

Visual Manufacturing™, a commercially available software package, along with supporting software modules written in-house constitutes a fully integrated, real-time ERP system that monitors and controls all of the fundamental processes of our business. It is the heart of our project management system. Overviews of the various modules follow:

[Estimating & Quotation](#) - creates comprehensive quotations that include material, labor, burden and outside services; determines realistic delivery dates based on material and resource availability.

[Order Entry](#) - provides access to crucial data including material and resource availability, order acknowledgments, percentage of completion and shipping information.

[Document Control](#) – virtual Librarian stores and catalogs all customer drawings, MTM process drawings, customer part lists, supplier material certifications as well as customer and industry specifications. Machine operators, engineers and support personnel can access any of these documents from the control stations of their CNC machines, their desks, or data terminals throughout the shop floor.

[Job Folder](#)- An electronic folder gives team members quick access to all crucial documentation related to a specific job and project. The first document entered into the folder is the scanned customer's purchase order followed by the Contract Review. Throughout the duration of the project all workscope communications and pictures are logged into the electronic job folder for quick access and secure storage.

[Process Engineering](#) - quickly and easily creates engineering plans and bills of material, and uses these to create quotations and/or work orders automatically; integrates seamlessly with material planning, purchasing, and scheduling.

[Scheduling](#) - real-time capacity planning by finite scheduling of all material and resource requirements. Utilizes "what-if" scheduling to detect and address bottlenecks before they occur.

[Purchasing/Receiving](#) - Receiving and Purchasing modules work hand-in-hand to record receipt of materials and services as well as automatic inventory issuance to specific areas of the shop floor, warehouse locations, or returns to suppliers.

[Inventory Control](#) - automatically adjusts inventory whenever a part's bar-coded label is scanned on the shop floor. Items are designated as purchased, manufactured, stocked, or non-stocked so we can place purchase orders or issue parts to each work order as they are needed.

[Part Traceability](#) - creates trace records for each lot number, serial number, or other grouping of a part and automatically tracks each part from receipt through shipping as well as all intermediate levels; query capabilities give us visibility into the flow of material lots and serialized parts throughout our manufacturing process.

[Labor Collection](#) – Machine operators electronically “clock in” on every job at networked data terminals; provides real time access to actual direct labor hours throughout the company; direct labor hours and machine spindle times are used to efficiently manage our resources and control costs on each job.

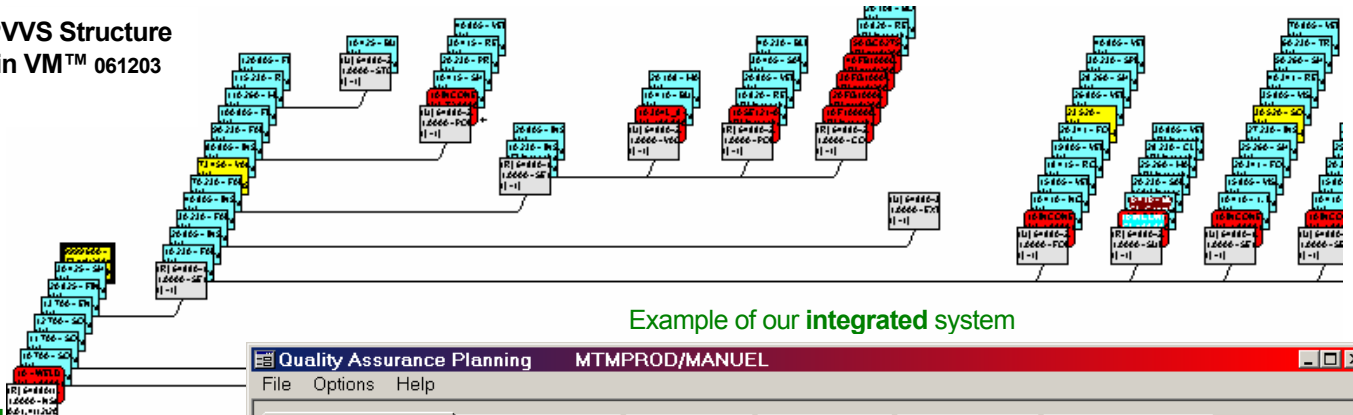
[Quality Assurance](#) - Inspection Data Checklists (IDC) integrated into the electronic shop router created in the Process Engineering module specify dimensions to be measured by operators on the shop floor and record results on-line; qualified personnel electronically sign off on the IDC upon acceptance of each characteristic. The Non-Conformance Report (NCR) system allows us to track disposition, root cause, and preventive actions of non-conformances; reporting features perform trend analysis to correct potential problems before they occur.

QAP – This fully integrated into Visual planning program is our central place to plan for what inspection information and documentation is required for a work order and all the information is linked to individual “cards” in Visual Manufacturing. This program is our central place to link scanned files as well as linking Excel and Word documents to fulfill the requirement for documentation control. The program is a central place to help QA and Engineering team members control, manage and obtain status on what information has been collected with respect to the plan. The following quality documents are easily accessed from one program; N/C system, IDC’s, NDT, Material Certifications and Material Traceability. With the click of one button a QA team member can print all of a specific work order’s required documentation into a QA data package that will be delivered to the customer upon completion of the work order.

Shipping - creates bills of lading, packing slips, and bar-coded shipping labels to each customer’s specific requirements.

Financial - databases supporting Visual modules support the complete accounting process including cost accounting, accounts receivable and payable, general ledger, and payroll. The accuracy and immediacy of the data and the fact that every functional area in the company uses this software create a management tool that the CFT responsible for your project will use to insure that they are finished on time, within budget and that they meet all quality requirements.

PVVS Structure in VM™ 061203



Example of our integrated system

At MTM we double click this white card in VM™ and then hit the QAP Button and this window opens with Quality Assurance Information.

Master Header Card “White”

Quality Assurance Planning MTMPROD/MANUEL

File Options Help

System Requirements | Other Requirements | Documentation | Data Package | Additional Docs | Non-Conformances

Workorder Base ID Lot Split 64880 1 0			Customer ID Name 8780 PRINCETON PLASMA PHYSICS LAB		Customer P.O. P.O. No. Item S-04344-F 1		Defense Contract <input type="checkbox"/> Yes Priority Code	
Part ID Description Rev NOR SE121 NSCX VACUUM VESSEL PROTOTYP A				10.0 Years of Retention		Quality System ISO 9002		
Sampling Plan <input checked="" type="radio"/> MTM Sampling Plan <input type="radio"/> Other Sampling Plan Document								
<input checked="" type="checkbox"/> N/A Requirements			<input type="checkbox"/> Required - Submit To:					
Customer Approved Suppliers <input type="checkbox"/> N/A Requirements								
Subcontractors require pre-approval			<input checked="" type="checkbox"/> Required - Submit To: Mike Viola					
Source Inspection <input checked="" type="checkbox"/> N/A								
<input type="checkbox"/> In-Process Hold Points Identified								
Method of Identification:								
<input type="checkbox"/> Hold at Final For Source Inspection								
Notice Required For Source Inspection (# days)								

Save IDC NUM

Manufacturing Window - [64880/1]
 File Edit View Status Change Info Options Window Help

Material Cards
"Red"

- 70 805 - VERIFY PROFILE TO INSP (U)
- 60 230 - TRIM PERIMETER TO PRO (U)
- 50 260 - SHOT BLAST WITH 180-22 (U)
- 40 341 - RE-STRIKE PANEL (U)
- 35 805 - VISUAL INSPECT SURFACE (U)
- 30 520 - SOLUTION ANNEAL FORM (U)
- 27 230 - INSTALL AND WELD ANNE (U)
- 25 260 - SHOT BLAST WITH 180-22 (U)
- 20 341 - FORM PANEL IN DIE # (U)
- 15 805 - VISUAL INSPECT SURFACE (U)
- 10 410 - 1. PRIOR TO BEGINNING (U)
- 10 INCONEL 625_5 - PLATE,NICKE (U), 1.0000 Qty Reqd
- (U) 64880-14/1
- 1.0000 - SE121-001P-2 PANEL # 1
- 0 - 0

PVVS Structure in VM™ 061203

- 10 410 - BURNOUT STRIPS PER M (U)
- 10 INCONEL 625_5 - PLATE,NICKE (U), 720.0000 Qty Reqd
- (U) 64880-38/1
- 1.0000 - PANEL ANNEAL BRACING
- 0 - 0

At MTM we double click this red card in VM™ then the Material window opens. See below
 In this card the Specifications tab has been selected.
 The material card has all the required information for purchasing.

This P.O. button is another **integrated** feature, when selected another window opens displaying all the Vendor Purchase Order information.

Material - 64880-14/1 Seq# 10 P
 File Edit Info Options Macro

Piece # 10 Material Leg/Detail P.O.

Part ID Descr INCONEL 625_5 PLATE,NICKEL ALLOY .375" THK IN

Warehouse ID

Quantities Specifications Costs Vendor Quotes Planning User Defined

INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED
 MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800).
 SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS
 CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT.

Effective date
 Discontinue date
 Drawing #
 Rev
 Drawing File

QAP 3 Traceable

Manufacturing Window - [64880/1]

File Edit View Status Change Info Options Window Help

Operation Cards "Cyan"

PVVS Structure in VM™ 061203

- 70 805 - VERIFY PROFILE TO INSP (U)
- 60 230 - TRIM PERIMETER TO PRO (U)
- 50 260 - SHOT BLAST WITH 180-22 (U)
- 40 341 - RE-STRIKE PANEL (U)
- 35 805 - VISUAL INSPECT SURFAC (U)
- 30 520 - SOLUTION ANNEAL FORM (U)
- 27 230 - INSTALL AND WELD ANNE (U)
- 25 260 - SHOT BLAST WITH 180-22 (U)
- 20 341 - FORM PANEL IN DIE # (U)
- 15 805 - VISUAL INSPECT SURFAC (U)
- 10 410 - 1. PRIOR TO BEGINNING (U)
- 10 INCONEL 625_5 - PLATE,NICKE (U), 1.0000 Qty Reqd
- (U) 64880-14/1
- 1.0000 - SE121-001P-2 PANEL # 1
- 0 - 0

10 410 - BURNOUT STRIPS PER M (U)

10 INCONEL 625_5 - PLATE,NICKE (U), 720.0000 Qty Reqd

(U) 64880-38/1

1.0000 - PANEL ANNEAL BRACING

0 - 0

At MTM we double click a cyan card in VM™ then an Operation window opens. See below
 These cards contain what's needed for each individual operation. Like the resource, estimated hours, tools, quality requirements, critical dimensions etc..

Operation - 64880-14/1 Seq# 20

File Edit Info Options Macro Window Help

Type [] Resource ID [341] PACIFIC 750

Seq # [20] Service ID []

Setup/Run | Other | Costs | Advanced | Scrap/Yield | Service | Quotes | User Defined

Setup hrs [0.00] Run [8.00] Run Type [HRS/PC]

Load size [] Move Hrs [] Min Move Qty []

Drawing # [SE121] [] N/A Drawing Rev [A] []

INSTALL AND ALIGN DIE SET # _____ INTO THE 750 TON HYDRAULIC PRESS.
 INSTALL PANEL BLANK INTO THE DIE SET.
 HYDRAULICALLY FORM THE PANEL TO CONFORM

WPS [0] GAP [0] IDC [1] N/A [] NDT [0] www []

This button is another **integrated** feature, when selected another window opens Librarian where all documentation (drawings, specs, tool sheets...) are controlled and can be viewed.

Manufacturing Window - [64880/1]

File Edit View Status Change Info Options Window Help

Sublet Cards "Yellow"

PVVS Structure in VM™ 061203

70 805 - VERIFY PROFILE TO INSP (U)
 60 230 - TRIM PERIMETER TO PRO (U)
 50 260 - SHOT BLAST WITH 180-22 (U)
 40 341 - RE-STRIKE PANEL (U)
 35 805 - VISUAL INSPECT SURFAC (U)
 30 520 - SOLUTION ANNEAL FORM (U) ← **Yellow Card**
 27 230 - INSTALL AND WELD ANNE (U)
 25 260 - SHOT BLAST WITH 180-22 (U)
 20 341 - FORM PANEL IN DIE # (U)
 15 805 - VISUAL INSPECT SURFAC (U)
 10 410 - 1. PRIOR TO BEGINNING (U)
 10 INCONEL 625_5 - PLATE,NICKE (U), 1.0000 Qty Reqd
 (U) 64880-14/1
 1.0000 - SE121-001P-2 PANEL # 1
 0 - 0

10 410 - BURNOUT STRIPS PER M (U)
 10 INCONEL 625_5 - PLATE,NICKE (U), 720.0000 Qty Reqd
 (U) 64880-38/1
 1.0000 - PANEL ANNEAL BRACING
 0 - 0

At MTM we double click a yellow card in VM™ then an Operation "Sublet" window opens. See below
 These cards contain what's needed for each individual sublet operation. Who's the operation being subbed out to, estimates duration, cost, etc.

Operation - 64880-15/1 Seq# 30

File Edit Info Options Macro Window Help

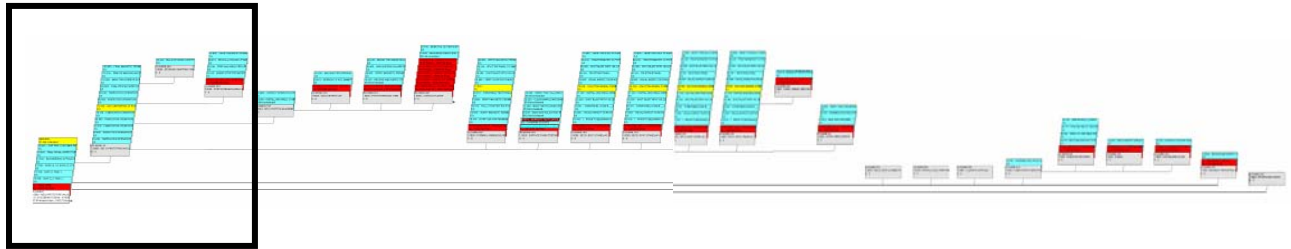
Type [] Resource ID [520] SUBLET, EXOTIC HEAT TRE
 Seq # [30] Service ID [THRML TR/NA SA] THERMAL TREAT/NICKEL A

Setup/Run | Other | Costs | Advanced | Scrap/Yield | Service | Quotes | User Defined

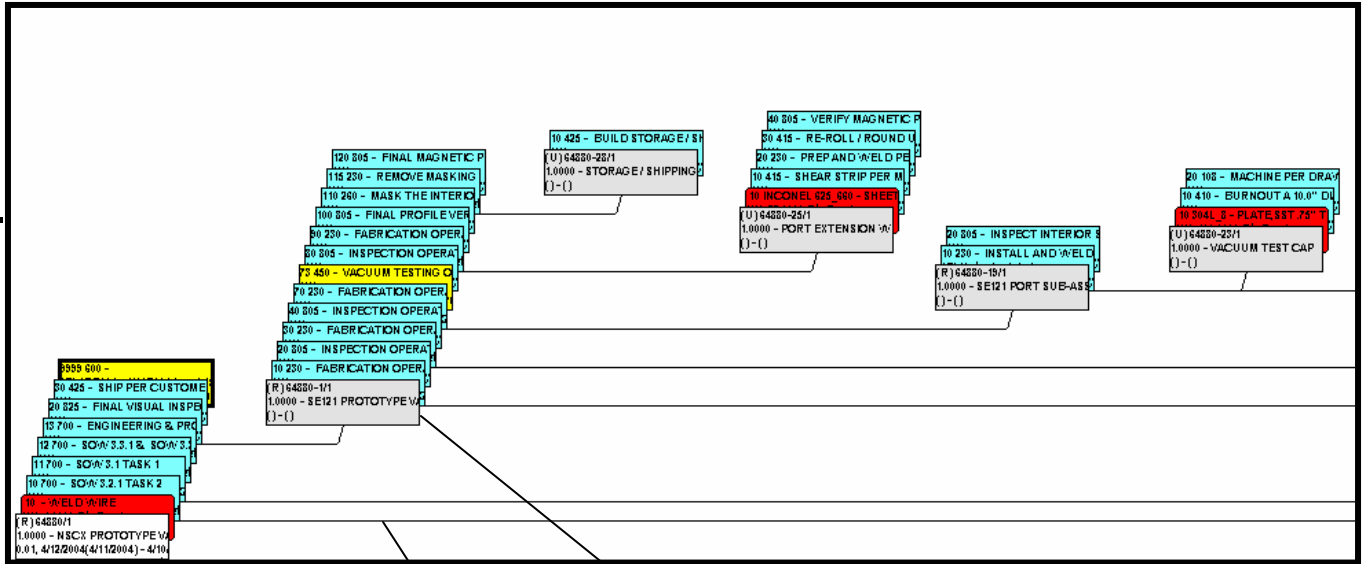
Trans days [0.00] SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING:
 Run [0.00] ATTENTION: PRIOR TO HANDLING THE PARTS OR
 Run Type [DAYS/PC]
 Load size [] Move Hrs [] Min Move Qty []
 Drawing # [SE121] [] N/A Drawing Rev [A] []

WPS [0] QAP [5] IDC [0] [] N/A NDT [0] [] WWW

These buttons are another **integrated** feature, when selected another window opens;
 WPS information
 QAP details
 IDC critical dims
 NDT requirements.



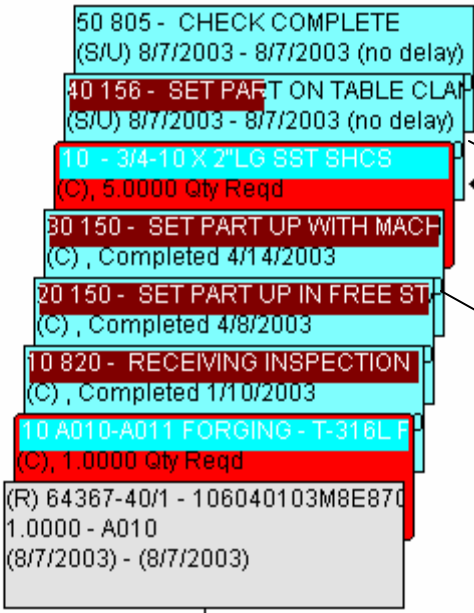
Entire P V V S Structure in VM™ 061203



Engineering Master "Main Header Card" SUB ID "O"

Leg coming off the first operation card – this card will not be completed until all cards from this leg are completed.

Detail – Sub ID created from the fourth operation card in the main header card of operations.



Open Operation

Running Operation almost 50% complete indicated by the highlight bar

Completed Operation indicated by the completely highlighted card