computers, and other items related to general business. The 'MMM' has multiple configurations for deployment. There are two sides to the 'MMM'. Side one is application deployments. Side two is application development, using the Code Avoidance Technology (CAT) methods.

The first side is detailed in our First and Second Series of White Paper presented by Softwest Programming, Inc. Side Two is detailed in the Third Series of White Paper on the 'MMM', MMMworks and Magic.

The MMMworks(tm) has a library of field types source code, data files source code, and program data files .....Magic is an Open Systems Rapid Application Development (RAD) and Deployment system designed for mission-critical Client and Server host architectures. Unlike other development products, Magic is based on a unique post - 4GL technology that replaces the traditional coding process with an automated, completely table driven programming environment using CAT methods.

This White Paper presents the respective roles of American Services Resources, MSE, Softwest Programming, Inc. and other manufacturers, and shows that, when used to complement each other, Softwest Programming, Inc. and MSE are natural partners for strategic support and information technology application development and deployments.

The corporate computing community has long recognized the economic benefits of compliance with international standards has been at the forefront in pressing both hardware and software vendors to deliver products that conform to such standards.

Innovators, on the other hand, often view standards as a straitjacket that inhibits precisely the technological progress desired by the same corporate computing community. In a world where corporate decisions must be made today concerning support automation technology (SAT) and information technology (IT) requirements for a future world whose only certainty is uncertainty, safeguarding the corporate investment in securing this investment is the use of open-compliant database management systems, particularly in true CLIENT and SERVER configurations.

Issues today are concerned with total cost of ownership (TCO), total value of ownership (TVO), inventory acquisition value (IAV), inventory recapture replacement value (IRRV), cost versus time ratio (CVTR), mean time analysis (MTA), and operational availability (Ao). The Master Maintenance Management software program series uncovers these issues so that top management has the tools to determine the course to follow for their business objectives, and provides the workers the ability to credit and identify exactly what is needed on a task by task basis. Then and only then the formula 5W+H=K can be realized.

Softwest Programming, Inc. develops and deploys in MAGIC, the international award-winning database application development system (outright winner of the 1992, 1993, 1994, 1995, and 1996 Developers Competition), represents a unique balance between innovation and compliance with standards:

Through innovation and unique design, Softwest Programming, Inc. improves cost containment practices already in place by top management.

Through experience and definitive procedures, Softwest Programming, Inc. improves maintenance avoidance practices for all workers.

Through by-products of good software design, Softwest Programming, Inc. increases productivity and the effectiveness of the total unit.

Through innovation, MAGIC drastically slashes application development costs.

Through compliance with standards, MAGIC shifts the burden of safeguarding the corporate investment in application software from developer to MAGIC itself.

This evaluation criteria and White Paper presents American Services Resources concepts for support of:

Top management; the ability to see the overall true picture of cost versus unit of time.

Supervisors; direction, backlog, deferment practices, and details of systems, assets, and personnel.

Workers; the ability to understand new processes, upward reporting, accountability, usability, and responsibility.

With the flexibility to use tools and applications, users and developers can meet objectives of top management and increase the return on investment in record time.

INTRODUCTION

Per the request of your company, requests on the details of the 'Master Maintenance Management' software program series, the evaluation criteria is outlined in the answers defined herein. The answers contained in this document are intended to convince the appropriate evaluators that American Services Resources and associated contractors and suppliers can successfully deploy and support the "Master Maintenance Management" software program series and tools for a Computerized Management System in accordance with specifications stated herein.

Thorough questions regarding a CMS for Support Automation Technology based on criteria that can yield qualitative and quantitative answers are presented herein. The questions are an integral part of these "Answers to the CMMS Evaluation Criteria".

1.1 General Description and Summary of basic needs

Minimal considerations for a single user version can be deployed with less than twenty (20) equipment items, one building, and less than one hundred (100) work order per year. Current deployment of the 'MMM' includes over 500 Million square feet that is managed with the 'MMM' nationwide. The largest single system has greater than 120,000 equipment items and generates greater than 200,000 work orders per year. Maximum use is dependent on the size of the computer hardware and network. The maximum client work stations on any platform is 999 per node.

Customers that would like to acquire and implement a new computer system to replace the existing programs or implement from ground zero the 'Master Maintenance Management' (MMM) software program series are prime candidates for the (MMM) application, MMMworks(tm) and MAGIC. The 'MMM' system will track facility inventory, work orders, preventive maintenance schedules, parts inventory and maintenance history. The 'MMM' is a well established CLIENT and SERVER application for tracking employees, vendors, manufactures, clients, contracts, assets, and other items related to support automation technology for Computerized Management Systems. Equipment management features equipment records that are one-to-one relationships for contracts, budgets, assets, etc. and one-to-many relationships where bill of materials are important to preventive maintenance, where sub-assembly definitions are important for components within an equipment item or system, and where device definitions include data related to nomenclature, sizes, hertz, volts, etc.

The 'MMM' proposed system will be able to generate and accept files to interface with the mainframe based systems, programs using Windows, and Novell compliant client/server architecture utilizing Ethernet or Token-Ring topology.

The proposed system CMS Master Maintenance Management software program series will provide the following:

A method to maintain all facilities and associated data. This includes converting existing data from the mainframe system to the new proposed system. The exact fields to be converted will be determined during conversion and implementation.

The ability to generate work orders and track work order history by building, employee, vendor, etc.

Storage and retrieval of building, asset maintenance and repair history for the life of the building.

Preventive maintenance scheduling based on variable schedules.

The ability to track warranty information and maintenance performed under warranty.

Cost per building and life cycle cost.

The capability to use bar code technology for building, work order, part, and employee work hour data entry.

A database management system that easily provides ad hoc inquiries, reporting, security, backup and recovery.

A user-friendly, flexible system including features like on-screen help, Graphical User Interface (GUI) screens pop-up screens, pull-down windows, and control by the use of a mouse or track ball.

Support by American Services Resources places a premium on quality customer service, documentation, maintenance, and training programs.

The capability to import and export files to and from this system in ASCII or other defined format.

Electronic interface capability to an automated Records Management System.

The capability to accommodate century dates. The MMM is compliant with the year 2000 and beyond.

1.2 Evaluation Criteria

GENERAL

Provide a value between 1 and 5 to weigh your evaluation based on what other vendors provide. One (1) being the lowest and five (5) being the highest.

· Is the program a 32 bit application Win95/NT capable? YES [ ]
· Data secure so that it can be used in a regulatory audit? YES [ ]
· How much time implement? See herein Implementation. [ ]
  Basic installation is less than four (4) hours for five (5) work stations.
· Mobile capabilities. YES [ ]

WORK REQUESTS

· Are there different ways to enter work requests? YES [ ]
· Can there be an USA (Underground Service Alert) interface. YES [ ]
Via eMail and the internet or WinBeep Paging.

WORK ORDERS

· Are there multiple entries for posting? YES, based on billing criteria, [ ] hours, material, etc.
· How do we easily accomplish planning and what is the process? [ ] This is done with manual scheduling item by item,
  globally changing criteria, or modeling.
· Can we have on the work order assignment of parts/material codes/locations? YES [ ]
· How do we interface with the warehouse computer system? [ ] Via ASCII data exchanges manually or automatically timed.
· Can we show multi-craft on a single work order? YES [ ]
· How do we input/show prioritization on a work order? with Priority Codes [ ]
· What levels of authorization can be used on a work order? [ ] Functions with each work order and via Estimates for
  Completion. [ ]
· How do we set up scheduling? With manual entry, globals, or modeling. [ ]
· How can we recall the history of an asset? By any criteria selected. [ ]

PM WORK ORDERS

· Can we use a toggle for the frequency of maintenance? YES. [ ] Pre-emptive, date sensitive, numeric sensitive, based on last
  or next date due.
· Can we set it up as hours based? YES. User defined coded methodology. [ ]
· How do we close and post? Last worker to indicate a completed date closes. Posting is is accomplished with a selection of
  criteria.

REPORTS

· Can we have user-defined reports? YES. Report writer comes with runtime. [ ]
· Can user-defined data be recalled from work orders? YES. [ ]

OPEN WORK LISTING

· Backlog? YES, many formats. [ ]
· By Type? YES, user defined. [ ]
· By Craft YES. And by Craft/Trade, and by Crew. [ ]
· By Facility (asset drilldown) YES. By Facility, Entity, Field Office, Depart., etc. [ ]
· Compatible with Microsoft Products (Win95 and NT) and GUI driven? YES [ ]
· Ease of up/down drill? YES [ ]
· Examples of reports? See attached on diskette. [ ]
· Adding/Removing/Updating? YES [ ]
· Data forms? (spec sheets) YES, includes over 1200 building PM procedures. [ ]
· Graphic interface - Hyperlinks? YES [ ] May require customer provided files to link to existing data sets.

SPARE PARTS & MATERIALS

· Can the program display parts grouping (kits)? YES [ ]
· Can the program interface with warehousing system (modular package) YES [ ] requires technical consulting to determine what data sets are needed.
· Can the program show parts codes and warehouse locations? YES, by Bin and Location [ ]
· Can the program generate requisitions? YES [ ]

PROVISIONS FOR TRAINING

· Who will be trained by the factory trainer? Selected end users, selected managers, [ ] selected administrators, selected network and CNE's as required.
 How much time will be included for training? See typical proforma proposal [ ] Basic Training is estimated at five (5) to seven (7) days. Must be proficient in Windows. CNE Training for Support and Supervisory Rights is one (1) day. Administration Training requires same as Basic plus one (1) day.
·How much for additional training costs? [ ] Work Shop Training at multi-customer locations is $595 per day per trainee. On-Site Training for a specific customer is $ 800 per instructor. (Max ten trainees) Executrain Sites vary from city to city. Minimum cost is $495 per trainee to $995.
· Will training be on-site or at the factory? Either, or at a multi-customer site. [ ] What is the price difference? See above.
· What are the equipment requirements for on-site training? Blackboard, Video Viewer, [ ] Single user work station for one or two trainees.

LIKE USERS

· Is there a list of users of this program who are in the same business as us? YES [ ] See diskette with demo for MMM and Magic.
· Are any of them regulated by a state, federal and private commissions? YES. [ ] We cannot provide a list at this time.
· Is there a list of users of this program who are in a similar business? YES [ ] See diskette with demo for MMM and Magic and our Reference Page.

1.3 Demonstrated Ability

Demonstrated ability to successfully provide a Computerized Management System for properties possessing similar characteristics as compared to other asset and property management programs. During the course of the presentation, we will provide examples of the items below. See details provided herein.

Ease of Use for non-technical users.
Best fit of features to business requirements.
Stability of vendor based on qualifications and financial soundness.
Total system cost (hardware, software, and communications)

Ability to integrate with other applications
Training and support available from vendor
Vendor references and number of installations
Future technology direction of vendor

American Services Resources would appreciate that the customer to also further evaluate this White Paper and our products and services based on:

Completeness and timeliness of receipt of information.

Experience and technical expertise of assigned project staff.

Demonstrated commitment to Equal Opportunity.

Ability to demonstrate the integral parts of the CMS and the ability to change user and technical specifications to meet the overall objectives of management and finances.

To act expeditiously to demands that are considered important to administration.

Years in the business without buyouts and mergers.

1.4 Basic Description of the MMM

The "Master Maintenance Management" (MMM) software program series can be installed as as an upgrade to an existing system, a direct purchase for application requirements, development system with MMMworks and MAGIC, or a "Contract Maintenance Assurance Agreement" whereby the client does not pay for any product but receives the expertise in management and deployments of products for reengineering and rightsizing that have a proven track record in the industry. The cost of the "Contract Maintenance Assurance Agreement" is solely the responsibility of American Services Resources. Additional training and support are the responsibility of the customer and is an elective implementation. A minimum of five (5) days should be budgeted and approved for all implementations.

Where the "MMM" as a product must be used as any other tool. Mostly aimed at collecting data for management to comply with the myriad of inspection agencies, details in assets, maintenance and personnel for better management, insurance and liability and as a resource for personnel so that decisions can be made before the fact so that costs are maintained and or reduced. The miracle of America is that it is the first country in the world to acknowledge the freedom of self interest. You can not talk about business and innovation in a vacuum. The economics of each worker and manager is to take ownership in their jobs. Each worker and manager is responsible for the success and or failure of the company. Without the right tools no one can see into the depths of a machine or a business operation. Technology is changing daily. This is an understatement that I am sure you are aware. Costs are increasing and companies are trying to rollout a re-engineering plan that works. Support costs are never ending and the money seems to be falling into an enormous black hole. The burden is on the people. Not just middle and upper management, but the workers as well, causing us all to suffer the effects and costs. Softwest Programming, Inc. is a high technology software company that has had several software programs in place since 1979. Softwest Programming, Inc. is the development arm for our distribution and management company called American Services Resources. There were only a handful of development companies that produced a computerized software maintenance management system in the early 1980's. Through years of research and development in the support automation technology area, we have developed and deployed software that is ahead of the competition. Now, deployments are available for clients to establish and maintain a sound re-engineering and rightsizing plan. Our current product line can be developed and deployed in true client and server platforms in DOS, Windows, Dec-VAX, Unix, AS/400 and Macintosh Power PC in the non-native mode. Development can be accomplished without writing any software programming code. Yes, CODE FREE. The tools that we develop in are called Magic Software. Magic Software is a 'Code Avoidance Technology' (CAT) product. For the last three years Magic Software Enterprise developers have won first place world wide at the Duke University international software competition conference.

Our product, the "Master Maintenance Management" (MMM) software program series uses a schema for relational databases, including Sybase, Btrieve, dbase, FoxBASE, Informix, Ingress, etc. The "MMM" is an integrated business process that meets the needs of most operations for client and server deployments. Btrieve has been proven to be the most robust and solid

database. Therefore, this database engine has been installed in all sites with the "MMM" nation wide that have a Novell Netware Network. Btrieve is a Novell certified product. The "MMM" provides team use so that all users know what the other users have started or completed in order for companies to model business processes as well as build the foundation for a strong data infrastructure and integrated strategy for the future. There are two sides to the "MMM" product line. One, the deployment of quality high technology product to customers. Software that has been stated as the top of the line for years. Customers use it to manage a wide range of assets and personnel. Two, the development side that can now be developed with the libraries that have been in place for fifteen years. Yes, customers can now change the look and feel of software without having to write any software program code. Again, that is called CODE FREE (CAT).

We know that our concepts and practices are beyond the competition. To improve our clients position American Services Resources is offering the "MMM" software product and roll out of an established management plan as needed to meet the changing demands of today. We know that with sufficient understanding of our clients support automation technology disciplines American Services Resources can reduce costs and maintain your cost containment strategies. Maintenance avoidance practices will be available at the worker and middle management level for a much better handle in the management of assets and personnel. Thereby increasing productivity and efficiency. The "MMM" computerized management system for support automation technology disciplines can be interconnected to high speed networks to provide fast data management and up to date information to hosts and clients. This is a real time accounting process for information related to help desk, assets, personnel, facilities, maintenance, jobs, etc. that cannot be matched by the competition. Tracking of transactions for technical details, troubleshooting, statements of failure, statements of solutions, hours for personnel, hours for contractors, contract premiums, risk management to determine quality improvement directions, details for safety regarding OSHA, NIOSH, and other government bodies can provide meaning data for management so that the correct decisions are made ahead of time.

2.0 PROPOSED SYSTEM ENVIRONMENT

2.1 Description of Products and Services

The following sections cover a detailed description of hardware and related software required in conjunction with the Master Maintenance Management software program series. All software required to operate and support the Master Maintenance Management software program series is quoted on separately based on the needs of the customer.

If not already provided under separate cover are brochures on American Services Resources and Softwest Programming, Inc. contained herein.

2.1.1 Installation and Implementation

Scheduled time line showing the sequence of events from the receipt of completed contract to the use of a fully functioning system using production data. The following represents a detailed description of the services and products required to accomplish the implementation. This is considered a sample plan based on fifty (50) concurrent terminals, fifty (50) thousand equipment items, and 200,000 work orders per year.

2.1.1.1 Sample installation schedule based upon contract:

Purchase necessary hardware ....Day 1-10

System Configuration, Orange County, California....................................Day 11-41

Equipment Delivery to CUSTOMER by selected hardware vendor ....Day 42-55

Installation of hardware...Day 25-46

Installation of software..Day 25-80 Initial software installation takes less than four (4) hours for five (5) work stations. On-going required for additional work stations.

Pilot implementation...Day 35-55

Training On-Site...Day 40-60

Initial Hardware and Software Acceptance..............................Day 56&70

Data Conversion for Files (M)..Day 11-41

Final Acceptance Inspection and Ownership...........................Day 100

Smaller scaled systems may take as few as three (3) days for installation and training. It has been our experience that the recommended days for training is five (5). Of which, only two or three may be needed in the onset. The actual number of days is based on the complexity of the system to be installed and the experience of the staff that will be using and managing the MMM software program series.

2.1.1.2 Installation and Implementation

The below scheduled time line showing the sequence of events from the receipt of completed contract to the use of a fully functioning system using production data. The following represents an itemized list of responsibilities to accomplish successful implementation.

Installation schedule based upon contract:

Purchase necessary hardware and software..CUSTOMER

System Configuration, Orange County, California.....................................ASR

Equipment Delivery to CUSTOMER by selected hardware vendor ....CUSTOMER

Installation of hardware...CUSTOMER

Installation of software..ASR

Pilot implementation...ASR

Training On-Site..ASR

Hardware and Software Acceptance...CUSTOMER

Data Conversion for Files (M)...ASR

Final Acceptance Inspection and Ownership..CUSTOMER

2.1.1.3 Implementation Schedule

IMPLEMENTATION SCHEDULE BASED ON DAYS TO COMPLETE

DURATION: 100 DAYS 1 1 1
TASKS: 10 : 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 0 0 1
NAME: CMS : 1 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0

_____

PURCHASE HW :I------I
:
SYSTEM CONFIG: I----I

```
:
DELIVERY CUST: I-------I
:
INSTALL HARD : I-----------I
:
INSTALL SOFT : I------------------I
:
PILOT IMPLEM : I----------I
:
TRAIN ON-SITE: I----------I
:
HARD/SOFT : I------I
:
DATA CONVERT : I----I
:
FINAL ACCEPT : FINAL ACCEPTANCE I-I
---------------------------------------------------------------------------------------------------------------
I---I - Scheduled date range
```

2.1.2 General System Specifications

The specifications in this section describe what American Services Resources proposes for a fully deployed computerized maintenance management system for support automation technology.

SOFTWARE OPERATIONAL CHARACTERISTICS

All major system functions shall be integrated to provide data sharing and facilitate data input, transfer, and transaction processing. The software shall be organized by module, or a similar structural design to provide a logical path to access related system functions.

The Master Maintenance Management (MMM) solution includes a modular approach to all standard CMS needs. All Modules are fully integrated with one another and support data sharing, facilitate data input, data transfer and conform to transaction processing.

The MMM solution can include any and all the following fully integrated modules:

Equipment Inventory Module Work Order Management Module
Scheduling Management Module Client Management Module
Vendor Management Module Personnel Management Module
Budget Management Module Archived Data Management Module
Network Support Module Risk Data Module
Purchase Order Module Posting & Utilities Module
Parts Inventory Module Asset Management Module
Report and Analysis Module Report Generator Module
Materials Distribution Module Bar Code Work Order Module
Bar Code Asset Management Module Bar Code Parts Par Level Inventory Module
Data Dictionary Module Type Dictionary Module
File Dictionary Module Source Code Module
Business Graphics Module Vehicle Management Module
Remote Work Order Module Remote Equipment Inventory Module
Remote NO COMPUTER MODULE MMMworks Fields Library
MMMworks Files Library MMMworks Program Library
MMMworks Help & Menu Library

MENU SYSTEM AND USER INTERFACES

The system shall be menu-driven to provide access to modular functions, data screens and all other areas of the system. The menu structure displayed on the screen shall be logical and consistent throughout the system. It is important that the system provides an intuitive user interface with easy-to-follow menus, logical data screen layouts, cursor prompts, processing messages, consistent function key operation, and that it permits easy access to all areas of the system.

The Master Maintenance Management solution is designed with practically and user friendliness user future in mind. Having supported an installed base of over 3000 sites in the past 15 years, the MMM solution is constantly undergoing improvements and enhancements based of new technology and end user feedback.

The MMM menu systems provides a very intuitive, logical and consistent interface for end users and system administrators. All portions of the MMM solution provide extensive on-line help to include but not limited to; data input validation, help prompts and processing messages. During training and installation, when a user learns one screen, all other screens are learned immediately due to the consistent design of user interfaces for common user access (CUA) for all DOS and Windows applications, whether trained in DOS, Windows, Unix, DEC-VAX, or IBM AS/400.

PROGRAMMING LANGUAGE

The software programming language and operating system shall be transparent to users, and require no prior experience on the part of the operator. The development and deployment languages are interpretive and do not require the customer to write any code. YES CODE FREE.

The MMM solution requires no specialized computer skills on the part of the end user or operator. The intuitive interface provides an easy to use, easy to understand application where the operating system and programming tool/language is completely transparent. ASR employs a database development tool called Magic Software. Magic Software has been recognized as "the fastest" database application, client and server development language in the industry for the past twelve consecutive years. Magic Software Enterprises, Inc. has won FIRST PLACE at Duke University for the last four years. Additional information on Magic Software is included herein. White paper and paradigm covering issues for client/server, web enabling, and development.

SOFTWARE OPERATING SYSTEM

The software shall be supported by MS-DOS Version 5.0 or greater, or an equivalent, compatible operating system and shall be capable of operating on IBM or IBM-compatible hardware with the CPU being of Intel 386 or above variety with at least 8Megs of RAM. MS-DOS 6.22 recommended as of January 1995.

Initially designed as a fully functioning, multi- user application, the MMM solution is recognized for it transparent portability to a variety of operating systems and its database independence. Below is a partial list of the current operating systems and databases the Master YSTEMSnce Management supports:

OPERATING SYSTEMS DATABASES

MS/DOS Btrieve
Microsoft Windows dBase III
Windows NT dBase IV
UNIX Data General Clipper
Hewlett Packard HP 9000 C-Tree
Sun/OS C-ISAM
NCR NetWare SQL
IBM RISC/6000 Oracle
DEC VAX/VMS Sybase
DEC Alpha ISAM
DEC Ultrix Rdb
AS/400 RMS
Unisys Convergent

LAN/WAN, ENTERPRISE WIDE & MULTI-USER REQUIREMENTS

The software shall be capable of operating on a Local Area Network (LAN) and shall be fully supported by the Novell NetWare Version 3.11 and higher operating system. The vendor shall specify the minimum and optimum memory requirements of the file server, workstations, and printers on this network platform and any additional required memory management programs. The system should be designed to function in a multi-user environment. Support for wide area connectivity on a multi-protocol network running Ethernet 10 Base T, TCP/IP, Novel IPX, SNA and Windows NT IP over user selected routers. The user must be able to access the software over this topology.

MMM was originally designed to function in a multi-user environment (LAN) and support networks with a net BIOS of 3.11 or higher. The MMM solution supports a variety of communications protocols to include but not limited to; TCP/IP, DEC Net Pathworks, IPX and FTP. The MMM follows the standards for IEEE 802.3.

SECURITY

The system shall contain security with ID and password capability at multiple levels including menu, screen, and data element. File locking, function locking, and function within file locking options are required. Establish operator identity and maintain audit trails.

The MMM solution provides multi level, password based security options. Record and file locking are built in for data integrity as well as a user rights security system allows 100% security control over viewing, editing and creating data elements.

CONCURRENT USAGE

Concurrent access by multiple users. Allows simultaneous on-line inquiry, report generation and data entry using the same database from multiple work stations

The MMM solution allows for simultaneous and concurrent access to all system functions while enforcing complete data integrity through the file and record locking algorithms.

DATABASE DESIGN

Databases are designed to share data efficiently and eliminate redundant data entry. They must be non-proprietary and flexible
enough for robust ad hoc reporting.

The MMM solution is recognized for the flexibility in database design and its open architecture approach to application development. Not only is the MMM solution providing a non- proprietary backend it also offers unique flexibility in allow System Administrators to chose any one of the 15 industry standard database engines listed above under SOFTWARE OPERATING SYSTEM. The MMM Open Architecture approach allows organizations the ability to salvage any dollars spent in the event a new operating system or database engine (including all SQL products) is chosen. Fifteen years of implementation and design have yielded a system that is fully normalized to prevent data duplication.

RECORD LOCKING

The system has file and record locking tools to safeguard against loss or corruption of data due to simultaneous update from multiple work stations.

Record locking and file locking are built-in, integral parts of the MMM solution.

SYSTEM NAVIGATION

All modules of the system are integrated to the highest degree possible. The operator does not have to log out of one module and into another to move from function to function.

Developed as a system that provides "Information from a single screen and available at the touch of a key", the MMM solution allows users to intuitively navigate from application to application without logging out of an existing application.

DATA ENTRY

Data entry and updates (not using a hand held device) are processed on-line in real time.

Data entry, queries and data modification is accomplished on-line to provide real-time data.

EDITS

Provides data entry editing and validation of all data entered by keyboard or other data entry devices. Edits to include value ranges, formats, required fields and correct codes. All data entry is supported by a variety of data validation techniques to include but not limited to; data input range validation, acceptable value validation, format validation and forced entry into required fields. The MMM solution also allows for "Pop Up" tables on any input field. The tables can be evoked either by pushing a "zoom" key or can be configured to open automatically to assist end users in data entry.

HAND-HELD DATA ENTRY

Supports hand held data entry devices capable of recording labor and parts used for a work order, replaces written time records, and records physical inventory counts for part stockrooms. Data recorded in the hand held device must be capable of being up-loaded and processed into the software's database without re-keying.

The MMM solution supports a large variety of hand-held data capture devices to include but not limited to Bar Code Readers, InfraRed Data Collection Devices and an Electronic Tablet Scribe Pads. Included in the White Paper is additional information and partial list of data capture options supported by the MMM solution. All data capture devices are designed for easy download capabilities into the MMM solution.

The MMM solution supports centralized and de-centralized WinBeep Paging on a LAN or WAN. This eliminates the need for workers to return to the central maintenance area and may pick up work orders after leaving the last location for maintenance.

BAR CODE SOFTWARE

American Services Resources supplies a complete Bar Code module series that fully integrate to the MMM solution. Each module is designed to offer special capabilities to end-users.

BAR CODE WORK ORDER MODULE for MMM versions. Integrates with WORK ORDER MANAGEMENT.

BAR CODE ASSET MANAGEMENT for MMM versions. Integrates with ASSET MANAGEMENT for tracking and collecting asset data.

BAR CODE PARTS PAR LEVEL INVENTORY for MMM versions. Par level tracking of parts and integrates with PURCHASE ORDER MANAGEMENT.

BAR CODE EQUIPMENT

ASR supplies state-of-the-art bar code equipment to include: Bar Code Readers (wands), pre- printed labels, software to produce internal use bar code labels, and bar code printers. ASR's multiple level options allow users of MMM to pick bar code technology that is best suited to your needs. ASR service representatives are available to discuss the hardware requirements based on customer demands, usage, number of staffed personnel and the size of the facility.

DURAW16K DURA WAND DATA COLLECTOR 16K BYTES RAM One button operation. Connects to key ring. Processes BAR CODE DATA without the keyboard. Downloads via serial port to computer.

PERC128K PERCON WAND DATA COLLECTOR 128K BYTES RAM Full alpha-numeric key pad for data entry. Processes BAR CODE DATA without the keyboard. Downloads via serial port to computer.

NOCOMP ScriptWriter with Bar Code Pen. An 8x11 tablet that can collect data via a bar code wand input

and a pen to scribe the other data onto a work order sheet that is later downloaded into system files.

OMNIWAND OmniWand infra-red scanner for Bar Code
Supports infra-red bar code laser and contact bar code reading.
Scans bar code labile and allows full data entry for work orders, parts inventory, parts par level, and asset tracking

BAR-CODE SCANNING

Bar Code scanning is supported as a primary data entry method.

By implementing any one of the various data capture options, Bar Code scanning can be used as the primary method on data entry. Bar Code scanner options include; "one button operation", "Full alpha-numeric key pad", "Infra-Red Laser" and "ScriptWriter with Bar Code Wand"

IMPORT AND EXPORT FILE CAPABILITY

Has the ability to build a file consisting of any data fields contained in the system and upload that file for export to other systems.

The MMM solution includes multiple posting and utilities modules that will allow for the creation and import/export of data files determined by the System Administrator.

POP-UP LISTS

Has pop-up list of valid Codes for appropriate fields. System fills field with Code selected from pop-up list.

The MMM solution allows pop-up lists that the user can simply cursor to the appropriate item and push the return key to populate the appropriate filed from the list. All lists are 100% user definable as well as included pre-established, industry lists.

MAJOR FUNCTIONAL CAPABILITY OVERVIEW

The 'MMM' system is modular and include these capabilities:

(1) System Management
(2) Work Order Generation & Tracking
(3) Preventive Maintenance Scheduling
(4) Automated Maintenance Planning
(5) Facility Management
(6) Labor Tracking/Resource Forecasting for FTE and Contracts
(7) Materials Management & Inventory Control
(8) Work History
(9) Help Desk Work Orders
(10) Planned Maintenance Work Orders
(11) Enterprise Wide Work Orders on a WAN
(12) Budgeting
(13) Reporting (Standard & Custom)
(14) Property and Portfolio Lease Information
(15) Asset Tracking via bar code and infra-red
(16) Fleet Vehicle Management

MODULAR DESIGN

The MMM software program has organized functions by module or similar functional grouping. The modular structure provides the option to add modules to the core system as future needs require, and as these modules become available from the vendor. The modular design is of a relational nature to permit data exchange and functional interaction between modular functions. All MMM solution modules are designed to fully integrate with each other and provide for complete information

sharing.

DATABASE INTEGRITY ROUTINES

The MMM software system ensure the integrity of the database by including utilities for identifying and reporting on database problems. The MMM software incorporates utilities or functional routines for repairing and recovering corrupted data files and associated records.

The MMM solution comes bundled with a variety of utilities supporting diagnosis software solutions, data recovery software solutions and data repair software solutions. Additional utilities are available from various manufactures of the database engine that is implemented. The standard DOS/Windows LAN system includes Btrieve as a database engine. Btrieve Technologies, Inc. offers a line of utility software for users of Btrieve. ASR provides utilities available on our dial in modem.

DATABASE/FIELD INTEGRATION

The MMM databases are structured so that updating a field in one database will automatically update any related record in any other database. The MMM solution supports fully relational database design. A change or update on any screen will invoke an update system wide.

USER CUSTOMIZATION

The MMM software is capable of being customized by the user. Customization capabilities shall permit editing of screen fields; adding, deleting, and hiding fields; changing field lengths and screen positioning. The software includes report and form generators, and provides for sorting of fields through alternate indexing. The ability of the user to create macro commands is also available.

The MMM solution quoted can include the development tool used to create the MMM solution as well as access to all data dictionaries, type dictionaries and program dictionaries. System Administrators have the ability to rapidly design new screens using any existing data element, create new data elements, configure new reports on the fly, automatically and manually create
forms. All end users have access (point & click) to a complete ad-hoc query systems that includes but not limited to; sorting, ranging, updating, modifying, and deleting (these options are controlled via user rights).

USER HELP

The MMM software provides immediate access to context-sensitive help for each information screen and key data fields. Help screen text information can be modifiable by the user to accommodate customized screen terminology. Windowing capabilities are available to access vital file information and facilitate data entry program-wide.

ASCII COMMUNICATIONS

The user shall be able to import and/or export ASCII format data to or from the system databases. In addition, the user shall be provided the ability to designate file formats for both reading and writing these files. The ASCII read/write process shall be clearly defined to the user for transfer of any database information via modem or other storage media (e.g., diskette, backup tape, etc.) for subsequent input to external systems or applications.

The MMM solutions Posting and Utilities Module provides for simplified data management. Designed to work with all modules of the MMM solution these powerful utilities provide global updating, archiving of data for historical purposes and data import/export (including ASCII). These utilities allow System Administrators to design and view export routines without any programming. This feature is unique to MMM & Magic Software Enterprises.

SYSTEM MANAGEMENT

System management functions shall include the following:

Database archiving based on user selection of ranges and time frames.

User customization. MMM offers the ability of end user customization, editing, updating and creation of Work Orders and Purchase Orders wh'ile allowing System Administrators the ability to rapidly customize any application, data entry screens or reports without writing a single line of traditional computer code. This feature is unique to MMM & Magic Software.

Accounts/file reconciliation accomplished in auditing.

The MMM solution supports file and account reconciliation as well as full auditing capabilities. Accounts and record reconciliation are only accessed by high security.

Ability to reopen/edit completed work orders. All existing Work Orders may be re-opened and edited based on user rights.

Feature to set printer definitions

The MMM solution employs a Printer Driver Management utility. This powerful utility supports different printers as well as providing the complete tool set to create your own Printer Drivers and printer definitions.

Database recovery utilities and methodologies are provided and included in our TECHNOTEs.

SYSTEM MANAGEMENT MODULE

A System Management Module or set of utilities shall be provided to the user to create an inventory of all file codes, system setup variables, security rights and other system
maintenance features. This functionality shall provide system wide administrative features and include the capabilities listed in the accompanying software specifications.

The Systems Management Module referred to herein be provided inherently in the development tool employed to develop the MMM application. All system setup variables, security rights and a majority of the maintenance features are bundled free in every copy of Magic Software Enterprises, Inc. post 4GL tools. Included in this White Paper are a single developer, Multi-User development license of Magic Software v5.02d and/or 6.00 for DOS and Windows development. System files codes provided in an intuitive interface in the MMM solution. These file codes are 100% user definable and customizable.

DOCUMENTATION

System documentation in the form of User Manuals, System Administration manuals, and any required technical reference guides is to be provided for all site installations. User documentation shall be completed in describing the operation of all system
functions using text, graphics, diagrams, print screens and other media understandable to users at all levels.

System Administrator and end user manuals describe in full detail all features of the MMM solution and are provided to all sites where the MMM solution is implemented. All end user manuals provide complete and detailed information, in an easy to understand format, for even novice users of computers. ASR takes great pride in its easy-to-understand end user documentation. Software programs created by Softwest Programming, Inc. have one (1) menu to learn, which is standard throughout the operation of all programs.

DATA DICTIONARY

Documentation shall include a completed data element dictionary which identifies all data elements/fields in each file within the database. Data types (e.g., numeric, alphanumeric, etc.) and length shall be specified.

Data Dictionaries, Type Dictionaries and Program Dictionaries are provided in the White Paper specifying the costs for each. Details are contained in the MMMworks(tm) product line.

SOURCE CODE ESCROW ARRANGEMENT

The software vendor shall agree to enter into an appropriate escrow arrangement giving access to the source code of the

software under predefined circumstances such as the business failure or dissolution of the software developer, or the unilateral decision by the developer to terminate support or discontinue enhancement of the software.

MMM agrees to place source-code into an escrow account per the terms of the contract.

EQUIPMENT FILES

Equipment items are important physical elements of maintenance operations. These facility assets are subject to preventive and corrective maintenance. The equipment file shall not be transactional in design, and interact with the work order and other system files to exchange data for all system functions. This facility equipment file includes such items as air conditioning/heating units, fire sprinkler systems, mother/daughter boards, contracts, PM Schedules, asset data, sub-assemblies, ancillary devices, etc.

The core of the MMM solution provide sophisticated tracking of Preventive and Corrective Works Orders as well as facilitating Demand Works Orders. All files are relational in design and implementation and support full transactional processing. All modules are fully integrated to share data and support full record and file locking routines. All facility equipment items and any sub-components of a given equipment item can be tracked and maintained with the MMM solution.

The MMM Inventory/Asset Management Module will value inventory based on actual cost, weighted average formulas as well as user definable costing methods.

RISK DATA MANAGEMENT

* Risk analysis is based on levels associated with pointers for planned maintenance.

* Risk management is based on threshold flags that find the pit-falls in maintenance and alerting management of the equipment and systems that have exceeded the plans for critical maintenance management.

Risk Data can be created either from a global posting of data or by manually adding the Risk Data to each equipment item. The starting point of entering Risk Data is at the inclusion of new equipment into the system. As each equipment item is entered into the system the Description Code is accessed with the 'F5' key and when a generic device is located based on any of the System Codes tables, the Risk Code, Category Code, and Description Code is attached to the equipment item. The Risk Code is created from the Table for the PM Guide Code which has a method of weighing each criteria for planned maintenance activities. The criteria connected to each equipment item is: Utility Function, Application of Equipment, Maintenance Requirement, Age of Equipment, and a fifth criteria that is user defined. This fifth criteria can be used for any definition, say Experience of Failure or Frequency of Use. The following is a recommended table of scoring devices:

Utility Function: Weighted Value (1)
Life Support 9-10
Monitoring/Diagnostic 5-8
Treatment/Therapeutic 3-4
Miscellaneous 0-2

Application of Equipment: Weighted Value (2)
Death/Total Shutdown 5
Injury/Temporary Stoppage 4
(less than 4 hours)
Misdiagnosis/Delays 3
(less than 20 minutes)
Minor Care/Restarting 2
(Stop/Immediate Starting)
No Value/Minimum Value 1

Maintenance Requirement: Weighted Value (3)
Repeated Breakdown/Repairs 5
High Technology/Complicated 4

Average/Less than 4 occurrences 3
per year
No more than 2 repairs per year 2
Less than 2 per year/Easy 1

Equipment Age: Weighted Value (4)
Twenty years or more 5
Fifteen to Nineteen years 4
Ten to Fourteen years 3
Five to Nine years 2
Four or less years old 1

Experience of Failure/Frequency of Use: Weighted Value (5a)
Daily Use/Many Problems 4-5
Monthly/Weekly Use 3-4
occasional problems
Annual Use/Very Reliable 2-3
No Problems/Defect Free 1

Complexity of Use: Weighted Value (5b)
Training Days Required for use
Seven to ten days 5
Four to six days 4
One to three 3
Four to Eight hours 2
Less than four hours 1

When selecting weighted value for Experience of Failure or Complexity of Use, use one or the other method. Which ever is important to your organization.

RECOMMENDED RISK CODE AND PLANNED FREQUENCY MAINTENANCE

0-11 No Planned Maintenance Required
12-14 Schedule at least every two years
15-17 Schedule at least annually
18-19 Twice annually (Semi-annual)
20-22 Three times annually (Tri-annual)
23-25 Four times annually (Quarterly)
26-27 Six times annually (Bi-Monthly)
28-29 Monthly
30+ Weekly

This method of weighing multiple values for each generic equipment item was introduced in 1985 by Softwest Programming, Inc. At which time the definition of these values were undefined. The summation of the weighted values is what is called the Risk Code. The underlying reasons to use a weighted value was based on not knowing much of anything about the equipment. Hence, equipment appears in service without any records from the administration or purchasing. Although, it is known by the department personnel that the equipment has been in place for several years. Many times the equipment is found without any property tag. Sometimes the property tag is identified as being owned by some other facility, but department personnel claim ownership to the equipment.

The value weighing method is for all practical purposes a pie in the sky approach in defining what is needed for any kind of planned maintenance. Not having any information on the equipment from the date of purchase or from any other historical records requires at least a method to determine what plan is necessary to install a schedule of planned maintenance.

Once the historical data is in place, you can post what is considered a real time method of determining what risk code is needed for future planned maintenance. This is done by posting some pseudo risk code value to each equipment item.

Reporting the occurrences of types of work orders to find the weaknesses in your equipment inventory. Hence, posting risk data, which is the real world of risk management. The following process will create a file, PLFIL038.DAT, based on virtual criteria and selection from the equipment file, PLFIL001.DAT.

POST RISK DATA FROM EQUIPMENT

The 'Post Risk Data' screen gives you options for selecting virtual criteria of Risk Data that will be written to the Risk Data file, PLFIL038.DAT.

First, enter a Risk Code that will be used to post to equipment inventory. if you have not attached a Risk Code when you entered new equipment. This code does not have to be accurate. Use a value of 18, which will require at least a semi-annual plan for schedules. If you have already attached a Risk Code via the Description Code table and attached this to each item of equipment, then leave the virtual Risk Code at zero.

Second, enter either a 'T' for the table of the Category Code which will take the Category from the Description Code table and write it to the Risk Data in file PLFIL038.DAT. If you have not attached the Description Code table to each equipment item, then use the 'E' option which will take the Category Code from the existing equipment inventory record.

Third, the Types of Work Orders that are identified in the System Codes need to be defined as to what threshold level is expected or not to be exceeded by each of the types of Work Orders that will be generated on a daily basis. This is what is considered the real world of Risk Management. The values of the threshold figures will be compared to the actual work order occurrences by each type of work order. For each type of Work Order, place a value and a user defined name as defined in your System Codes table.

TYPE OF WORK ORDERS THRESHOLDS

PM 3
PA 6
MJ 1
DM 2
OE 1
AB 1

Fourth, at the execution screen indicated below, use the Key and Range function to select equipment inventory items that you will post the aforementioned risk data. This method may be done repeatedly to selected equipment inventory items after returning to the virtual Risk Data selection screen.

This Risk Management data process is taken directly from the manuals to describe briefly what constitutes the process to define
risks for any given condition.

FACILITY & BUILDING FILES

The system should provide files to accommodate information on facilities and buildings. It is essential that facilities have identification numbers and that work orders, preventive maintenance schedules, and accounting information be tied to facility numbers.

The MMM solution tracks equipment items by identification number and allows for the tracking of location. The location tracking can incorporate building information and the location within a building. MMM has been implemented in many sites that have multiple buildings, with multiple floors. All relevant data regarding a particular building, site or location can be tracked. Additional Information regarding "Facility & Building Files"

The facilities database management system will also provide the following features to include but not limited to the following:

MMM identifies facilities by a unique identification number and locations within that facility are
identified with building numbers, room numbers, client code and responsibility code.

All relevant design, essential physical data and construction data are available in the facility module of the MMM.

Historical data pertaining to major construction and modernization projects are tracked by the MMM system.

Mandatory and statutory inspections can be tracked within MMM, to include but not limited to elevators, fire suppression systems and associated renewal dates. MMM will flag any renewals that have become past due.

Inspections and required or scheduled tests are traceable in MMM.

Long term planning regarding projected replacement dates of major systems and components of those systems are available through the MMM Reports Module.

EMPLOYEE/LABOR FILES

The software shall provide for employee records. The system shall be capable of projecting labor expenditures, assigning selected crafts and employees to work orders, and accounting for actual work order labor efforts. Employee/labor records shall contain approved alternate job classifications for each employee or a similar scheme of alternate pay rates that will calculate labor expenses based on employee's currently assigned job classification.

The MMM solution includes a complete and sophisticated Employee and Labor Usage Module. This module can project labors costs based on a schedule of events or historically, assign individual artisans to a particular task via certification or a job skills file. The MMM solution will also provide timely and accurate accountability for actual time versus projected time and where the billing will be charged to (i.e. Department, Staff, Location, Client, etc..) The MMM solution also provides these additional features:

Labor rates, charges and billing structure are completely users definable to include but not limited to tier billing with variations based on other system criteria (e.g. per division, overhead charges, etc.).

Actual labor rates become a function of the user definable rates. These rates can be calculated based on specific (a) tier, (b) employee classification, (c) shop or department that WORK ORDER is be charged to, or (d) whether billing is done straight time, time and a half, double time for holidays or any permeation there of.

All labor rates are associated with the applicable number of hours for the WORK ORDER. These rates are calculated as extended labor costs. If rates or hours are changed, new extended totals are automatically re-calculated.

All labor costs are a function of rate, time (to include overtime), tier and overhead. The MMM Hours Transaction Log provides labor costs to be extended and recorded on any labor charge applicable to a department, shop or WORK ORDER. The extended totals are rolled up and charged against the accumulated Labor Rate cost field in the WORK ORDER. Labor rates per individual artisan or group level employee are automatically linked to the employee ID number in the WORK ORDER. These rates also provide for specific action regarding time/overtime flags.

WORK ORDER FILE

The work order file shall be the primary medium of information exchanged throughout the software system. This file shall maintain interactive relationships with all pertinent system files for the transaction of work order information. The work order file shall appear intuitive to the user to facilitate data entry and the execution of all work order module functionality.

The MMM's core application is the "Work Order" module. This highly integrated systems allows for complete tracking of all types of Work Orders to include Preventive Work Orders, Demand Work Orders and Scheduled Work Orders. With an intuitive and user friendly interface, the MMM solution allows for novice to expert level users to benefit from the MMM solution. Other features included in the MMM Work Order module include but not limited to:

WORK ORDER MANAGEMENT - Additional Features

WORK Order's are entered via the Work Order Module of MMM. WORK Order's may be input from a range of enterprise

wide remote work stations by maintenance staff, customers, clerk-of-the-works or other personal who have "rights" to do so.

MMM will perform on-line data entry validation to automatically verify account codes, facility numbers, department codes and all other user-designated key fields during the order entry process.

MMM will support user-definable job codes and priority codes in relationship to the routing and tracking of work flow.

Customer initiated WORK Order's will automatically assign the job status as "Requested" and will automatically be routed to Work Control for further inspection, verification, review and shop assignment.

MMM supports electronics distribution of WORK Order's to the appropriate assigned shop for further processing. Filters for WORK Order's to ensure that these are distributed only those groups that are affected. This filtering systems will limit WORK Order's presented for review or update to only those affected groups or user ID's. These filters may be overridden to enable more general queries.

MMM table driven security limits access based or pre-defined users rights. These "rights" can be limited to view only inquires or other inquires based on record specific, shop specific or field specific rights based on access level in the security table.

MMM provides a complete "audit trail" for virtually all transactions. These audit trails can be customized to provided additional details with the MMMworksÔ module (included in this White Paper). MMM can assign WORK Order's based on numerous parameters to include but not limited to shops, craft, crew or individual artisans. WORK Order's can also be assigned to a particular vendor (for warranty work) or to specific contractors. Out of warranty (excitu warranty billings) can be produced when the vendor does not provide services as outlined in the contract or purchase order processes.

MMM supports the estimation of labor hours and scheduled starts dates in the MMM Scheduling module. The MMM work order module also tracks actual details of specific jobs to include but not limited to start and completion dates, actual labor hours and other related details automatically through the day-to-day routine processing of daily time logs and job status updates in the Hours Transaction Log.

MMM supports on-line inquires to all WORK Order's so that users may inspect the status of WORK Order's regarding status, crew or artisan assignment, estimated and actual labor hours and material costs as well as all additional information associated with a individual or group of WORK Order's.

MMM allows for multiple artisans, crews or groups to be associated with the same WORK Order's. This is particularly valuable to track crews involved with assets comprised of major assemblies and sub-assemblies in the Hours Transaction Log.

MMM's labor tracking includes all productive and non-productive time. These entries are available from a single data entry screen for each employee.

Hours charged to any particular WORK Order's are automatically posted to the WORK Order's master record. The items that are posted include but not limited to date, employee ID, hours, billing rate per each line item in the WORK ORDER.

MMM provides extensive reporting capabilities in the Reports Module as well as offers supplemental reports available through the Report Generator. Comprehensive reports can provide extensive analysis of time usage by employee, shop, crew and organization.

Under each line item in any WORK Order, unlimited materials charges are tracked for multiple sources. MMM will distinguish between items that originate from inventory, purchase orders and/or cash purchases. All relevant items to include but not limited to date, PO and/or inventory number, description, quantity and extended costs are recorded per each line item.

MMM offers flexibility in that miscellaneous and contractor costs may be added to any WORK Order. The miscellaneous charges/costs will be added with the option for end-user input for descriptions of added charges supporting unlimited freeform text in the Work Order Module.

WORK Order's may be re-opened or added to provided the users has the appropriate rights to do so. Once these WORK Order's have been closed again, all related screens, files and reports will reflect changes.

MMM supports billing of charges to multiple cost centers and/or customer accounts. Billings can be by employee rates, burden rates, client billing rates and fixed rates.

MMM will support sub-jobs of a particular WORK Order. This allows accurate tracking of WORK Order with more than one major component. These sub-assemblies WORK Order's can be treated as an individual child WORK order's under the parent WORK Order with all the benefits of work order system.

MMM tracks all active WORK Order's status to include WORK Order's that are rescheduled, in a backlog status or past-due. This information is readily available in the MMM reports module.

MMM offers enhanced efficiency by:

a] Displays warning message if a duplicate WORK Order is created during order entry.
b] Provide detailed information regarding necessary travel during job scheduling.
c] Display messages regarding warranty and service contracts.

PREVENTIVE MAINTENANCE FILE

This file shall contain all elements necessary to automatically generate PM work orders and maintain a specified work schedule This file shall maintain a record of preventive maintenance due dates, last done dates, and a full description of the work activity to be performed on the equipment item or facility asset.

The MMM solution provides for soft and hard scheduling with the pre-emptive scheduling techniques of PM Work Orders scheduling.

WORK HISTORY FILE

This file shall maintain for selected number of years a full set or a separate subset of data collected from completed work orders. This shall include both corrective and PM work and shall be accessible through on-line queries as well as reports.

The MMM solution allows for the active maintenance of historical files to include any selected number of years of historical information on completed WO's, PM's and DM's (Demand Maintenance). These files are accessible through on-line queries and a variety of reports. Work History Files are archived by date sensitive master records.

PARTS/MATERIAL INVENTORY FILE

This file shall contain all vital information on each stock item maintained in the file and shall permit parts to be stored in multiple stockrooms. This information shall be utilized interactively with other system files to perform purchasing functions and parts receipts, issues, and returns. The files shall be relational in design to permit updating of field data from system transactions.

The MMM solution provides for a complete and detailed Parts/Material Inventory File. This file will support multiple locations, replacement parts, receipts, issues and returns. As a fully relational file structure, the MMM solution provides real time, accurate data. Also included in the MMM Parts/Material Inventory file are the following:

Inventory transactions to include requisitioning stock, placing orders with vendors, receiving shipments and issuing and returning inventory to stock are completely audit-able. All transactions are code-stamped with user, time and date details.

The MMM Parts/Material Inventory Management Module is accessible from any workstation for on the network for performing on-line inquires and order entry functions.

Inventory total are updated on-line in real time as items are brought in and removed from warehouse.

The MMM Parts/Material Inventory Management Module allows for the issue of inventory to a particular WORK order's or

cost center. Items returned to inventory are reversible at original costs and updates are provided to the associated WORK Order or cost center.

Inventory issued to a WORK Order is automatically posted to WORK Order's record. Issues per WORK Order's are accessible via the Work Order Module or the Inventory Module.

MMM's data entry screens allow for one to many relationships to include multiple line items for one WORK Order.

The MMM Parts/Material Inventory Management Module allows for complete location information to include multiple warehouse locations, stockrooms, shelves and bins. MMM also supports inter-warehouse transfers of assets.

MMM provides additional inventory information to include:

Usage history can be queried by date ranges.

Order history to include all related PO's, Vendors, quantities ordered, unit costs, order/receipt dates and lead time.

Allows users to define max/min levels. The MMM will automatically generate re-order points based on order/receipt and lead times while supporting a user definable safety stock factor.

MMM will allow users to define minimum reorder quantities (MROQ) formulas to assist in determining optimum quantities and re-order points based on usage and planned maintenance parts, typically called bill of material (BOM).

When inventory re-order level are reached, users have the option to placing item on order. This process can create a Requisition and/or Purchase Order and provide material/parts in the inventory file with "on-order" notification.

The MMM Parts and/or Material Inventory Management Module offers a full range of specialized reporting capabilities to include:

* Inventory turnover

* Identify obsolete, slow-moving or excessive stock problems

* Any stockout conditions that might occur

* MMM's expression tables will allow for statistical and standard analysis.

Adjustments to Inventory Systems are supported with full explanatory descriptions and complete audit trails.

VENDOR FILE

This file shall contain all vital information pertaining to each vendor from whom materials and parts will be purchased. This file shall interface with the inventory, purchasing and other associated files to exchange data from system transactions.

The MMM Vendor Module tracks all relevant vendor data to include but not limited to the following items:

Name, Address, Phone, Fax, Contact, Parts Supplied, Costs, Replacement Parts. A completely relational data file, the MMM Vendor Module makes available timely and accurate data pertaining to individual Vendors working for customers while updating all related files and user screens in a real-time mode.

PURCHASE ORDER FILE

This file shall be the primary transaction file for all material and parts purchases. The purchase order file shall interact with inventory, vendor, work order, and other system files to maintain a complete and accurate audit trail of purchasing activity.

The MMM Purchase Order files tracks all parts and materials needed to complete a given work order as well as provides

re-order point Purchase Order creation. The PO file integrates with the Inventory Files, Vendor Files, Work Order Files and all related system files for an accurate and audit-able information and Purchase activity.

MATERIAL RECEIPTS/ISSUES/RETURNS FILE

This file shall be the primary transaction file for all materials and parts received, issued to work orders, returned to stock, or transferred to another stockroom. This file shall interact with inventory, work order, budget and other system files to maintain a complete & accurate audit trail of receipts, issues, transfers & returns activities.

The MMM Parts/Material/Receipts/Issues/Returns File integrates with Equipment Inventory Files, Work Order Files, Budget Files and other related system files. This module allows for the tracking of all materials used, ordered, returned, issued, received and transferred from one location to another.

BUDGET/ACCOUNT FILE

This file shall provide a detailed accounting for each cost account record that has been established, and it shall provide breakdowns of these amounts by labor, materials, other expenses and total cost. This file shall be updated as selected in the operational functions.

The MMM Budget Module allows for real time accountability of all cost accounts and provides detailed breakdowns via labor, materials, related expense items and totals.

WORK ORDER PROCESSING

Capabilities shall include entry, tracking, & cost accounting of all work. The system shall be capable of comfortably processing a minimum of 500 work orders per day per data entry clerk. The work order file shall be the primary transaction medium for the processing of work order information. Additionally, the work order modules interaction with other system modules shall make possible single module data entry with relational transaction processing and resultant updating of related files.

The MMM Work Order Module includes the entry, tracking and full cost accounting of all work performed. This is the primary/core application of the MMM solution. This module has been described previously under WORK ORDER FILE of this White Paper.

The MMM solution will support unlimited work orders to include up to 99,999,999 with no noticeable system degradation or performance. At current MMM sites, excess of 5000 work orders per month and over 500,000 total on a Novell Network with out a decrease in system performance.

WORK ORDER TRANSACTION PROCESS

This process shall track information that interacts with the system management, PM activity, inventory and reporting modules or
files in the system. This process shall track all associated costs and data, until the work order is successfully completed and data is posted to appropriate file records.

The MMM solution provides for full tracking of all related information regarding Preventive- Scheduled and Demand-Corrective Maintenance, Inventory, Reporting and other related system modules/files. This transaction file tracks all related costs and data until the moment the Work Order is successfully completed and posted to the appropriate files.

WORK ORDER SCREEN FORM

Processing of this information shall consist of single screen/multiple window data entry. Full command control shall be easily accessed for the creation, editing, completion and printing of work orders. The system shall provide the user with the option to customize the work order screen format.

The Work Order screens are intuitive in design, easy to use and accessible from a single data entry screen. By employing a "zoom" feature, unique to the MMM solution, the user can easily access additional information at their finger tips. Users have

full creation, editing and printing of Work Orders (provided the user rights allow this). Customizing of any and all MMM screens is a function of the Systems Administrators. Customization of screens and formats can be accomplished without writing a single line of traditional computer code.

WORK ORDER PRINT FORMAT

Work order information shall be available on-line as well as in report form. Printed work orders shall contain all vital work order data elements, and the user shall have the option to customize the work order form on plain 8.5" x 11 " paper. Bar codes will also print on the work order.

The MMM solution comes with over 50 pre-designed Work Order forms as well as allows users to design their own form. All WO's include all vital information and can be printed with Bar Code information.

WORK ORDER NUMBERS

The user shall have the option to determine the work order number format. The system shall automatically assign sequential work order numbers and shall input the date and time of creation on each work order. The user shall have the option of modifying the work order number assigned by the system.

The MMM solution supports users definable numbering, incrementing schemes, number formatting and user override capabilities. The MMM solution provides time and date stamping of all work orders.

WORK ORDER PRIORITY, STATUS, AND TYPE

The system shall provide for user-defined priority, status and type code designations accessible via data validation tables (lookup windows). The work order type shall be assigned by the system as a result of the scheduling routines used to generate the work order (e.g., 'CM' for corrective or 'PM' for preventive maintenance.) The option shall be available for the user to edit this type field.

The MMM provides for code designators available through scrollable pick list windows which are 100% user definable. This feature allows for the rapid viewing and selection of available options and promotes data integrity and accuracy. Work Order types are determined by the scheduling methodology as well as being flexible for end user override if necessary.

CORRECTIVE WORK ORDERS

These work orders shall be entered into the system on-line. The operator shall determine the status of the work order (e.g., whether it is requested, scheduled, on parts hold, etc.), and shall have the ability to view and edit this status. The system shall provide a means of handling the work order request process by a separate request function or by use of status changes.

Corrective and Demand based work orders can be entered into the system on-line from any terminal or workstation having access to the MMM application. This also include remote and dial-in sites supported over a WAN or via modem communication. The MMM system operator has the ability to determine the status of any work order and determines the details regarding priority status, scheduled or needs immediate attention, weather parts and materials are available. Operator has full editing and updating ability and will facilitate work orders processed through a separate request or status change.

PREVENTIVE MAINTENANCE WORK ORDERS

PM work order creation shall be done via the scheduling function of the PM module. PM work orders shall be maintained in a work order file provided with full query, edit, completion and re- open functionality.

MMM PM work orders are created via the scheduling function in the PM Module. All PM's are maintained in a separate file for full query and reporting access. Based on user rights, PM work orders can be edited, completed and closed as well as re-opened in necessary.

WORK ORDER PRINTING

Printing of work orders shall be accommodated via easy access to a print command. The user shall be able to print work orders at any location either individually or in groups (by work order number, facility number, craft assigned to, status, priority, location, date, or any user-selected criteria). The option to reprint work orders, either individually or in batch, is also required.

The MMM solutions provides intuitive and user friendly printing for any work orders either in a batch or by individual work order numbers. The MMM solution also includes support for any printer. Uses of the MMM solution have the ability to direct output to any accessible printer on the network. user can also have work orders routed directly to the responsible parties for action with full auditing. Work Orders can be printed based on user definable criteria; dates, sequence of numbers, artisans assigned to task, facility as well as other user definable criteria.

WORK ORDER COMPLETION, REOPEN & CANCELLATION

The required function shall enable the user to update work orders either individually or through a batch process. The calculation and final posting of all data elements to the appropriate related files shall be accomplished at completion. This function shall also remove/add work orders from the active work order file and transfer information to an accessible work history file.

The MMM solution allows for users to update, modify, query, open, re-open or complete work orders in a individual or batch process. As work orders progress through the MMM system, MMM intelligently tracks the status of opened or closed for on-line updating of historical files. In other words as MMM moves a work order from a open to a closed status, MMM stores a copy in the archived file of closed work orders. In the event this work order is re-opened, MMM takes the reference out of the historical file.

WORK PLANNING/SCHEDULING

A function shall be provided to facilitate the planning and scheduling of non-PM type work orders. This scheduling function shall consider available resources, labor and materials as well as the requested date and priority of all active work orders on file. Geographical regions and locations must be included.

The MMM solution provides intelligent work order scheduling and planing based on a number of available criteria to include but not limited to; available resources, labor availability, materials and priorities. MMM also takes under consideration geographic locations to include individual building sites, room numbers, client codes, employees assigned, etc.

WORK HISTORY

A separate file shall be provided to receive and store completed work order information for a user selected period of time. This data shall be easily accessible on-line. Full reporting functions shall be provided to accommodate end-of-period and year-end reporting needs.

The MMM solution allows for the storage, retrieval, query and reporting of all work orders stored in a historical or archived files. MMM allows for historical files in excess of three years based on user needs and requirements. MMM has built in reporting for work orders to facilitate end- of-period and end-of-the-year reporting needs.

WORK ORDER LABOR ENTRIES

The system shall provide for individual employee labor hour entries for any work order. The system shall automatically calculate the labor costs for each labor entry on a work order and the order's total labor dollar amount (based on hours worked, employee ID#, and his/her job classification for that labor entry), and shall post data to the appropriate files during work order completion.

MMM supports the tracking, updating, posting and automatic calculations of labor costs. All labor rates are a function of crew, craft, trade, employee classification and ID# , hours, overtime and double time if applicable.

WORK ORDER MATERIAL ENTRIES

This function shall provide for material/part entries for any work order. Material entries may be issued from stock on-hand (inventory file/module) transactions via window lookup features or from non-stock transactions via entry of part number, quantity and price information. The work order materials function shall be totally interactive with the equipment, inventory/materials, vendor and purchase order files to accommodate exchange of data during material-to-work order transactions.

All work orders requiring materials to complete a work orders are accomplished through the Work Order system via a Material File. The MMM solution provides a fully integrated, on-line, windowing capabilities into available materials. From the Materials file a user can query Vendor information, costs and other related details. The work order files provides full integration with other related modules to include Vendor Files, Inventory Files, Purchasing Requisitions and Purchase Ordure Files as well as Equipment Files.

WORK ORDER CRAFT ASSIGNMENTS

The system shall provide the option of assigning multiple crafts to a single work order. The system shall also provide scheduled projections for estimating craft/trade hour requirements and a means of accumulating the actual craft/trade labor hours used to complete the work order.

Each work order is assigned to a crew. All work orders will accommodate unlimited craft/trade and crew for artisans to a single work order. MMM automatically calculates and projects estimates based on pre-defined estimates in the system or historical information or a combination of both. Actual labor charges are a function of time and rates used to complete the actual work order.

2.1.3 Preventive Maintenance Processing

PREVENTIVE MAINTENANCE ACTIVITY MODULE

This module shall provide functions to specify periodic maintenance routines and maintain a planned schedule for specified equipment items and facility components. The PM activity module shall store all information and/or interact with other system modules and files necessary to automatically generate scheduled work orders. The PM activity file or similar files shall be the main transaction medium for performing the minimum functional requirements.

The MMM Planned Maintenance Module allows users to specify periodic maintenance routines and schedule maintenance repairs on a scheduled basis. Recognized for the flexibility we offer, the PM Module of the MMM solution allows the user a better implementation, tracking and method to record maintenance of all equipment.

The MMM Preventive Maintenance Module also include, but is not limited to the following features:

MMM's Preventive Maintenance System minimum level of operation includes the required ID number, general task description, start date and scheduling basis. MMM also provides additional options to include but not limited to additional free form text to describe additional detailed procedures associated with the PM. MMM also supports a complete BOM and the ability to establish links to associated documents including safety notice, CAD drawings, manufacture's specifications or scanned documents.

MMM allows for multiple PM scheduling frequency and methodologies to include time, hours, unit measure, appointment or mileage. All PM codes are user definable , modifiable on-line or globally for multiple or individual items. Any PM routine can be easily copied using the MMM replicate feature. This will allow minimum data entry and reduction in errors.

Fixed interval PM's routine may be based on either completion date of last PM or the original schedule date. All routines are user definable and modifiable.

When a PM work order is defined and has been entered into the MMM systems, MMM will automatically schedule, track and alert user of PM's based on pre-defined scheduling.

MMM will globally roll-up coinciding PM work orders based on deferred maintenance demands (e.g. monthly into quarterly, quarterly into yearly).

MMM's Work Order Module allows start and stop dates based on seasonal cycles. These dates may be calendar based, time, hourly, unit of measure, mileage or user-definable scheduling.

MMM allows for printing of reports detailing PM's that are scheduled based on a date range or by individual work order. This powerful feature allow managerial staff to better allocate assets, personnel and provides a forecasting tool.

MMM will produce summary reports of PM's by a given crew and/or craft/trade, group or artisan to facilitate simple repetitive PM's.

SCHEDULE PREVENTIVE MAINTENANCE WORK

This function shall provide for scheduling of all PM work assignments due for any given calendar period of time, on unit-of-measure (hours, days, etc.) meter count. This procedure shall also create a new work order in the work order file with a system assigned work order number.

The MMM Preventive Maintenance Module schedules all preventive maintenance based on a numbers of available and user definable options to include but not limited to time, date, mileage, meter reading, units of measure and usage. PM work order are system created and fully modifiable based on user rights.

PREVENTIVE MAINTENANCE PROJECTIONS

This function shall provide the capability of projecting the PM workload. It will include labor hours, materials, and special tool requirements. PM projection schedules shall be modifiable by the user as needed to produce a work schedule that is balanced with the available resources.

The PM Work Order produces workload schedules based on labor hours, parts/materials, special tooling requirements as well as alerting user of "Hazardous" materials involved. The work load projection schedules are user modifiable to produce optimized schedules based on availability of the components (labor, parts, materials, etc..).

PREVENTIVE MAINTENANCE WORK ORDER QUERY/EDITING

Once created, all PM work orders shall be available for query, editing, and printing. The operator shall be able to change the status of a PM work order and to edit other preprinted-assigned (and operator entered) work order data elements as necessary. The PM work order shall be distinguished from other, corrective work orders by a type classification (e.g., PM).

All PM work orders are available for editing, modifying, printing and batch updating. Control of all portions of the PM work order are a function of the operator and user based rights. PM's are distinguished from other type work orders by a "P?", "M?", or a "S?" designator.

PREVENTIVE MAINTENANCE WORK ORDER TRACKING

The desired functionality shall include full tracking of each PM work order with all collected information and costs (labor, material, other), through and including the completion process.

The MMM solutions allows for complete audit trails and full featured tracking of all work orders, to include PM work orders throughout their life cycle (from initialization to completion and in a final archived form)

PREVENTIVE MAINTENANCE PROCEDURES

The system shall provide for user-developed maintenance tasks/procedures for the maintenance of equipment items and facility components/assets. This task definition function shall include equipment-specific measurements, tolerances and tests; frequency; labor hour projections; and estimated material and tool requirements.

MMM comes bundled with hundreds of pre-established work order procedures for standard equipment items (air handlers, compressors, heating units, plumbing, computers, servers, medical equipment, etc.) as well as support user defined work order procedures. Additionally, the preventive maintenance work order procedures available from Veterans Administration MP-3, G-29 Series, the American Hospital Association PM series, Emergency Care Research Institute (ECRI), General Services Administration 5850 series can be imported into the MMM directly. This gives any management authority the access to thousands of pre-approved procedures for preventive maintenance. These work order procedures can be edited, modified, created independent from the MMM solution and imported as well as being available for printing. All work order procedures include task or job procedures to include but not limited to; equipment specific measurements and details, tolerances, frequency, labor hour projections, materials and tools required. The MMM solution will also support a relational link to CAD Drawings, blueprints, safety notifications and any other documents that be stored in a scanned format. Total PM Maintenance Guide Text procedures as of the date of this White Paper are greater than 1,400. Other source procedures are available.

PREVENTIVE MAINTENANCE WORK ORDER FORMAT

The system shall provide PM work orders with the same or similar printed format as the standard corrective work order. Users shall have the option to define a PM work order format and make it printable from a menu selection.

The MMM solution allows for the creation and design of PM and CM forms without writing computer code. The MMM Reports & Form Generators allow a great deal of flexibility in producing specialized or stylized forms for use. MMM comes bundled with over 25 predesigned forms that may be used as is or modified. Any form created can be quickly implemented as a menu report option for all users.

Formats from the Veterans Administration MP-3, G-29 series, General Services Administration 5850 models for PM Guides, American Hospital Association PM Procedures for Plant Engineering and Biomedical Engineering, Emergency Care Research Institute PM Procedures, and other formats are directly importable to the MMM.

COMPLETING A PREVENTIVE MAINTENANCE WORK ORDER

The system shall provide the capability of completing outstanding work orders and posting the accumulated information to the appropriate files. This process shall be similar in design to that of completing standard corrective work orders.

Closing of any MMM work order can be accomplished quickly. MMM maintains a "uniform" approached to closing PM and CM work orders. When closed, work order totals and related information are automatically posted to the appropriate files and accounts.

PREVENTIVE MAINTENANCE WORK HISTORY

Completed PM work orders shall be contained in the standard work history file (the same work history file that maintains standard corrective work order history information). The work history shall be easily accessible on-line for a period of at least three (3)years.

The MMM solution allows for the storage, retrieval, query and reporting of all work orders stored in a historical or archived files. MMM allows for historical files in excess of three years based on user needs and requirements. MMM has built in reporting for work orders (PM's & CM's) to facilitate end-of-period and end-of-the-year reporting needs.

PREVENTIVE MAINTENANCE WORK ORDER REPORTS

The system shall provide a variety of standard PM reports on active and completed work. In addition, it shall provide the options to modify the standard supplied reports, to create custom reports, and to save either report to a menu selection. Reporting shall be provided through a report module or similar ad hoc report generator.

MMM supports virtually unlimited reporting options. From the end-user point of view, MMM comes bundled with an end user Report Generator and Ad-Hoc Query System. With all Data and Type Dictionaries being supplied (included in this White Paper) the System Administrators can create any report necessary. These reports can include any and all fields in the system, computations, sub totals and totals. These limitless reporting features make the MMM solution a powerful tool for both

Managers and End-Users. Any report created by an end user can be easily implemented as a standard menu option.

MMM currently offers up to 150 standard, canned reports that are accessible to all end users based on system rights. These reports may be linked to other PC-based applications users. End Users also may develop additional reports through the implementation of the Report Generator and dictionary. All reports may be output in a variety of formats to include but not limited to the following options; printer, screen, or data files that are accessible to and may be incorporated in other PC-based applications. Complemented with the MMM WorksÔ Module, reports using any data field from any screen are rapidly implemented for system users.

2.1.4 Parts & Material Inventory Processing

PARTS/MATERIAL INVENTORY CONTROL MODULE

The Parts/Material Inventory Control Module shall include all functions necessary for purchasing, stocking, issuing, and maintaining transaction data requirements for inventory materials and parts. The inventory control module shall interface with all major system modules/files to perform the required functions. All material management transactions shall be supported by a thorough and logical audit trail that can be verified via the reporting features of the module.

MMM's Parts/Material Inventory Control allows for powerful and accurate control over inventory costs, vendors, locations of items and other related details to include but not limited to:

Inventory transactions to include requisitioning stock, item master records, placing orders with vendors, receiving shipments and issuing and returning inventory to stock are can be audited. All transactions are code-stamped with user, time and date details. The MMM Parts/Material Inventory Management Module is accessible from any workstation on the network for performing on-line inquires and order entry functions.

Inventory totals are updated on-line in real time as items are brought in and removed from warehouse, inventory or work order management.

The MMM Parts/Material Inventory Management Module allows for the issue of inventory to a particular work order or cost center. Items returned to inventory are reversible at original costs and updates are provided to the associated work order or cost center.

Inventory issued to a work order is automatically posted to the work order record. Issues per work order are accessible via the Work Order Module or the Inventory Module. MMM's data entry screens allow for one to many relationships to include multiple line items for one work order.

The MMM Parts/Material Inventory Management Module allows for complete location information to include multiple warehouse locations, stockrooms, shelves and bins. MMM also supports inter-warehouse transfers of assets.

The MMM Parts/Material Inventory Management Module will value inventory based on actual cost, weighted average formulas as well as user definable costing methods.

MMM provides additional inventory information to include:

* Usage history can be queried by date ranges.

* Order history to include all related PO's, Vendors, quantities ordered, unit costs, order/receipt dates and lead time.

* Allows users to define maximum and minimum levels

* Will generate re-order points based on order/receipt and lead times while supporting a user definable safety stock factor.

* MMM will allow users to define formulas to assist in determining optimum quantities and re-order points.

When inventory re-order level are reached, users have the option to placing item on order. This process creates Requisition or

Purchase Order and automatically flags inventory file with "on- order" notification.

The MMM Inventory/Asset Management Module offers a full range of specialized reporting capabilities to include:

a] Inventory turnover
b] Identify obsolete, slow-moving or excessive stock problems
c] Any stockout conditions that might occur
d] MMM's expression tables will allow for statistical and standard analysis.

Adjustments to Inventory Systems are supported with full explanatory descriptions and complete audit trails.

PARTS/MATERIAL INVENTORY FILE MANAGEMENT

Inventory file management shall be provided to allow the user to enter, query or edit all inventory module files. Inventory transactions shall automatically update the data files and perform necessary calculations to maintain a real-time accountancy of all material receipts, issues and returns, purchases and vendor transactions.

The MMM's Parts/Material Inventory File Management supports user entries, edits, updates and all necessary functions listed.

INVENTORY STOCK ITEM INDEXING

The system shall provide stock item indexing by part number, type and Vendor number by using part number prefixes, or by any user-defined field. Parts/Material Inventory Identification numbers are "Key" or "Indexed" fields. Searches or look-ups and be accomplished by partial searching and wild card searching as well as searching via Vendor, Vendor part number, prefixes or by user selectable fields. Parts pre-fix file defines the type of part that is used. The following fields define the uniqueness of the parts inventory record: National Stock Number or user defined stock number, manufacturers part number, American Electronics Association part number or Jedec number (previously called the EIA number), the location field, and the bin number field.

INVENTORY RECONCILIATION

The system shall provide options for performing physical stock reconciliation's (annual, and through cycle counting) of all items in the inventory; and shall provide a method of updating inventory stock counts. Reports shall be provided to display reconciliation transactions.

MMM allows for complete inventory reconciliation by allowing system operators (with rights) to edit inventory files after a physical inventory. All updates are time, date and users identifiable and include complete audit trails.

INVENTORY TRANSACTION SECURITY

The system shall support the use of permission passwords for performing inventory transactions (e.g. material receipts, issues, returns).

MMM supports a sophisticated user rights based security system. Casual users with limited rights can be automatically logged in simply by starting up the system. Those with more rights can log in with password based security and predetermined rights.

2.1.5 Purchase Oorder Processing

PURCHASE ORDERS

The system shall include complete purchasing functions to replenish inventory stock-on-hand and fill orders for non-stock items.
The program shall be structured to give and accept data about the status of the purchase order (e.g., open, on hold, partially completed, completed, canceled).

MMM provides a Purchasing/Requisition System that allows uses to issue PO's based on stock levels, projected usage,

scheduled tasks, out of stock and non-stock items. These purchase orders will display a status regarding their immediate state (i.e. waiting on parts, under warranty, service call, open, partially completed, canceled, etc.).

PURCHASE ORDER TRACKING

The system shall provide the capabilities of entering, querying, completing, canceling, archiving, and purging purchase orders. It shall also provide the ability to fill work order parts/materials requirements from partially received vendor shipments.

Purchase Order tracking under the MMM solution includes the following partial feature list:

Purchase Orders may be generated from the MMM system for both purchasing personal and authorized personal. All purchase orders can be routed to the purchasing office via the network.

MMM automatically generates unique purchase order numbers. These numbers and numbering sequences are a function of System Administrators. User defined numbers can override the system.

The MMM systems will flag orders based on pre-established dollar limits or type of materials for Multi level electronic approval by authorized personal.

MMM purchase order systems can initiate and document purchase requisitions for the following:

* Purchase orders can be documented per department, crews, facility, and individual requester.
* Purchase orders can be assigned per contract purchaser codes or other identifiers.
* MMM supports petty cash accounts where authorized users may establish preset limits.

All purchase orders are available for on-line inspection, query and updates as it progresses through the purchase cycle. MMM tracks purchase orders from initiation to final outcome. MMM supports partial receipt and backorder tracking as well as documenting final delivery.

MMM offers complete contact management support for a vendor database. This highly powerful fully integrated contact management systems can track the necessary information regarding vendor name, address, phone/fax numbers, point(s) of contact, and call tracking. Completely integrated with the inventory and purchasing systems. MMM, this systems can also identify vendors by any number of user defined traits to include but not limited to' number of employees, minority or women owned, special; purchasing provisions or any number of characteristics.

MMM flexibility allows for short or partial orders, backorders, returned orders at original cost for replacement or credit.

PURCHASE ORDER INTEGRATION

The system shall provide complete integration of purchasing functions with the inventory, material receipts/issues/returns, work order, and budgeting modules of the system. Such integration shall include easy movement among these related modules via windowing. MMM provides complete integration between all modules through the use on common data dictionaries. This tight integration allows for real-time updates of all transactions to include purchase orders that are documented against work orders or inventory files. As PR's become approved as PO's MMM notifies inventory files that items are on order to include sufficient documentation on quantity ordered and any applicable description or freeform text.

PURCHASE ORDER PRINTING

The system shall provide the capability of printing as well as generating purchase orders. The user shall be able to create a custom purchase order format, and add either format as a menu selection.

The MMM purchase orders printing format is user (System Administrator) defined. Customized formats can be easily implemented without coding and are quickly added to reporting menus.

PURCHASE ORDER ACCOUNTING

The system shall include features for preventing the chance event of double charging of purchases. This option shall be designed to charge material purchases either directly to the designated work order, or to an inventory cost account.

MMM tracks purchase orders based on work orders and inventory levels thus preventing double billing opportunities. MMM also facilitates electronic multi-level approvals.

2.1.6 Parts & Material Processing

MATERIAL ISSUES

The system shall provide a means by which inventory is controlled, and material item costs are accumulated to a work order at completion of the issue process. Issues shall be entered into the system when the items are actually used for a work order, which will decrease the stock-on hand quantity. Material issue capabilities shall include transferring of items from one stockroom or stores site to another.

MMM provides a fully integrated and sophisticated Material/Inventory Issuing System. This powerful module adds control to inventory management. By charging or issuance of outgoing material/parts from inventory, or a variety of other sources, directly to a source (work order, return, inter-warehouse transfer, etc.), the MMM system provides full accountability.

Other features included in the issuing system include:

MMM allows for unique identification of warehouses by index-subject number. MMM also supports unlimited satellite warehouses or stockrooms, also by unique identifiers. Additional identifiers may be added to offer additional details of actual location (e.g. shelf, bin, floor, etc..).

MMM Parts/Material Inventory module offers complete accountability for inventory that is dispersed for work orders or transferred to other warehouses via an inter-warehouse transfer. Outgoing inventory is automatically billed to applicable work orders or shown as incoming inventory from other warehouse locations.

All data is accessible in a real-time mode. MMM will make available ASCII files that conforms to the customer file format needs for integration into existing purchasing/accounting systems. Users have the option to output files in a variety of formats to include SQL, dBase, Btrieve, ASCII, or a variety of other file structures and formats. These files may be printed, displayed or transferred to any type of computer media (e.g. tape or disk) as well as being made available for direct on-line query.

PARTS/MATERIAL ISSUES TO WORK ORDERS

The system shall provide the function of issuing materials/parts to work orders in the following situations:

(1) issuing materials/parts from inventory stock to a designated work order;
(2) issuing non-stock items to a work order.
In both types of situations, the materials issue process shall provide a full audit trail.

MMM's material and parts issuance's, including non-stock items are tracked via the account or work order they are dispersed for. Other options include returns or inter-warehouse transfer. All transactions provide time, date and user identification.

PARTS/MATERIAL ISSUE STATUS

The system shall identify, upon receipt of any item purchased, those high priority work orders which are currently on hold awaiting the item.

As parts on order become available, MMM issues these parts based on operator input or priority codes of work orders. Status codes on work orders prompt the user to notify users to complete work orders.

RETURN TO STOCK

The system shall provide the function of returning unused stock items, which had been issued to a work order, to the inventory/materials file. The transaction shall reconcile all parts and material inventory and activity files related to the return.

MMM allows for unused parts and material to be returned to inventory, updating all appropriate files related to its dispersal. These transaction reconcile all related files and provide an audit trail.

PARTS/MATERIAL ALLOCATIONS

Material/part items shall be reserved or allocated from the inventory for work orders that require the items. The user shall have the option of flagging work orders that require the use of the material or part. The allocated amount shall be maintained in the inventory record.

MMM allows for the flagging of on-hand inventory based on needs, scheduled or planned work orders

PARTS/MATERIAL ISSUE COST ACCOUNTING

The system shall automatically track any stock or non-stock material issue to work order. The transaction process shall track part number, work order number, date and other pertinent information, and shall also provide itemized cost reports.

MMM Parts/Material Inventory module offers complete accountability for inventory that is dispersed for work orders or transferred to other warehouses via an inter-warehouse transfer. Outgoing inventory is automatically billed to applicable work orders or shown as incoming inventory from other warehouse locations. All transactions include the appropriate detail information to include; work order number, date and other relevant data. Itemized accounting reports are available as standard options

PARTS/MATERIAL INVENTORY REPORTING

The system shall provide a variety of standard inventory reports on stock items, vendor activity, purchasing, material issues, returns to stock, etc. (e.g., inventory turnover report). Included shall be the options to modify the standard supplied reports, to create custom reports, and to save either report to a menu selection. Reporting shall be provided through a Report Module or similar ad hoc report generator.

MMM provides extensive reporting capabilities in the Reports Module as well as offers supplemental reports available through the Report Generator. Comprehensive reports can provide extensive analysis of materials and parts associated with work orders or inventory.

2.1.7 Budget Processing

BUDGETING MODULE

The Budgeting Module shall be provided as a planning and analysis tool that enables users to establish amount budgets and monitor actual expenditures against a predetermined annual budget. Information maintained and collected in the budget module shall be utilized to prepare annual work programs, balance resources to budget allocations, and project facility resource needs. A full compliment of reports shall be provided.

The Contract File and Job Control File give each equipment item a budgeted amount of dollars and dates that the department is required to comply with. Additionally, the cost of operations is identified on a monthly basis for the fiscal year. All work orders by employees and vendors are compared against these costs. Reports available related this portion of the program are created by the user with the report writer.

BUDGET BREAKDOWN

The budget capability shall enable the creation of budget accounts (individual records) with an accounting breakdown by labor, materials, facility number, project, other expenses and total cost. The budget accounts shall interface with other system files (e.g., work order, inventory, etc.) to automatically update budget records at the completion of system transactions.

The MMM uses a burden rate figures based on company code and the month of the budget year to process work orders and parts/material used. Codes defined by the user can be classified by
work performed and estimated hours and quantity per each.

END-OF-YEAR PROCESSING

The system shall include procedures to process budget file information at the end of the year. The capability of rolling over budget accounts for the start of a new year shall be included. In addition, the system shall provide a method to archive budget data for ad hoc retrieval and reporting purposes.

The roll over budget data can be retained for the next budgeted year or edited to plan for the next year. Archiving the data is elective for each year or years.

EXPENSE SEARCHES/REPORTING

Ability to show on-line and in report format expenses by: department, division, organization number, job order number; and operating account, facility number, or any combination of the above. Also the ability to do searches by accounting period, month, fiscal year, calendar year; fiscal year to date and calendar year to date; and company code and field office codes to a geographical region.

All expense searches and reporting are available in the Report Writer Dictionary section of the MMM application. Accounting methods are user selectable.

2.1.8 Lease Information Processing

Provide approval of work order based on lease information. For example, if the work order is for an electrical job, check the lease code information to be sure electrical is included.

The approval for work ordered would have to be user defined. Based on the codes that are used in the system. Selection of the
type of job would then be pre-coded in the billing feature of the program. All jobs with a pre-coded billing rate would then be automatically calculated.

Provide screen to review all information related to lease, i.e., location of facility, department, expiration date, etc.

Screens would have to be created with the MMMworks(tm) product library to meet the objectives of the customer. The design of the MMM incorporates the information for location of facilities, departments, expiration date, etc. Capturing this data would require the MMMworks module.

Provide capability to bring up entire lease (imaging function). This capability would include the ability to scan and link CAD (Computer Aided Design and Drafting) drawings to a particular facility.

MMM provides imagining software solutions. MMM employs an award winning imaging software to store and retrieve scanned documents. These documents can be sized, cropped and printed out on printers that support graphical output. These stored documents can be linked to any data item.

Provide override capability to generate work order if lease does not allow one.
The MMM work order system allows the user to override a specific type of work order. This gives the flexibility of the issuing leased space work order assignment versus owned spaced work order assignment.

2.1.9 Reporting & Graphics Processing

REPORT GENERATOR MODULE

The report generation capability shall be provided for comprehensive reporting of all system module information. The system shall provide for custom ad hoc reporting via a query report option. To facilitate this selection, users shall have the option to

add custom created reports to report menus and save these queries for future use.

MMM provides extensive reporting capabilities in the Reports Module as well as offering supplemental reports available through the Report Generator. Comprehensive reports can provide extensive analysis of materials and parts associated with work orders or inventory.

MMM currently offers up to 150 standard, canned reports that are accessible to all end users based on system rights. These reports may be linked to other PC-based applications users. End Users also may develop additional reports through the implementation of the Magic Report Generator. All reports may be output in a variety of formats to include but not limited to the following options; printer, screen, or data files that are accessible to and may be incorporated in other PC-based applications.

Complemented with the MMMworksÔ Module, reports using any data field from any screen are rapidly implemented for system users. As an end user, the MMM solution also incorporates a powerful end user ad-hoc query system complete with sophisticated searching and ranging options. All end user created reports may be re-used as a standard menu option.

STANDARD REPORTS

The MMM software includes a set of standard reports. Each of these reports have various styles and configurations. Current to date, there are over 150 reports included in the MMM software program series. The quantity and types are different per version and modules.

(1) System files and management
(2) Work Orders
(3) Equipment Inventory
(4) Ancillary Data and Sub-assemblies
(5) Parts/Material Inventory activity and listing
(6) Work history and equipment history
(7) Preventive Maintenance scheduling
(8) Employee records and labor forecasting

All reporting requirements can be fully met with the MMM Reporting System. A few selected sample reports are included in diskette format. Each report is numbered and may be referred to in the MMM program. Disk file is REP-EA.ZIP.

GRAPHICS CAPABILITY

All information contained on the files/databases shall have the capability to be output in graphic format, either through internal graphics capabilities or via an external graphics report program (e.g. Harvard Graphics, Lotus, Excel, etc.).

The MMM solution includes a professional graphics module as well as allowing logical linking to industry graphics packages to include Harvard Graphics, Excel and Lotus.

AD HOC REPORT FUNCTION

An Ad Hoc report generator capability shall be provided with the standard core program. This report function shall enable the user to define and create reports accessing the information contained in the databases. The ad hoc report capability shall be fully integrated with all software program modules and shall be accessible through standard menu selections.

The MMM ad hoc query and report tools are included and accessible to all users of the MMM solution. Reporting limits are a function of user based rights and data views available through System Administrators. Additional information regarding ad-hoc query and reporting tools are listed in previous sections of this document. All reports created by end users are fully reusable as a standard menu item. All report creation is accomplished without writing a single line of computer code.

MMM supports over 150 standard mathematical and statistical functions as well as allowing System Administrators the ability to create their own formulas and algorithms. MMM supports unlimited sub-total fields and break point reporting. The MMM will support virtual and derived report fields.

MMM allows for usage and implementation of standard SQL databases to include Oracle, Sybase, Rdb and NetWare SQL. SQL access requires additional gateway access products. Although not included in this White Paper, implementation can be accomplished normally in a single day. System Administrators can benefit for a SQL Statement Generator included in the SQL Gateway product line. The MMM supports a variety of querying options.

2.1.10 Data Entry Processing

BAR CODE INTERFACE

Provide an interface for data collection via hand-held or similar technology for downloading such data into a LAN file server. The goal is to improve speed and accuracy of data management by replacing manual data collection and subsequent data entry by maintenance and clerical personnel with one-step data entry scanning of bar code labels and menus. The desired solution is that vendor would supply a bar code interface that will facilitate data collection/entry for work orders and materials/inventory.

The MMM solution supports a large variety of hand-held data capture devices to include but not limited to Bar Code Readers, InfraRed Data Collection Devices and an Electronic Tablet Scribe Pads. Included in the White Paper is additional information and partial list of data capture options supported by the MMM solution. All data capture devices are designed for easy download capabilities into the MMM solution.

BAR CODE SOFTWARE

ASR supplies a complete Bar Code module series that fully integrate to the MMM solution. Each module is designed to offer special capabilities to end-users.

BAR CODE WORK ORDER MODULE for MMM versions. Integrates with WORK ORDER MANAGEMENT.

BAR CODE ASSET MANAGEMENT for MMM versions. Integrates with ASSET
MANAGEMENT for tracking and collecting
asset data.

BAR CODE PARTS PAR LEVEL INVENTORY for MMM versions. Par level tracking of
parts and integrates with PURCHASE
ORDER MANAGEMENT.

BAR CODE EQUIPMENT

ASR supplies state-of-the-art bar code equipment to include: Bar Code Readers (wands), pre- printed labels, software to produce internal use bar code labels, and bar code printers. ASR's multiple level options allow users of MMM to pick bar code technology that is best suited to your needs. ASR service representatives are available to discuss the hardware requirements based on customer demands, usage, number of staffed personnel and the size of the facility.

DURAW16K DURA WAND DATA COLLECTOR 16K BYTES RAM One button operation. Connects to key ring.
Processes BAR CODE DATA without the keyboard.
Downloads via serial port to computer.

PERC128K PERCON WAND DATA COLLECTOR 128K BYTES RAM Full alpha-numeric key pad for data entry.
Processes BAR CODE DATA without the keyboard.
Downloads via serial port to computer.

NOCOMP ScriptWriter with Bar Code Pen
An 8x11 tablet that can collect data via a bar code wand input
and a pen to scribe the other data onto a work order sheet that
is later downloaded into system files.

OMNIWAND OmniWand infra-red scanner for Bar Code
Supports infra-red bar code laser and contact bar code reading.
Scans bar code labile and allows full data entry for work orders, parts inventory, parts par level, and asset tracking

2.1.11 Interface Requirments

Provides automated facilities for receiving and accumulating cost and income data from the a mainframe system even after the work order is issued or closed.

MMM allows for the creation of over a dozen industry file formats for export/import to MMM and other systems. File format design and export routines are easily created without writing computer code.

Ability to produce a list of all valid work order numbers to be uploaded to a mainframe for use in validating labor charges.

All data field are available as export files to perform data validation. MMM allows for the creation of over a dozen industry file formats for export/import to MMM and other systems. File format design and export routines are easily created without writing computer code.

Provides automated facilities for producing custom data files to be uploaded to other systems including an automated Records Management System.

Ability to accept files from other systems and produce work orders. For example, work orders may be created on a mainframe system and downloaded to the client/server platform (automatically or manually).

MMM will accept data from the customers mainframe system and allow for the automatic generation of work orders in the MMM system. This is accomplished with the MMM- Mainframe to PC work order module.

DATA CONVERSION REQUIREMENTS

Convert building/equipment inventory data from the current database to the new system. Data conversion services are available either remotely or on-site during the training and installation period. Standard data conversion fees are based on time and/or the number of data files.

DATA-CON DATA CONVERSION SERVICES

Data conversion will consist of importing/exporting of customer legacy data and the processing of pertinent data required for the MMM series. Standard fee's are either $ per day or $ per file, which ever is lower.

USER DEFINED TABLES

The following table names are a representative list of the look up tables available in the MMM software program series for a Computerized Management System. American Services Resources and Softwest Programming, Inc. reserves the right to alter, add or delete tables as necessary for new versions.

Department Codes
Field Office Division Codes
Company Organization Codes
Type Work Order Codes
Failure and Solution Work Codes
Function Codes for Work Orders
PM Schedule Code
Location Facility Codes
Square Footage Codes
PM Standard Codes
Equipment Description Codes

Device Codes
Work Order Status Codes
Work Order Priority Codes
Asset Type Codes
Asset Class Codes
Craft/Crew/Trade Codes
Type Meter Codes

2.1.12 Hazardous Material Inventory

The system shall have the ability to provide type, quantity, location, and condition of hazardous materials (i.e., asbestos, lead, etc.) that may be located in each facility. MMM allows for "hazardous" materials tracking to include details associated with given materials.

2.1.13 Elevators & Sprinklers

The system shall have the ability to search and carry all characteristics of these entities.

This is a standard function in the MMM solution. The MMM has preventive maintenance procedures for elevators and sprinkler systems that define exactly what is required for inspections and estimates for hours.

The MMM system notifies the end user of due dates for certification of stand pipes, chemical systems, sprinklers, etc. The fields shall be included on the database and the end user shall have the ability to update the fields as necessary.

The MMM system has the required to identify which facilities need compliance activities. For example, if an elevator needs an inspection, the system will notify the user that it is due and record the compliance activity.

MMM has specialized in compliance regulations since its inception. Having evolved out of the service management and facilities sector, MMM takes great care in compliance needs and requirements. Currently, the MMM has passed every facility nationwide in requirements for the Joint Commission on Accreditation of Hospitals, the State Licensing for Health Care Facilities, and those facilities that require compliance with the College of American Pathologists also have used the MMM to meet certification.

2.1.14 Management of Outside Contracts

The MMM system has the ability to manage outside contract hourly work or projects from scheduling, labor, and cost perspectives.

Outside contracts are managed with the codes for client billing and vendor costs. Each work order gives the user the ability to transactionally code what and who was completed.

Costs for contracts, payments, and premiums can be tracked to determine the cost/benefit ratio.

2.1.15 Training & Work Shops

American Services Resources provides full system hands-on training for all modules and system administration functions.

American Services Resources is dedicated to provided complete comprehensive training for all users of the MMM systems as well as extensive training for System Administrators charged with maintaining the MMM system.

End User training starts from simple data entry and progresses to extensive hands-on training on every screen and field in the system available to end users. End Users are taught how to best implement the extensive end user HELP systems for a better understanding of the MMM data fields, screens and system reports.

End user training also provides in-depth instruction on the built-in add hoc query systems and the end user Report Generator. End Users are taught to create and customize their own reports. These generated reports may be saved and added as normal

report options by the System Administrator.

System Administrators are provide with rigorous hands-on training encompassing the actual application, security, file management, use of add-on tools, report generation, troubleshooting and the development tool employed. Training is available at selected training centers in North America or may be held at the customer's designated location. System Administrator training normally takes eight (8) hours of classroom instruction. Unlimited, technical support is provided for trained staff members to provide our goal of Continuos Measurable Improvements (CMI's). ASR is recognized for its complete and totally comprehensive training and support services.

Training of the customer's System Administrators will be provided for either the week preceding installation or the week of installation. It has been the experience of ASR that System Administrators who are trained in the deployment prior to actual implementation offers a smoother transition into the MMM Systems. This benefit is recognized as ASR's Continual Measurable Improvement (CMI) concept. Advance programming classes and Client/Server training is provided on the MMM development tool and MAGIC Software, are also available in southern California.

2.1.16 Documentation

Copies of user General Operation Manuals, Training Manuals, Application Manuals and TECHNOTE Manuals are available upon request. System Administrator training is offered in conjunction with MMM Training for Deployments and Magic Software Enterprises, Inc. These training materials include deployment and developer manuals and guides, source code libraries, Mastering Magic (Developers Guide with over 800 pages of Tips, Tricks and Programming Techniques with hundreds of sample applications) and 8 additional add-on utilities to enhance developer skills and proficiency.

Available Documentation:

[1] Training Guide
[2] General Operations Manual
[3] Technotes Manual
[4] Applications Manual
[5] Report Writer Manual
[6] Mastering Magic
[7] The Magic Developers Guide and Reference
[8] Magic Business Templates
[9] X-Ref Cross Reference Utility
[10] Bar Code Deployment
[11] Script Writer Development
[12] ISO 9000 Readiness Guide
[13] Hard Disk Technical Guide
[14] Magic Tutorial Evaluation Guide

2.1.17 Service & Maintenance

Toll free 800 number for software support (800) 333-1157; Fax: (714) 362-2969
Toll free 800 number for general information is (800) DIR-SOFT, (347-7638)
Internet World Wide Web address: http://www.amerisoftwest.com
Emal: softwest@deltanet.com

All ASR customers have options for product and application support. End User support is available daily from 8:00am to 5:00 PM PST by dialing (800) 333-1157. Customers can fax requests or call with the modem for additional levels of support and updates. Response is guaranteed during regular hours with response time less than one (1) hour. Backup support is available nationwide via our nationwide paging system.

ASR provide remote system troubleshooting, diagnostics, corrections and testing from the ASR headquarters other selected sites nationwide. Updates, utilities and tech-notes are also available from our modem service. Access is provided via 9600 baud rates.

ASR offices provide call-backs after normal business within two hours on the next days business as well as guaranteeing regular hours responses normally within 1 hour.

Periodic software enhancements and modifications including documentation and training are provided to contracted customers. The ASR Support & Maintenance Plan offers comprehensive coverage to include but not limited to the following:

* One year unlimited technical support for end users

* One year of 12-hour a day unlimited System Administrator Support
* Free updates and fixes for one year on the MMM application.

* Updates, upgrades and technical support on all development tools and utilities provided
with the MMM solution. This level of support is included at no charge during the first year of operation. The customer has the option to renew support on all development tools and utilities on an annual basis. The customer will be billed automatically in the 11 month of each years operation to prevent lapses in technical support. Support fees are calculated at 20% of the current MSRP of development tools and utilities in use as well as a function of the number of programmers requiring such assistance.

* All documentation regarding the MMM application fixes, enhancements or technical notes are made available at no charge for current customers under support.

ONGOING SOFTWARE MAINTENANCE

Ongoing support is available in a variety of options for MMM users. These options include;

MMMFULL-S FULL FUNCTION SUPPORT FIVE DAYS A WEEK 8AM-5PM DAILY
Single user systems. Unlimited toll-free support for MMM, DOS, and
other ASR applications. Includes one day on-site training. MINIMUM
two updates per year.

MMMFULL-N FULL FUNCTION SUPPORT FIVE DAYS A WEEK 8AM-5PM DAILY
For Network systems. Unlimited toll-free support for MMM, DOS, and
other ASR applications. Includes one day on-site training. MINIMUM
two updates per year.

MMMMAXI-S MAXI-SUPPORT (on-site) FIVE DAYS A WEEK 8AM-5PM DAILY
Single user systems. Unlimited toll-free support for MMM, DOS, and
other ASR applications. Includes two days on-site training. On-line
remote access assistance. MINIMUM four updates annually.

MMMMAXI-N MAXI-SUPPORT (on-site) FIVE DAYS A WEEK 8AM-5PM DAILY
For Network systems. Unlimited toll-free support for MMM, DOS, and
other ASR applications. Includes two days on-site training. On-line
remote access assistance. MINIMUM four updates annually.

5X8X6MMM-L LIMITED SUPPORT FIVE DAYS A WEEK
8AM - 5PM Daily. Annual update and a maximum of six (6)
calls per year. Requires current version of MMM program.

UPDATES-S ANNUAL UPDATES ONLY WITHOUT ANY SUPPORT
UPDATES-N ANNUAL UPDATES ONLY WITHOUT ANY SUPPORT Network versions. Must have current version.

2.1.18 Maintenance Management Survey

Evaluating a maintenance management organization requires first to identify the various areas of concern. The identified process contained herein includes budgeting, planning, work order processes, data analysis, material and parts management,

preventive maintenance (planned maintenance), productivity, cost control, safety and environmental services, and training.

The rating structure is based on a 1000 points. The major headings for evaluation are listed below. Each are packed with multi-questions that need to be weighted on a percentage basis. These questions can be asked by administrative personnel and calculated to determine where, if any, problems exist in the maintenance organization.

Maintenance Level
Organization and Administration
Work Order System
Failure, Analysis and Planned Maintenance
Purchasing and Stores
Cost Control
Safety and Housekeeping
Engineering
Training

A sample page is included after this page. Total cost to administer this survey is $950.00. On-Site surveys are based on cost per day and expenses portal to portal.

3.0 ESTIMATED FEES AND COSTS

The following represents the fees and costs associated with the installation and implementation of the 'Master Maintenance Management' software program series. Pricing for other options for single user and smaller network versions can be found in the General Price list included herein.

3.1 MMM Application Software License Costs

3.1.1 MMM Base license fee

(network for each site - $ 90,000.00
specified concurrent seats on a Novell Network
deployed in DOS or Windows. Includes one (1)
user site license deployed on one or more networks. Maximum of
one hundred (100) concurrent seats and up to 999 work stations.

Note: Includes all documentation for TECHNOTE MANUAL,
GENERAL OPERATIONS MANUAL, MMM APPLICATION
MANUAL, TRAINING MANUAL, REPORT WRITER
MANUAL. Quantity is two (2) sets per site. Additional
copies are $ 199.00 each or $995.00 for all manuals on diskette.

3.1.2 MMM Application Modules Included

Facility Maintenance Equipment Maintenance
Work Order Maintenance
Preventive Maintenance
Personnel Management
Vendor/Client/Address Management
Purchase Order Management
Parts/Material Management
Risk/System Mission Critical Management
Reports and Analysis Module
Data Management Utilities

3.1.3 Twelve (12) months maintenance support $ 1,150.00 for maximum twenty (20) users

3.1.4 Installation and Implementation for one (1) site. $ 4,000.00
Travel costs plus $150.00 per diem plus air fare and
ground transportation expenses.

3.1.5 Training and Work Shops Fee five (5) sites, 15 days. $ 10,200.00
The days required for each site may vary based on their
technical expertise. This price is a not to exceed fee
and may be varied from one site to another. At a minimum
ASR's agreement will specify at least three (3) days to be
authorized for each site. It is recommended that sites be crossed
trained and each site have the opportunity to meet with other sites
during training to receive the maximum benefit for all support
maintenance personnel. Travel costs plus $150.00 per diem are
billed before installation.

3.1.6 MMMworks(tm) Development and Deployment Modules

Basic MMMworks(tm) Type & File Dictionary Library $ 17,900.00
Includes over 480 type fields; over 180 data files;
Magic Software Enterprises, Inc. Version 6.00 for one
user on a multi-user network. Used for the administrative site.

3.1.7 Training for Administrative site on Development and Deployment of the MMMworks(tm)
software applications.

Magic University, Irvine, California $ 2,000.00
Includes five (5) days in a class room setting.
Includes Mastering Magic, two volumes of business
applications created with Magic, and other tools.

On-Site Training with Magic Software Development $ 6,000.00

3.2 Optional Costs and Fees

Support per site after the first year. This is due after $ 1,150.00
the first year.

MMM Bar Code Applications for Deployment:

Each of the following software programs require hardware
wands, interfaces, power supplies, chargers, etc. in addition
to the costs for software. Hardware ranges from $300.00 to
$ 7,000.00 each depending on the sophistication of the device.

Bar Code Work Order Management $ 3,900.00
Bar Code Parts Par Level Management $ 3,900.00
Bar Code Asset Tracking Management $ 3,900.00
Bar Code Infra-Red Sensor Management $ 19,000.00
No-Computer Script Writer $ 3,900.00

MMMworks(tm) Software Program Applications
Source Code Modules:

Facility Management $ 99,000.00

Help Desk Management $ 39,000.00

Service Management $ 79,000.00

Equipment Management $ 99,000.00

Reports and Analysis Module $ 89,000.00

Data Management Utilities $ 89,000.00

Bar Code Module $ 29,000.00

MMMworks Field Library $ 1,900.00

MMMworks File Library $ 9,800.00

MMMworks Enterprise Wide Menu $ 895.00

MMMworks Files/Fields/Menus/Help $ 12,900.00
Includes Magic 5.02d or 6.00 development tools.

3.3 Source Code Escrow Cost $ 1,200.00

Data Conversion Costs. Base fee for conversion is $ 800.00
based on a per file charge or per day charge.

Base fee for programming required to provide for update $ 125.00/hour
and download requirements for main frame data. Fee is
stated as a per hour cost, plus contracted travel expenses.

3.4 Payment Terms

A deposit is required in good faith based on details of the computer
systems agreement to configure all software systems. Payment is
required fifteen (15) days or less from billing date for all source code
products and services. Delivery is less than fifteen (15) days from
receipt of funds.

3.5 General Price List

American Services Resources general price is listed on separate pages.

4.0 OVERVIEW OF VENDOR INFORMATION

Name: Pamela Anne Tarzian, Chief Executive Officer

Patrick Tarzian, President & Chief Technology Officer and contract negotiator.

Parent
Company: American Services Resources
24331 Muirlands Blvd.
Suite 4-125

Lake Forest, California 92630
Telephone: (800) DIR-SOFT (347-7638)

Software
Company: division of American Services Resources
Softwest Programming, Inc.
24331 Muirlands Blvd.
Suite 4-125
Lake Forest, California 92630
Telephone: (800) DIR-SOFT (347-7638)

Copyrights, Trademarks and Service Marks for all of the Master Maintenance Management software program series are registered to Softwest Programming, Inc. a division of American Services Resources

4.1 Brief Company History

January 1980; started Softwest Programming, Inc. the software development arm of the software products distributed by various United States companies. In May, 1985, American Services Resources became the exclusive distributor of the 'Master Maintenance Management' software program series after a buy-out from partners. Softwest Programming started using Magic in January 1987 that was used to develop software for the support automation technology industry. Development was centered on facility and equipment management. Experience, training and education came from designing and operating support entities for companies that needed organization of support management. The basis for the 'Master Maintenance Management' software program series started with the ASD (Aircraft Statistical Data) Program used in the U.S. Marine Corp. that was provided by the U.S. Navy. Now, the 'Master Maintenance Management' software program series is used to manage sites around the world by contractors that work for the United States Air Force on bases that control the Defense Early Warning system. Furthermore, the United States Government General Services Administration has used the 'Master Maintenance Management' software program series to manage over 400 government buildings.

Health care facilities include two of the largest; BJC Health Systems with over 100 clinical engineers and service technicians operating on multiple servers on a wide area network; and SSM Health Business with customers in multiple sates and multiple servers.

4.2 Financial Statements

American Services Resources is a privately held company and does not release any financial information.

4.3 Marketing brochures on and American Services Resources.

Brochures for products and services are directly after this section. Manufacturers
listed are:

Softwest Programming, Inc. Percon, Inc.
Magic Software Enterprises, Inc. Videx, Inc.
ScriptWriter Worthington Data Solutions
WinBeep by Strain AmeriTech, Inc.

4.4 Number of Staff and Contractors

Primary Vendor: American Services Resources: 4 Staff
Distributor of products created by
Softwest Programming, Inc. American
Services Resources is contracted with
Softwest Programming, Inc. to provide
all software for support automation technology
needs since May 1985.

Contractors: See Below 4 Engineers

Secondary Vendor: Softwest Programming, Inc. 2 Staff
Master developers and designers
for the 'Master Maintenance Management'
software program series contracted and authorized for
development and deployment with Magic Software
Enterprises, Inc. post 4GL tools, Irvine, California.

Total Number Of Associated Staff: 10 Staff

· American Services Resources is a Woman-owned Business Enterprise (WBE). Pamela Anne Tarzian, Chief Executive Officer, of American Services Resources is listed with United States General Services Administration as a Woman-owned Business Enterprise.

4.4.1 Responsibility listing

American Services Resources is the primary vendor utilizing contractors and developers to provide solutions with the support automation technology products developed by Softwest Programming, Inc.

4.4.2 Titles

Titles: Quantity

Administrative 2
American Services Resources

Management 2
American Services Resources

Marketing 2
American Services Resources

Sales 6
Wilson Tablets;
Tanner Enterprises
RT Enterprises
JM New York Sales
HH Southern Sales
EM Orleans Sales

Developers 3
Softwest Programming, Inc.; Patrick Tarzian

Implementation Specialists 3
American Services Resources; Patrick Tarzian
Facility Data Management; Dennis Daniel
Networks and Communications 2

Customer Service (Help Desk) 4
American Services Resources; Ryan Tarzian
Facility Data Management; Dennis Daniel
American Services Resources, Pamela Tarzian

Note: The 'Master Maintenance Management' software program series

is used to provide Help Desk customer service support for all of the customers of American Services Resources, and Facility Data Management.

4.5 Installations

The installation information regarding the Master Maintenance Management software program series since its inception in 1979 is given upon request.

Release schedule for the MMM is monthly via modem connections.

Release schedule for the MMM is monthly. Clients are updated via email or UPS.

Total quantity of version 6.xx is approximately 700.
Total quantity before the release of the current version is greater than 3,500.
Total quantity on current version 6.xx is greater than 800.
Total quantity for all versions since 1979 is greater than 5,100 licenses.
Total individual work station seats are greater than 45,000.

4.7 Software Maintenance & Support

American Services Resources provides support as an included cost for the first year of operation of the 'Master Maintenance Management' software program series. Additional support is outlined in the ESTIMATES AND COST SECTION.

Updates and enhancements to the current version are provided at no cost. Customers that migrate from DOS to Windows to UNIX to Dec-Vax to AS/400 will be charged seat costs for the same number of licensed seats already in place.

Customers can call in with their modem and pick up the latest version at no cost. If customers do not have a modem, then a shipping and handling charge will be invoiced.

Per the Customer Agreement, all errors in software are the responsibility of ASR. Those
errors brought to ASR's attention are corrected at no cost.

Customers are urged to stay current with all versions. At least quarterly updates are recommended.

Additions, change requests, and modifications to the MMM software can be made at no cost to the customer if the time frame of 90 days is acceptable. Otherwise, charges of $200.00 per occurrence is invoiced upon approval.

4.8 References

The following pages represent customers currently using the MMM. A more complete list is found in our references page. s

4.9 Future Technology Direction

American Services Resources interfaces directly with the customer and provides system analysis support to determine what features can keep the customer abreast of technology. Maintenance avoidance and cost containment are the keys to the development of our support automation technology product line created and designed by Softwest Programming, Inc. The main direction of the 'Master Maintenance Management' software program series is to be totally hands free from the keyboard in the daily processing of data.

New products include the interfacing of instrumentation to the management of support automation technology. Data management will be voice inputted in future versions.

Details of any new products before release date for distribution cannot be described herein due to the possibility of the competitions ability to copy.

New releases and deployments are described in our presentation programs.

5.0 FEATURES AND FUNCTIONALITY RESPONSES

The following samples of function/features are questions that can be included into a prospective customers White Paper which allows the vendor to understand the level of importance of each question and provides an answer as to the compliance for a particular feature/function with an explanation.

There are over two (200) hundred questions which allows the prospective customer to evaluate the different vendors software capabilities. A sample of the questions are on the following pages. A weighing methodology is available as a new module with the MMM. This is sold separately for $900.00.

5.1 Questions with Multiple Choice Answers
Each multiple choice question is answered with a letter defined below.

A = Currently Installed
B = Available but Not Installed
C = Available with Modifications
D = Under Development
E = Not Available

BASIC FEATURES

1. Security levels are assigned and revised by the user. [ ]

2. The proposed system will provide customer defined window prompts at [ ]
selected fields.

3. Bar codes for employee identification currently in user by the customer [ ]
will be used by the proposed system.

4. Bar codes for equipment identification will be defined by the user. [ ]

5. Bar codes for parts identification can be defined by the user. [ ]

6. Work orders are bar coded for identification on each work order [ ]
automatically, if bar code collecting is used to open and close work orders.

7. The proposed system will allow the customer to print bar code labels. [ ]

8. The proposed system will identify location by I.D., Site, Bldg/Floor & Room. [ ]

9. The proposed system will identify multiple sites. [ ]

10. The proposed system will identify multiple buildings, floors, square footage. [ ]

11. The proposed system will identify multiple rooms. [ ]

12. The proposed system will identify location I.D. with square [ ]
footage values.

6.0 REPORTS AND ANALYSIS SAMPLES

The following are samples of reports, graphs, and work orders used in the 'MMM' software program series. At a minimum, if these representations of data for support automation technology disciplines is not available on a daily basis with very little effort, then is proof positive that your company has a definite need to improve operational conditions.

American Services Resources and Softwest Programming, Inc. reserves the rights to include or excluded any reports, screens, data utilities as necessary to configure various versions of the Master Maintenance Management software program series.

As of January 1995 the "MMM" has over 150 reports and graphs. Each graph and report can be ranged on one or more fields. Sorting can be accomplished on multiple fields of data.

7.0 Conclusion

We have presented in this paper the specifications, development and deployments of the 'MMM' in a true CLIENT and SERVER environment, and explained how the MMM, MMMworks and MAGIC provides support for most companies. The visible interfacing and development process is accessible to all programmers. CODE FREE development provides self created documents with date and time stamp for all users.

In application deployments for users, a context visual sensitivity with menus for some users and Windows deployed via icons for others. User defined colors, printers, keyboard layouts, and other selectable options so that each user can operate in a manner consistent with other known applications.

For established users of the MMM and other CMS systems, this paper has shown that the manner in which support for a CMS is implemented does not take away any of the benefits which influenced their decision to choose the 'MMM' in the first place.

For established users of other applications and tools, considering the MMM, MMMworks and MAGIC for strategic database application development, this paper has defined briefly the familiar concepts of programming in the conventional methods versus the CODE FREE programming in MAGIC. These CODE FREE concepts are delivered to the programmer in a way that eliminates the cumbersome techniques and drudgery associated with conventional procedural programming without sacrificing any of the benefits which influence their decision to choose MAGIC.

The computer based presentation programs on diskette provided under separate cover give the viewer the details of design, development, and deployments with MAGIC and MMMworks. Please review these programs in addition to this White Paper.

Description of Program: File Name:

Support Automation Technology Applications MMMPRES.PPT
Software Administration and Control SOFTWEST.PPT
Information Systems Design and MAGIC DESIGN.PPT
Access to Network for full operational testing CCA-REM.EXE

Despite tangible improvements in programmer productivity over the years, no real breakthrough has occurred in the economics of application development and maintenance. However, the worldwide evidence is now compelling that Magic represents such a breakthrough and does address the real costs of the application software life cycle. For those who recognize that only innovative solutions can deliver real economic benefits, but also feel that innovation implies non-conformance, MAGIC with MMMworks presents a uniquely balanced approach - the benefits of MMMworks, the benefits of MAGIC, and the conformance with standards.

We feel that your company is interested in the deployment of the 'MMM' and MAGIC. Please consider meeting with American Services Resources and discussing in more specific terms how we can meet or exceed your expectations for quality products and services. The 'MMM' will be the system to bring together the workers, middle management, and top management, saving

valuable development dollars, valuable deployment dollars, and giving people the options to create strategies to meet company demands now and into the next century.

American Services Resources is turning new knowledge and technologies into business tools. A complete management guide for support automation technology disciplines that calculates a weighted value on your departments by answering questions for work management, parts and material acquisitions, planned maintenance technology, inspection protocol, techniques in management, etc., is available for $950.00. This can be used as a self test or administered as query from administration for scoring workers and management.

American Services Resources (800) DIR-SOFT.

end.