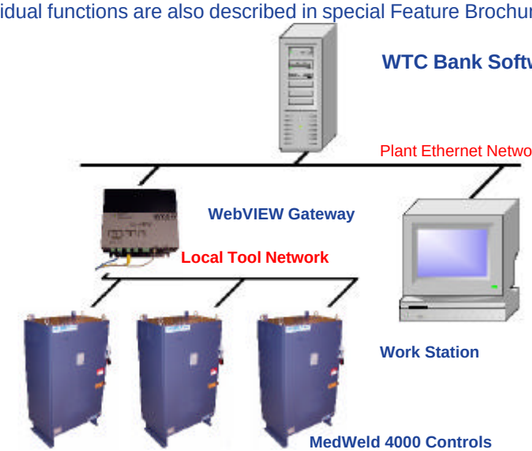
Number & Function	Range of Values	Number & Function	Range of Values
01 SQUEEZE nn CYCLES	n = 00 to 99	50 TURN ON WELD COMPLETE	
02 COOL nn CYCLES	n = 00 to 99	51 TURN OFF WELD COMPLETE	
03 HOLD nn CYCLES	n = 00 to 99	52 TURN ON ISOLATION CONTACTOR	
04 OFF nn CYCLES	n = 03 to 99	53 TURN OFF ISOLATION CONTACTOR	
05 INITIAL SQUEEZE nn CYCLES	n = 00 to 99	54 TURN ON VALVE n	n = 1 to 8
06 POS ANALOG WINDOW = 0.nnnn +/- 0mmmm E+p	n & m = 0000 to 9999; p=0 to 4	55 TURN OFF VALVE n	n = 1 to 8
07 WAIT nn CYCLES	n = 00 to 99	56 TURN ON PRESSURE SELECT n	n = 1 to 4
08 ABORT IF ANALOG INPUT #n NOT IN WINDOW	n = 1 to 2	57 TURN OFF PRESSURE SELECT n	n = 1 to 4
09 FAULT IF ANALOG INPUT #n NOT IN WINDOW	n = 1 to 2	58 TURN ON OUTPUT n	n = 1 to 8
10 EXTEND UNTIL #n IN WINDOW OR mmTIMES	n = 1 to 2; m = 00 to 99	59 TURN OFF OUTPUT n	n = 1 to 8
11 READ ANALOG #n CALIBRATION ZERO POINT	n = 1 to 2	60 IMPULSE= nn HEAT CY mm COOL CY	n & m = 01 to 99
12 WAIT FOR ANALOG#n IN WINDOW	n = 1 to 2	61 ABORT IF NO INITIATE FOR nn CYCLES	
13 WAIT FOR ANALOG#n IN WINDOW OR mm CYCLES	n = 1 to 2; m = 00 to 99	62 REPEAT (AT NEXT FUNCTION)	
14 SET ANALOG OUTPUT #n TO 0.mmmm E+p	n = 1 to 2; m = 0000 to 9999; p=0 to 4	63 TURN ON TFF SIGNAL OUTPUT	
15 NEG ANALOG WINDOW=0.nnnn +/- 0.mmmm E+p	n = 1 to 2; m = 0000 to 9999; p=0 to 4	64 TURN OFF TFF SIGNAL OUTPUT	
16 READ ANALOG #n RELATIVE ZERO POINT	n = 1 to 2	65 WAIT nnn CY FOR INPUT m TO BE p (0=OFF)	n = 000 to 999; m = 1 to 8; p = 0 to 1
17 TURN ON ADVANCE VALVE #n SQZ mmCY	n = 1 to 2; m = 00 to 99	66 WAIT FOR INPUT n TO BE m (0=OFF)	n = 1 to 8; p = 0 to 1
18 TURN ON INTENSIFY VALVE#n SQZ mm CY	n = 1 to 2; m = 00 to 99	67 EXTEND WHILE INPUT n IS m (0=OFF)	n = 1 to 8; p = 0 to 1
19 TURN OFF INTENSIFY VALVE#n	n = 1 to 2	68 WAIT nnn CY FOR PRESSURE SWITCH	n = 000 to 999
20 WELD nn CYC / IMP mm% I	n = 00 to 99; m = 20 to 99	69 WAIT FOR PRESSURE SWITCH INPUT	
21TEMPER nn CYC / IMP mm% I	n = 00 to 99; m = 20 to 99	70 WAIT nnn CY FOR WELD PROCEED#m	n = 000 to 999; m = 1 to 2
22 PREHEAT nn CYC / IMP mm% I	n = 00 to 99; m = 20 to 99	71 WAIT FOR WELD PROCEED #n	n = 1 to 2
23 POSTHEAT nn CYC / IMP mm% I	n = 00 to 99; m = 20 to 99	72 WAIT nnn CY FOR LINE>mmmVOLTS	n & m = 000 to 999
24 PRE-WELD nn CYC / IMP mm% I	n = 00 to 99; m = 20 to 99	73 WAIT FOR LINE>nnn VOLTS	n = 000 to 999
25 WELD nn CYC / IMP mm.m% I	n = 00 to 99; m = 20.0 to 99.9	74 WELD nnn IMP mm% I HIGH pp% I LOW	n = 001 to 999; m & p = 20 to 99
26 WELD nn HALF CYCLES mm.m% I	n = 00 to 99; m = 20.0 to 99.9	75 EXTEND UNTIL NO INITIATE	
27 TFF MIN nnn HCY INC@ +mmm HCY MAX ppp HCY	n, m, & p = 000 to 999	76 SEC. CURR LIMITS: HI=nnnn0 LO=mmmm0	n & p = 00000 to 99990
28 TFF MIN nn CY INC@ +mm CY MAX pp CY	n, m, & p = 00 to 99	77 ISOLATION CONTACTOR DELAY= nn SEC	n = 00 to 99
29 TFF MINIMUM EXPANSION: nnnn	n = 0000 to 9999	78 PROCESS WELD FAULTS	
30 WELD nn CYC / IMP mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	79 WAIT nnn CY FOR SYSTEM COOLING	n = 000 to 999
31 TEMPER nn CYC / IMP mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	80 VERIFY TIPS DOWN EVERY nn CY mm TIMES	n & m = 00 to 99
32 PREHEAT nn CYC / IMP mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	81 SLOW CYLINDER TEST EVERY nn CY mm TIMES	n & m = 00 to 99
33 POSTHEAT nn CYC / IMP mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	82 LINEAR STEPPER #nn ASSIGNED (0=OFF)	n = 00 to 99
34 PRE-WELD nn CYC / IMP mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	83 KVAT LIMIT HIGH = nnnn LOW=mmmm	n & m = 0000 to 9999
35		84 WINDOW HI=+nn% LO=-mm% C-FACTOR=ppp	n & m = 00 to 99; p = 000 to 999
36 WELD nn HALF CYCLES mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	85 WAIT FOR NO INITIATE IF FAULT	
37 TFF WELD nn CYCLES mmmm0 AMPS	n = 00 to 99; m = 00000 to 99990	86 TIP DRESS ADVANCE: GROUP nn - STEP m	n = 00 to 99; m = 1 to 5
38		87 SET SPC OFFSET TO nn	n = 00 to 99
39 TEST FIRE nn% I	n = 20 to 99	88 SEND ALL SAMPLES UNTIL NEXT SPC OFFSET	
40 SLOPE nn CYC / IMP mm% I TO pp% I	n = 00 to 99; m & p = 20 to 99	89 VERIFY CYLINDER #n IS OUT OF RETRACT	n = 1 to 2
41 SET VALVE nn TOUCH DOWN PRESSURE TO mmPSI	n = 1 to 2; m = 00 to 99	90 TRANSFORMER TURNS RATIO nnn:1	n = 1 to 256
42 SET VALVE nn TIP DRESS PRESSURE TO mmPSI	n = 1 to 2; m = 00 to 99	91 FAULT IF TIPS TOUCHING	
43 SET VALVE nn CYLINDER PRESSURE TO mm PSI	n = 1 to 2; m = 00 to 99	92 FAULT IF TIPS NOT TOUCHING	
44 SET PRESSURE= nn	n = 00 to 99	93 INITIAL PF LIMITS: HI=nn% LO=mm%	n & m = 00 to 99
45 SLOPE nn CYC / IMP mmmm0 AMPS TO pppp0 AMPS	n = 00 to 99; m & p = 00000 to 99990	94 EXTEND WELD IF LOW CURRENT LIMIT FAULT	
46 TIP STUCK PULSE AFTER nn CYCLES	n = 00 to 99	95 EXTEND WELD IF CURRENT LESS THAN nnnn0	n = 00000 to 99990
47 WAIT nn CYCLES FOR PRESSURE ACHIEVED	n = 00 to 99	96 POWER FACTOR LIMIT: HI=nn% LO=mm%	n & m = 00 to 99
48 TURN ON CONTACTOR SELECT nn	n = 1 to 15	97 C-FACTOR LIMIT: HI=nnn LO=mmm	n & m = 000 to 999
49 TURN OFF CONTACTOR SELECT nn	n = 1 to 15	98 GOTO SCH#nnn IF CURRENT LESS THAN mmmm0	n = 1 to 255; m = 00000 to 99990
		99 GOTO SCH#nnn	n = 1 to 255

The MedWeld 4000 has a large repertoire of available functions that can be programmed in any of 255 welding schedules. For a complete description of these individual functions, please refer to the MedWeld 4000 Technical Reference Manual. Individual functions are also described in special Feature Brochures available from WTC and its distributors.



Software releases will include all appropriate functions suited for selected applications.

All WTC welding controls are network ready.

The MedWeld 4000 control uses a simple RS485 MedLAN network that daisy chains up to 30 controls on one channel. The information from these controls can be brought to the plant's Ethernet network by means of a WebVIEW gateway.

The WebVIEW gateway is available in single, dual, and quad channel configurations.

Welding Controls Group
24775 Crestview Court, Farmington Hills, MI USA 48335
Tel: +1 (248) 477-3900 FAX: +1 (248) 477-8897
Email: **sales@weldtechcorp.com**
Web: **http://www.weldtechcorp.com**

Effective Date: May 2003
Data Sheet #: ML00269- Rev 1.1

WTC products are supported with parts, service and training from ITS

Welding Technology Corporation

Adapting to Welding Excellence!

MedWeld 4000

Flexible Format Control with advanced capabilities

The MedWeld 4000 resistance weld control is unsurpassed in its flexibility and simplicity for a powerful control system. Quality welds with repeatable performance is made possible with the control tools made available by the MedWeld 4000 control.

- Various I/O configurations:
  Discrete I/O, Device Net, Profibus, Serial, etc...
- Various Power Sources:
  Single Phase AC/DC or MFDC Inverters
- Total I/O Programmability
- Local Safety I/O embedded
- C-factor monitoring- useful in monitoring weld tool deterioration and current shunting
- Dynamic Squeeze functions
- Wait for line voltage function
- High/low weld current window limits
- Dynamic power factor compensation
- ½ cycle weld capability
- Thermal Force Feedback option
- Weld Energy Window function
- Electrode Soft Touch Control function
- AVC or current compensation
- Selectable delayed firing prevents saturation of wound-core transformers
- Two Analog Interface Ports
- Large repertoire of inputs and outputs
- Network Ready for Data Collection, Backup and Restore
- Large number of diagnostic LEDs
- Local DEP Port for one-on-one programming
- Modular design for ease of maintenance

WTC welding controls have numerous features, much of them protected by world-wide patents.

List of Available Inputs and Outputs for MedWeld 4000

Inputs	Number	Outputs
Binary Select 1	1	Valve 1
Binary Select 2	2	Valve 2
Binary Select 4	3	Valve 3
Binary Select 8	4	Valve 4
Binary Select 16	5	Valve 5
Binary Select 32	6	Valve 6
Binary Select 64	7	Valve 7
Binary Select 128	8	Valve 8
Weld Initiate	9	Weld In Progress
Weld / No Weld	10	Weld Complete
Isolation Contactor Saver	11	Fault
Global Stepper Reset	12	Alert
Fault Reset	13	No Fault
Global Tip Dress	14	No Alert
Pressure Switch	15	End of Hold
Retract Pilot 1	16	Steppers are Reset
Retract Pilot 2	17	Ready to Weld
Weld Proceed 1	18	End of Stepper
Weld Proceed 2	19	Stepper Approaching Max
Request Pressure	20	Water Saver Valve
Transformer Overtemp	21	Retract Valve 1 / Ohma Block 1
No Stroke / No Weld	22	Retract Valve 2 / Ohma Block 2
Program Mode Security	23	Pressure Select 1 / PB1
Heat Display Security	24	Pressure Select 2 / PB2
Parity	25	Pressure Select 3 / PB4
Door Interlock Control Stop	26	Pressure Select 4 / PB 8
Contactor Short Input 1	27	Contactor Select 1
Contactor Short Input 2	28	Contactor Select 2
Contactor Short Input 3	29	Contactor Select 3
Contactor Short Input 4	30	Contactor Select 4
Contactor Short Input 5	31	Contactor Select 5
Contactor Short Input 6	32	Contactor Select 6
Contactor Short Input 7	33	Contactor Select 7
Contactor Short Input 8	34	Contactor Select 8
Contactor Short Aux Input 1	35	Contactor Select 9
Contactor Short Aux Input 2	36	Contactor Select 10
Contactor Short Aux Input 3	37	Contactor Select 11
Contactor Short Aux Input 4	38	Contactor Select 12
Contactor Short Aux Input 5	39	Contactor Select 13
Contactor Short Aux Input 6	40	Contactor Select 14
Contactor Short Aux Input 7	41	Contactor Select 15
Contactor Short Aux Input 8	42	Weld Mode On
User Input 1	43	Weld Mismatch
User Input 2	44	Forge Valve
User Input 3	45	Tip Dress Request
User Input 4	46	Aux. Contactor
User Input 5	47	Read Pressure
User Input 6	48	Tip Change Required Group #1
User Input 7	49	Tip Change Required Group #2
User Input 8	50	Tip Dress Request Group #1
Stepper Group 1 Reset	51	Tip Dress Request Group #2
Stepper Group 2 Reset	52	End of Stepper Group #1
Aux Counter Reset	53	End of Stepper Group #2
Tip Dress Group #1	54	Stepper Alerted Group #1
Tip Dress Group #2	55	Stepper Alerted Group #2
* Increment Heat Toggle	56	User Output 1
* Decrement Heat Toggle	57	User Output 2
	58	User Output 3
	59	User Output 4
	60	User Output 5
	61	User Output 6
	62	User Output 7
	63	User Output 8
	64	TFF Signal
	65	TFF Good Weld
	66	TFF Bad Weld
	67	TFF Expulsion
	68	TFF Part Fitup
	69	TFF Fault
	70	Ohma Intensify #1
	71	Ohma Intensify #2

** The "Heat Toggle" inputs are currently in development*

The table of available user inputs and outputs can be configured into the various I/O interfaces.

A complete listing of the Inputs and Outputs with description is available in the Technical Reference Manual.

Programmable Discrete I/O Module "821"

Inputs 1 - 8:

J3: 12-pin Phoenix connector for a bank of programmable inputs. Inputs numbers 1 to 8 are interfaced at this location. There is also an available 24Vdc supply for activation of inputs. Inputs can be operated automatically by 24Vdc or 120Vac without the need for user configuration.

Inputs 9 - 16:

J4: 10-pin Phoenix connector for a bank of programmable inputs. Inputs numbers 9 to 16 are interfaced at this location. Inputs can be operated automatically by 24Vdc or 120Vac without the need for user configuration.

Outputs 1 - 10:

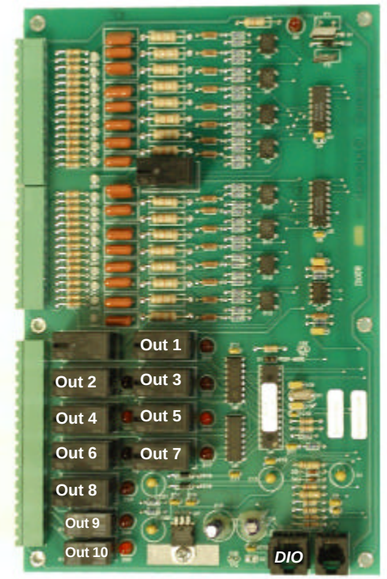
J5: 17-pin Phoenix connector for four banks of programmable outputs.

Output Bank 1: Outputs 1 to 4
Output Bank 2: Outputs 5 to 8
Output Bank 3: Output 9
Output Bank 4: Output 10

All banks can be supplied by various voltages (24Vdc, 24 Vac, 120 Vac, ...)

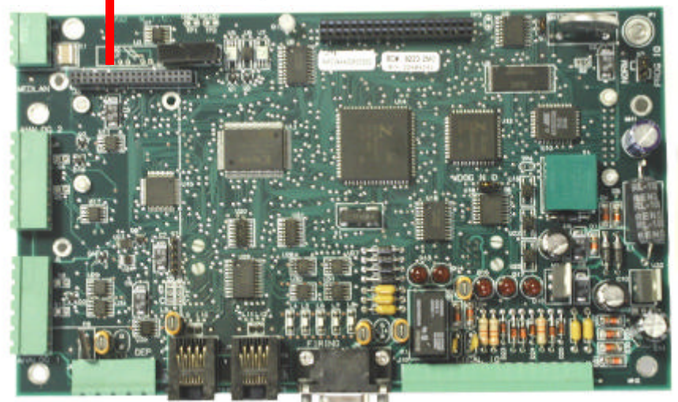
Banks 1 & 2: SPST Contacts - N.O.

Banks 3 & 4: SPDT Contacts - N.O and N.C. sets



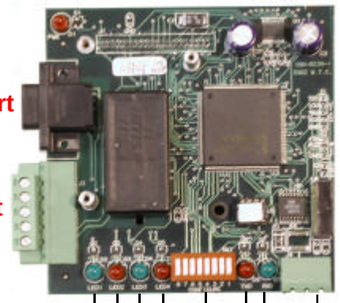
The "823" Serial Interface module or the "825" Ethernet IP module sits as a "daughter card" connecting to its "mother board" which is the "822" Weld Control module by means of this connector.

Welding Control Module "822"



The "821" module connects to either DIO 1 or DIO 2 points of the "822" module. If you use two "821" modules then both DIO 1 & DIO 2 are used. The control automatically detects which module is connected to which port.

Serial Interface Module "823"



The serial Interface Module "823" sits on top of the Welding control Imodule "822" as a daughter card.

Interface Points for "822"

"A": MedLAN Network

J2: 3-pin Phoenix connector for RS485 daisy chained network for networking up to 30 welding control modules. A simple twisted wire pair with shield is used to connect terminals MDL1, MDLS, and MDL2 of all controls on the network.

"B": Analog Port "2"

J4: 6-pin Phoenix connector for Analog interface Port #2. There is a complimentary input and output with provisions for either current loop or voltage control for the output

- Output 4-20mA (+I Loop, -I Loop)
- Output 0-10V (+Vout, -Vout)
- Input 0-10V (+Vin, -Vin)

"C": Analog Port "1"

J5: 6-pin Phoenix connector for Analog interface Port #1. There is a complimentary input and output with provisions for either current loop or voltage control for the output

- Output 4-20mA (+I Loop, -I Loop)
- Output 0-10V (+Vout, -Vout)
- Input 0-10V (+Vin, -Vin)

"D": Local MedLAN

J8: 5-pin Phoenix connector for local programming of welding control module using DEP100s via a Door Port Kit. The door port kit can be remotely mounted using two (2) twisted wire pairs with shield to connect terminals HHT+, HHTS, HHT-, +12V, and Gnd to power up and transmit data one-on-one to a Data Entry Panel. Remote Door Port Kit can be mounted up to 30 meters from the welding control.

DIO 1: Discrete I/O Number 1

J6: RJ45 connector for communicating banks of I/O between the "822" welding processor and an "821" Discrete I/O module. This is used to interface the first 16 discrete inputs and first 10 discrete outputs.

DIO 2: Discrete I/O Number 2

J7: RJ45 connector for communicating banks of I/O between the "822" welding processor and an "821" Discrete I/O module. This is used to interface discrete inputs 17 to 32 and discrete outputs 11 to 20.

"E": Firing Module Interface

J9: 15-pin D-sub connector for connectiong the welding control module to either an AC Thyristor (SCR) pack or an MFDC inverter module. The welding intelligence remains part of the welding control module

"F": Local Safety I/O Interface

J10: 16-pin Phoenix connector for providing 24VAC to the welding control module. All safety I/O are residential to the WCU module and kept separate from the user I/O points.

Inputs - (1) Control Stop (isolated for external or internal power supply), (2) Firing Module Thermal Switch, and (3) Position of Isolation Contactor

Ouputs - (1) Circuit Breaker Shunt Trip or Undervoltage Trip, and (2) Isolation Contactor Coil

"G": I/O Configuration Jumper

S3 Jumper is used to configure the machine I/O setting of the control. When the S3 Jumper is ON on power up, the M3200 will revert to an I/O Configuration Program Mode. When the S3 Jumper is OFF on power up, the control will operate in normal mode. This makes the M3200 completely programmable for varied applications.

Also available on special request are Discrete I/O with built in Anti-Tie Down Circuit module "824" and/or an Ethernet IP Serial Interface module "825".