

Company and XM Control Introduction

“DSP”

CONTROL & MONITORING
TECHNOLOGY
FOR THE FUTURE



AMET HISTORY

⌘ OWNERS EXPERIENCE (Don Schwemmer & Dave Stompro)

- ☒ DOE WEAPONS COMPONENTS - Idaho Connection
- ☒ ARMY ARMOR PRODUCTION
- ☒ AUTOMOTIVE MANUFACTURING - Ford
- ☒ NUCLEAR NAVY
- ☒ CRITICAL COMPONENTS, SOPHISTICATED PROCESSES, STRINGENT REQUIREMENTS AND VOLUME PRODUCTION

⌘ INCORPORATED 1989

⌘ OVER 100 ADVANCED SYSTEMS

- ☒ NUCLEAR, AEROSPACE, DEFENSE, AUTOMOTIVE, MEDICAL, TURBINE REPAIR, BOILER

AMET RESOURCES



- ⌘ 22,000 sq.ft. Manufacturing/Development Facility
- ⌘ GTA / GMA / SAW / PAW Development/Production Systems
- ⌘ Circuit Board Design / Manufacturing
- ⌘ Machine Shop Capabilities
- ⌘ +40 Engineering and Technical Personnel



AMET RESOURCES



- ⌘ New 7,500 sq.ft. building
- ⌘ 20 ton overhead crane
- ⌘ Large system assembly & testing
- ⌘ First Phase of an overall new facility
- ⌘ New facility will be over 30,000 sq. ft.



AMET TECHNICAL RESOURCES

- 1 2 MS Metallurgy
- 1 3 BS Computer Science
- 1 4 BS EE & 1 BS EEE
- 1 4 MS Mechanical Engineering
- 1 3 Associates Mechanical Drawing
- 1 5 Associates Electronics

Science with *Blue Collar* attitudes

AMET CORE CAPABILITIES

- ⌘ Innovator and developer of real-time control hardware and software for automated welding processes.
- ⌘ Designer and manufacturer of integrated “Turn-Key” Welding and Monitoring Systems
- ⌘ Developer of DSP based Modular Technologies
 - ☒ Plug and Play
 - ☒ Bolt on Automation - AVC, Cold Wire Feeders, Seam trackers, Oscillators (Mechanical & Magnetic)
- ⌘ Developer of user interfaces for the welding environment

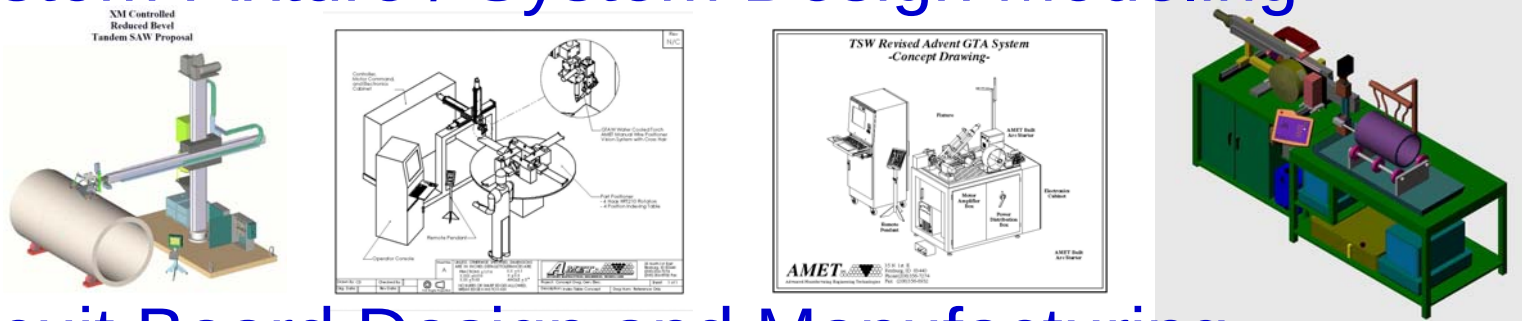


AMET CAPABILITIES

⌘ Weld System Design, Test, and Integration



⌘ Custom Fixture / System Design Modeling

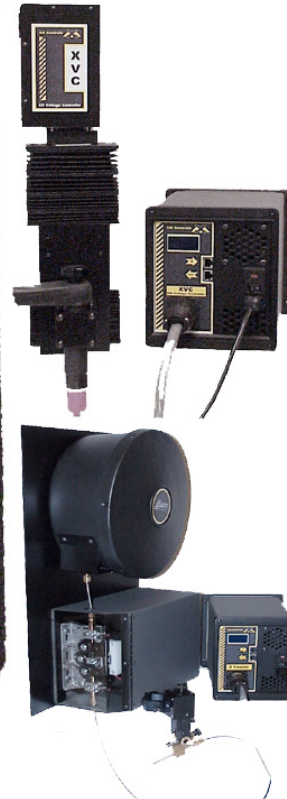


⌘ Circuit Board Design and Manufacturing



AMET's NEXT CONTROL

XM Controls



Truly modular
“Plug and Play”
welding
controls utilizing
the latest in
controls and
communication
technologies



⌘ Linux based operator interface.



⌘ AMET DSP real-time control technology



⌘ “Plug and Weld” capability with controller.

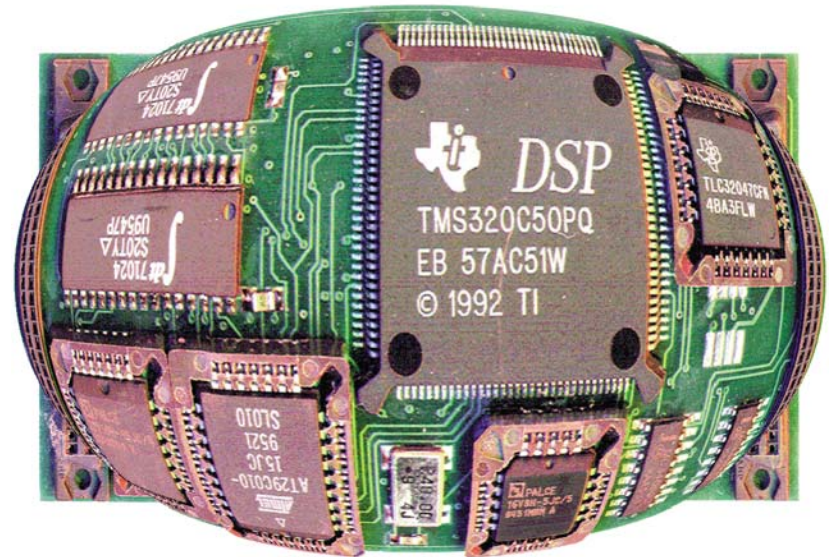


⌘ Modular components to support all welding functions in stand-alone or integrated configurations.



DSP TECHNOLOGY

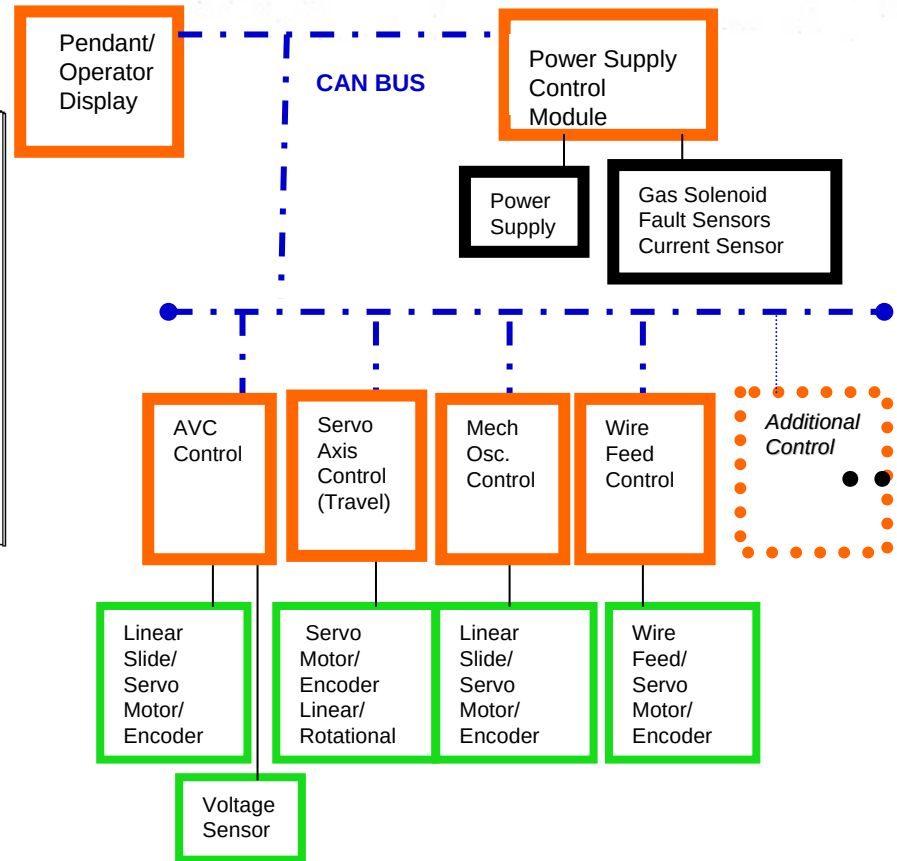
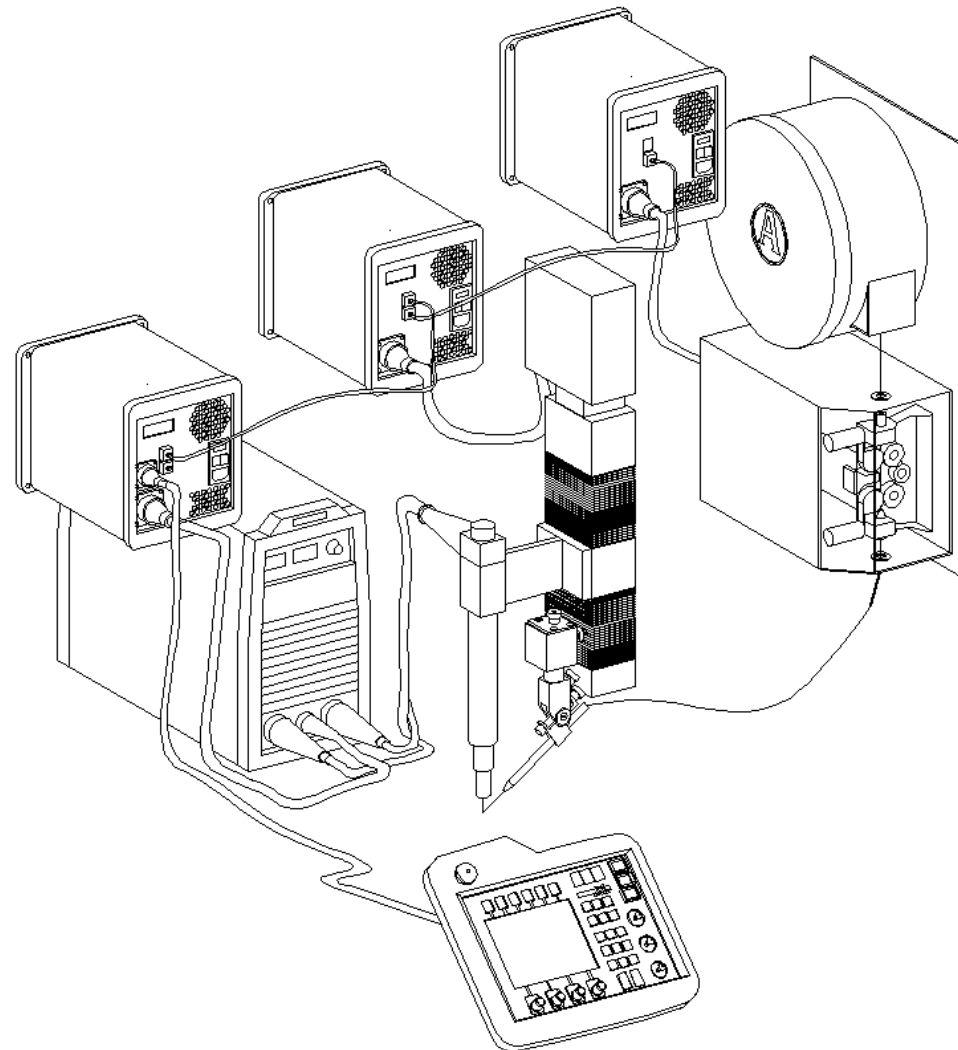
- ⌘ Welding Control is signal processing
- ⌘ DSP's are optimized for high speed, real-time signal processing.
- ⌘ DSP's are the fastest growing segment of the signal processing market
- ⌘ DSP's are used in cell phones, internet appliances, industrial motion controls, etc.
- ⌘ AMET has built DSP based controllers for the welding industry since 1995.





Design Criteria

- ⌘ Complete systems can be made up of one or many modular controls.
- ⌘ Turn key or customer integrated systems.
- ⌘ System configuration is automatic (plug & weld).
- ⌘ Modules are weld function intelligent.
- ⌘ Capabilities can be scaled up or down at any time.
- ⌘ Custom modules can be integrated into the system.
- ⌘ Digital Signal Processor technology used in every module.
- ⌘ Convenient Operator Interface integrated with the remote pendant functions.
- ⌘ Simple Programming environment.
- ⌘ Modules for all welding needs.





ARCHITECTURE



⌘ Plug & Weld

- ☑ Each module participates in a daisy chained high speed serial network.
(CAN - Controller Area Network – an industrial Ethernet)
- ☑ Modules can be located near the equipment they are controlling, minimizing bulky I/O cabling.
(only the two-wire CAN cable between modules)
- ☑ In most modules, only one cable from module to slide or device being controlled



ARCHITECTURE

- ⌘ Standalone or part of an integrated system
 - ☑ Each module can operate as a stand-alone controller, or as an integrated component of an automated system.
 - ☑ As a stand-alone unit a small pendent with display is used to program or override the module.
 - ☑ When integrated with the XM-Controller, programmed commands and synchronization are received from the CAN bus connection.



ARCHITECTURE

⌘ DSP Controlled

- ☑ Each module will use a hybrid DSP operating at 80MHz, allowing sophisticated signal processing and control algorithms.
- ☑ On-board **non-volatile** flash memory is used for program and data storage.
- ☑ This same DSP technology is used in other AMET products.





- ⌘ Operator Interface/ Remote pendant
 - ☑ Lightweight and ergonomically designed for handheld or stand mounted use.
 - ☑ Full Color TFT active matrix 6.4 in. backlit LCD display.
 - ☑ Windows-like Graphical User Interface, based on Embedded Linux for reliability
 - ☑ 4 encoder pots for parameter overrides and data entry
 - ☑ 3 programmable proportional joysticks for control of motion axes.
 - ☑ Dedicated buttons for commonly used functions
 - ☑ Controller Area Network (CAN), Ethernet, and RS-232 serial interfaces
- ⌘ 200MHz X-Scale StrongARM processor
- ⌘ USB Flash Drive for Storage and Updates

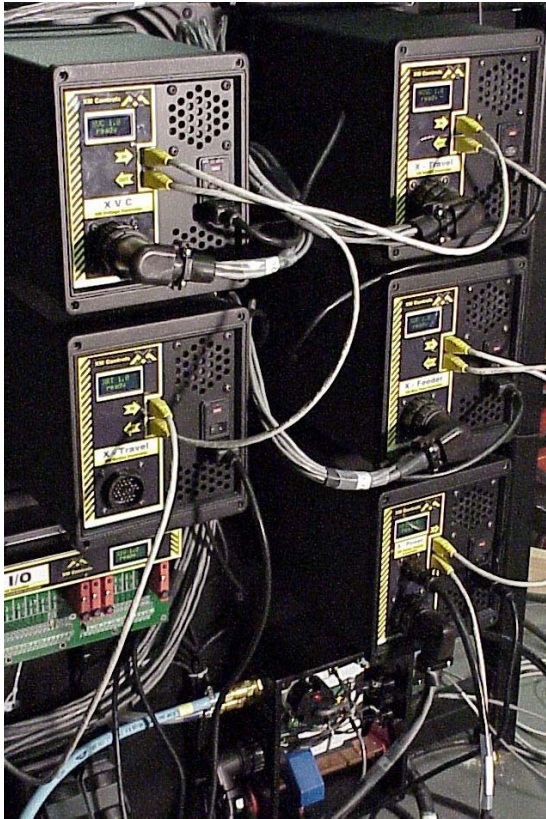


XM – Optional Software

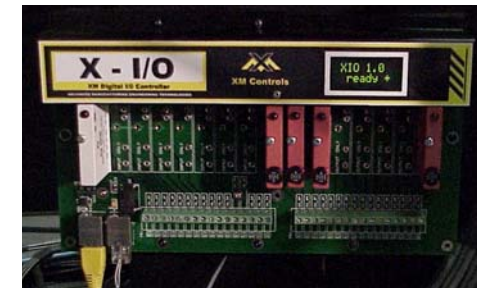
- ⌘ AC/VP Control (other manufacturer power supplies)
- ⌘ Virtual Alignment
- ⌘ Spiral Clad with Turning Rolls
- ⌘ Spiral Clad with Positioner
- ⌘ Multiple Arc Control
- ⌘ Bar Code and Bar Code reader
- ⌘ XM Automation
- ⌘ Arc Link Interface
- ⌘ Bore Cladding



Available Modules



X-PS - Power Supply Control
X-VC - Arc Voltage Control
X-ROTARY - Rotation Control
X-WIRE - Wire Feed Control
X-LINEAR - Linear Travel Control
X-OSC - Mechanical Oscillation
X-MAG - Magnetic Oscillation
X-I/O - Digital Control
X-PLASMA - Gas & Pilot Control
X-THERMAL - Temperature
X-TRACKER - Seam Tracking
X-SENSOR - Feedback control
X-CNC - CNC motion control





⌘ Power Supply Control

- ☑ Versions available for GTA, GMA, PAW, SAW and VPPA
- ☑ Controls all aspects of the power supply
 - ☒ Pulsing (frequencies to 1 khz)
 - ☒ Sloping and taper controls
 - ☒ Optional closed loop control of the power supply parameters
 - ☒ Fault sensing and processing
- ☑ Multiple Arcs – can operate 2 or more welds from XM control with the addition of more modules
- ☑ Arc Link Compatible



Introduction to XM

⌘ Three Modes of Operation

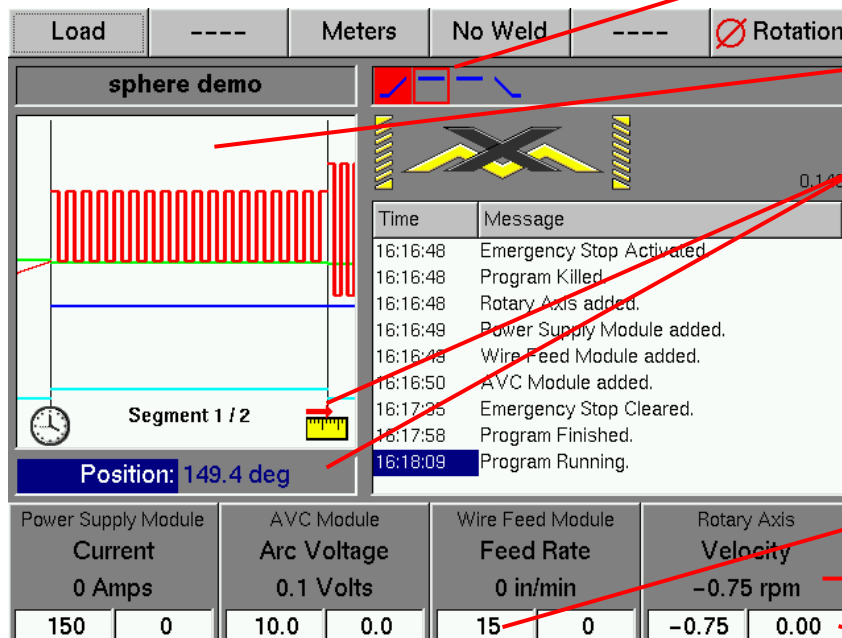
⏏ Weld Mode

⏏ Edit Mode

⏏ Setup Mode



Weld Mode



- ⌘ Active Weld Segment
- ⌘ Parameters displayed
- ⌘ Segment type and duration
- ⌘ Message Screen
- ⌘ Digital Meters
 - ⏏ Programmed
 - ⏏ Actual
 - ⏏ Override

Weld Mode

- ⌘ Hard wired E-stop
- ⌘ Software key buttons
 - ⏏ Switch active meters
 - ⏏ Disable
 - ⏏ Load new program
- ⌘ Override weld parameter with encoder knobs
- ⌘ Advance to next weld segment

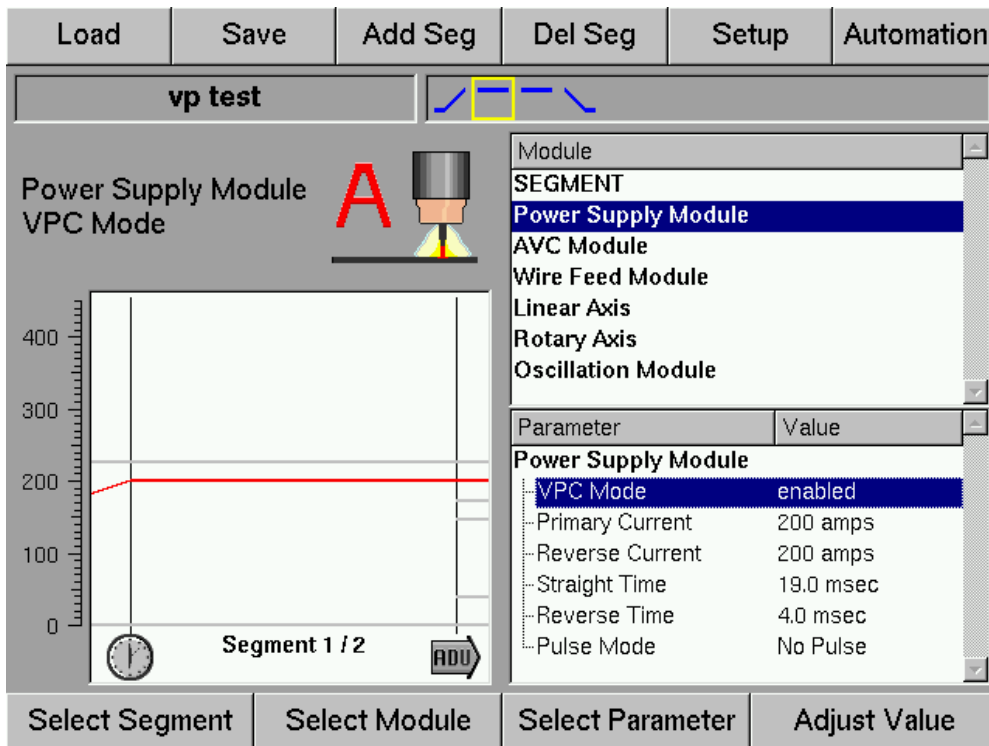


Weld Mode – Jog Capability



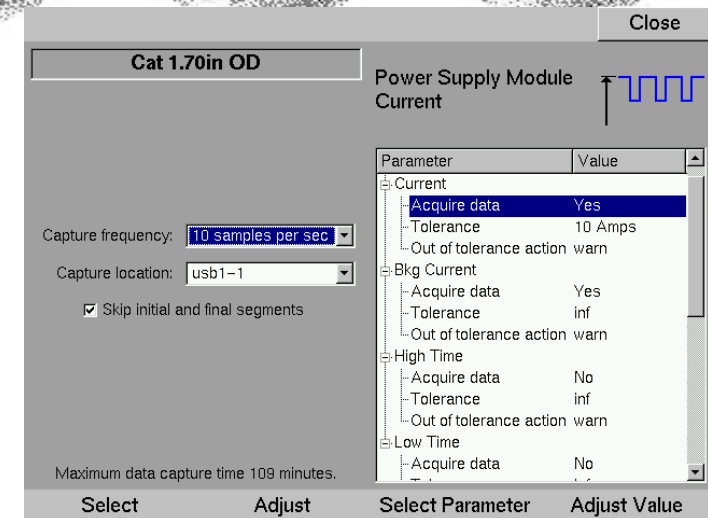
- ⌘ Joysticks
 - ⏏ X-Y motion
 - ⏏ Z & other
 - ⏏ Wire positioner
- ⌘ Wire Jog
- ⌘ Travel Jog
- ⌘ Continuous & High Speed
- ⌘ Home positions
- ⌘ Preset start positions

Edit Mode – Create your weld



- ⌘ Load/Save ability
- ⌘ Segment control (up to 32 weld segments in each program)
- ⌘ Program each module and the parameters available to program
- ⌘ Pre & Post weld program
- ⌘ Use encoder knobs to adjust and select

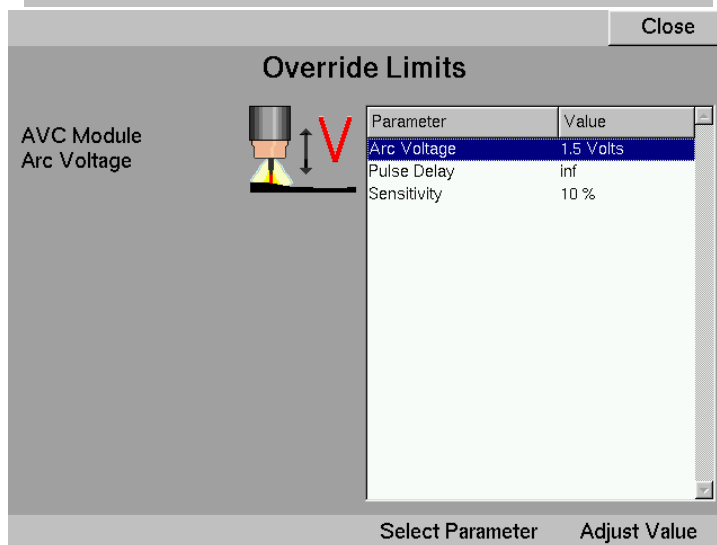
Edit Mode – Setup Tab



⌘ Set up override limits

⏏ For each weld schedule

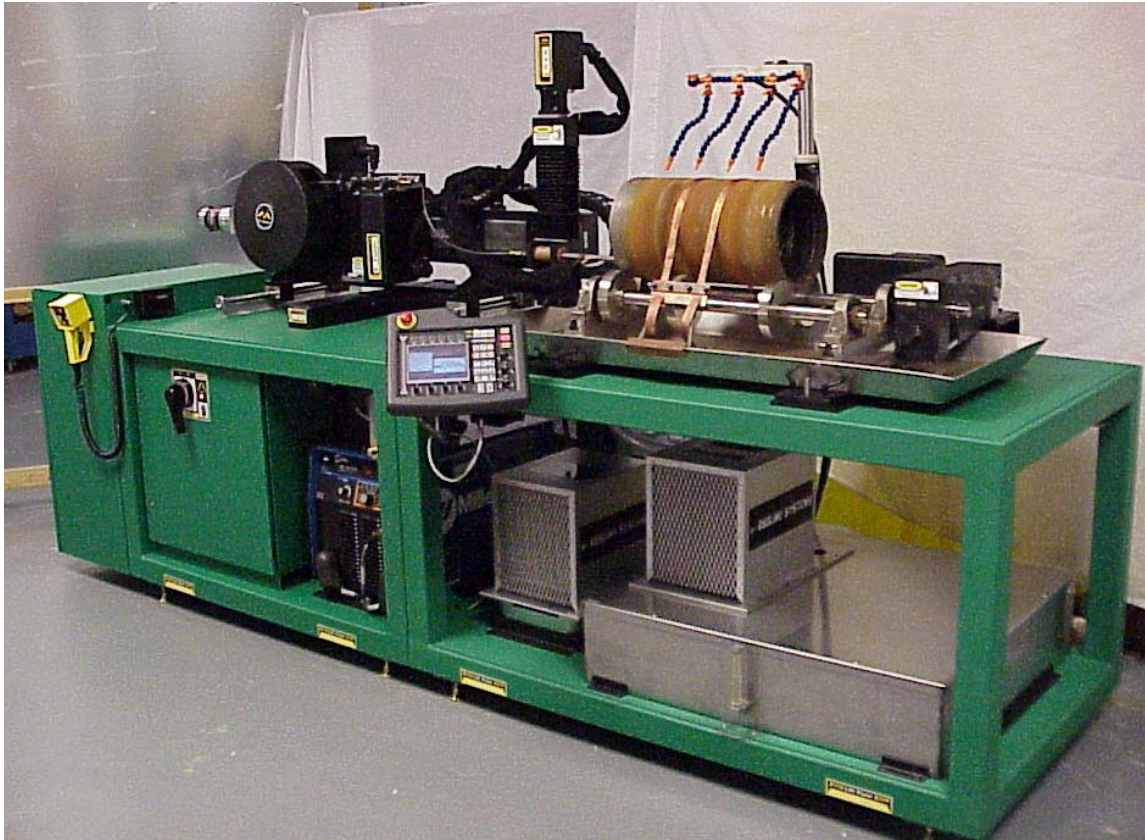
⌘ With Data Acquisition feature, set up data rates



XM Controls



Systems

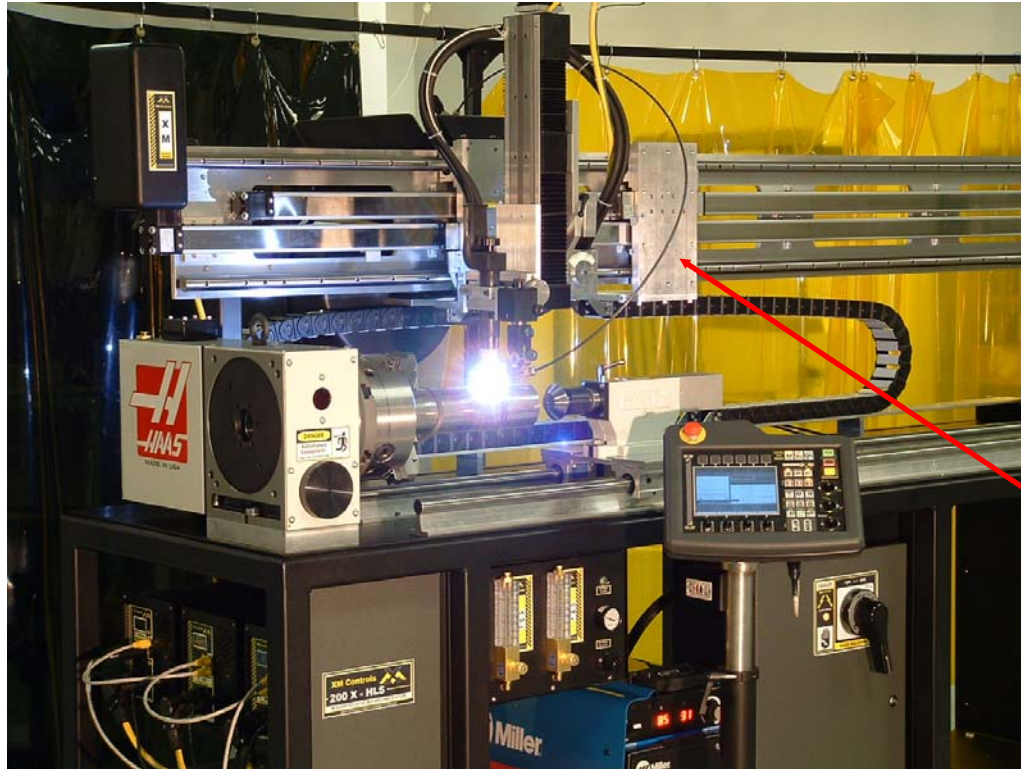


BWXT ID Bore Clad System

XM Controls



Systems



Solar Turbines GTAW
Cold Wire System

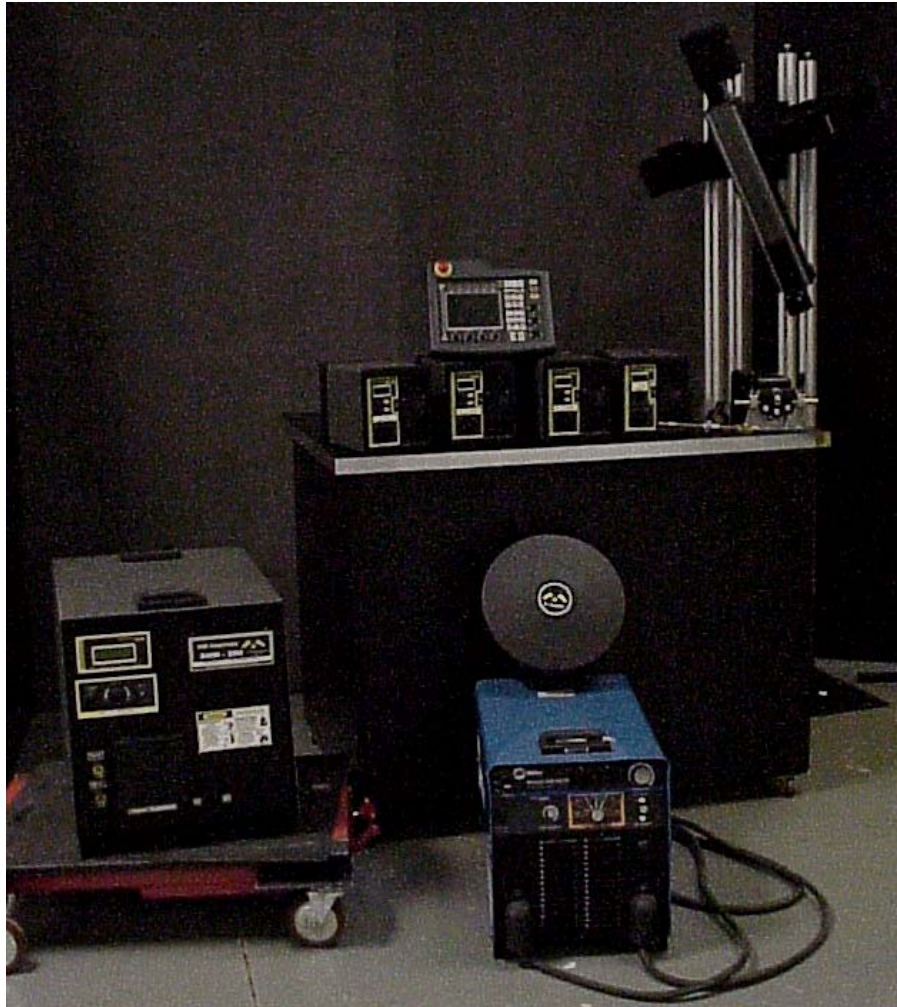
Dual Carriage
Precision Lathe

Customer will upgrade
with second weld head
in 2005 – operated
from one XM control



Standard and Custom Lathe Style Systems

Precision and expandable
control for any
circumferential welding
application.



BWXT Hot Wire System

For integration by
BWXT with existing
BWXT Positioner and
Manipulator

XM Controls



**XM System Control – the
AMET Advantage!**

Thank you for your attention!



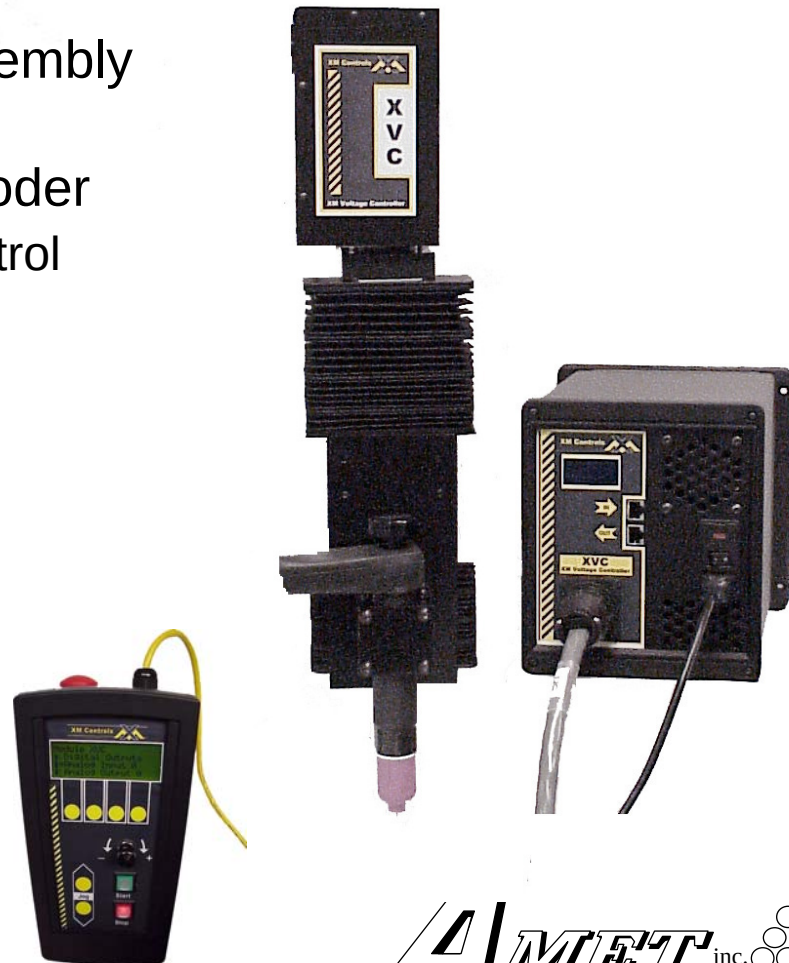
AMET thanks you for your time
to allow us to introduce to you
one of the most advanced and
versatile welding controllers
on the market today.

XM Control Modules – Supplement Information

Next slides introduce in more details SOME
of the XM control modules AMET has
available to “plug and play” with the XM
control.



- ⌘ Precision Sealed Slide Assembly w/ Torch Mount
- ⌘ Precision Servo Motor/Encoder
 - ☑ Closed-Loop Position Control
- ⌘ Programmable
 - ☑ Start Delay
 - ☑ Voltage Deadband
 - ☑ Response
 - ☑ Touch Retract
- ⌘ Optional AC/VP Software
- ⌘ Pendant with Override for Standalone Operation





- ⌘ Precision Sealed Slide Assembly
- ⌘ Precision Servo Motor/Encoder
- ⌘ Programmable
 - ☑ Oscillation
 - ☒ Slew rate, Amplitude, L/R Dwell
 - ☑ Jogs
 - ☑ Delay
 - ☑ Touch Retract
- ⌘ Manual Joystick Positioning
- ⌘ Pendant with Override





- ⌘ Precision 2 or 4 Roll Feeder
- ⌘ Precision Servo Motor/Encoder
- ⌘ Programmable
 - ☑ Feed Rate
 - ☑ Retract
 - ☑ Delay
- ⌘ Manual Joystick Feed
- ⌘ Pendant with Override
- ⌘ Optional Dab Mode
 - ☑ Synchronized Pulsation





- ⌘ Use with Precision Servo Motor/Encoder
- ⌘ Programmable
 - ☑ Rotation Speed
 - ☑ Position
 - ☑ Delays
- ⌘ Manual Joystick or Pushbutton Jog
- ⌘ Pendant with Override
- ⌘ Drive up to 300 watt motor

