

Leave this bulletin on the job site for future reference!

The advanced **BMPlus Zone Control System** allows you to easily upgrade an inefficient single zone HVAC system, into a Multi-zone, Energy savings, Comfort producing, HVAC system. The robust and superior design, intuitive firmware, simple setup options, and easy to understand wiring, makes the BMPlus Zoning system the Contractors dream. Combined with EWC motorized dampers and practically any off-the-shelf heat/cool thermostat, EWC Controls once again proves to be the innovative leader in the residential & light commercial Forced Air Zoning industry.

Zone Capacity

The main module controls three zones using motorized dampers and may be expanded up to 5, or 7 zones, using 1 or 2 **XM2 Expansion Modules**.

Compatible HVAC Systems

Controls 2 stage conventional or dual fuel heat pumps, without the need for dual fuel kits. Also single or two-stage gas, oil, & hydronic heating systems, with single or two stage air conditioning. Constant or variable speed fan systems.

Not compatible with 2 speed / 2 stage compressor heat pumps. (3 stage heat pumps).

Compatible Thermostats

Compatible with most 1 stage conventional 4 or 5 wire heat/cool mechanical or digital thermostats that operate on 24vac. Battery powered or power robbing thermostats that draw less than 20 ma of current. Zone 1 will accept most 2 stage heat conventional thermostats. Heat pump thermostats are not required, but a select type can be used on zone 1 only, if desired. See page 4 & 5.

Automatic Heat/Cool Changeover

The BMPlus Zone system features automatic changeover from any thermostat allowing for individual zone comfort from the HVAC system.

Status LED

The STATUS LED pulses as a steady heart beat to indicate active Micro-processor status.

System LEDs

On board LED's illuminate to indicate HVAC system mode, system status, active and inactive zone identification. See page 10 for details.

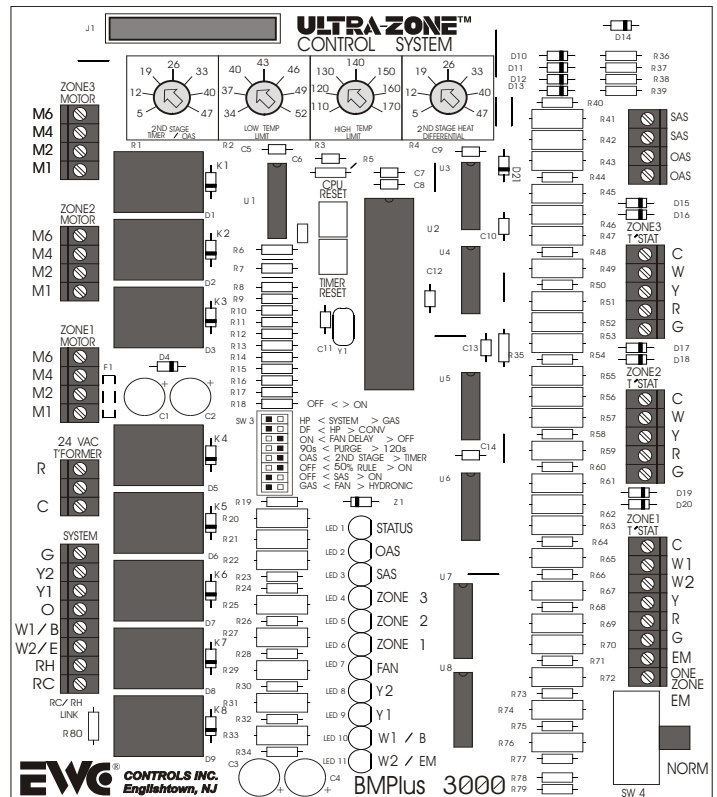
Damper LEDs

LEDs labeled Zone 1 thru Zone 7 indicate which dampers are energized open.

Operating Power

All modules operate on 24vac power supplied from a separate transformer. A single 40va transformer can power up to 5 zones with a total of 5 ND/URD dampers directly connected. See page 9 for details.

TB-215



Contents

- * BMPlus 3000 Control Panel
- * Supply Air Sensor
- * Technical Bulletin TB215
- * Mounting Hardware

Thermal Circuit Breaker

The BMPlus module has a Thermal circuit breaker that protects the module(s) from shorts in the damper and thermostat field wiring. It will not protect against shorts in the HVAC system wiring.

CAUTION: When the circuit breaker is tripped it will get quite hot. To reset the breaker: **Shut off power to the panel. Find and repair the short. Restore the 24VAC power.**

Watch Dog Circuit

The processor has a built-in feature that monitors the processor performance and resets the system if an error occurs in operations or due to power failures.

Indoor Fan Control

Any zone can activate the indoor fan and only the dampers in zones calling for continuous fan operation will open. **Continuous fan operation will only occur when there are no active or pending, heat or cool demands.**

Indoor Fan Control During Heating

A dip switch is provided to enable automatic fan operation in heat mode. Useful for straight electric heat or hydronic heat applications. **NOTE:** Fan mode is automatically set when Heat Pump is selected.

Built-In Timer Settings

- The panel has built-in delay timers that insure safe & reliable operation.
- ***Short Cycle Timer** 3 minutes, fixed.
 - ***Changeover Timer** 4 minutes, fixed.
 - ***Opposite Mode Delay Timer** 20 minutes, fixed.
 - ***2nd Stage Delay Timer** 5 to 47 minutes, Adjustable
 - ***Supply Air Limit Delay Timer** 3 minutes, fixed.

***Short Cycle Timer**

When the system is satisfied, the panel will not resume the same mode for a minimum of 3 minutes.

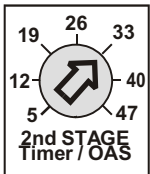
***Changeover Timer**

A built-in timer prevents the system from rapidly switching between heating and cooling modes. At the end of a call, a 4 minute timer is started and the panel will not switch to the opposing mode until the timer has expired.

***Opposite Mode Delay Timer**

A 20 minute delay must expire, or the active zone(s) must satisfy, before the panel will honor a thermostat demand to changeover to the opposite mode of system operation.

***2nd Stage Timer / OAS**



5 to 47 minutes or 5 to 47 degrees F.

The 2nd STAGE TIMER sets the amount of continuous call time in 1st stage, before second stage heat or cool is energized. **NOTE:** The potentiometer also serves as the *2nd stage Heat Outside Air Changeover Setting.*

The BMPlus 3000 can inhibit 2nd stage heat based on Time or Outside Air Temperature.

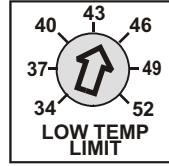
NOTE: An Optional OAS Sensor is required to use the OAS feature.

NOTE: 2nd stage cool delay defaults to 15 minutes, if OAS is chosen to inhibit 2nd stage Heat.

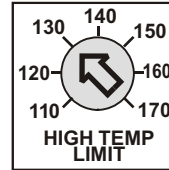
***Supply Air Limit Delay Timer**

The time delay of 3 minutes must expire before the BMPlus 3000 will re-energize heat or cool mode. This occurs when the processor detects the supply air temperature is higher or lower than the Heat/Cool limit settings.

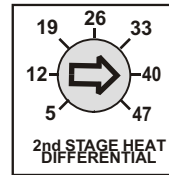
Cooling and Heating Limit Controls



The Adjustable Cooling Limit potentiometer sets the supply air temperature at which the cooling is cycled off and the fan continues to run, allowing the coil to warm up.



The Adjustable Heating Limit potentiometer sets the 1st stage heat supply air temperature, at which the heating is cycled off and the fan continues to run, allowing the heat exchanger or coil to cool down.



The Adjustable 2nd stage heat differential potentiometer sets the 2nd stage heat supply air temperature, at which the heating is cycled off and the fan continues to run, allowing the heat exchanger or coil to cool down.

Example:
Hi Temp. limit=130
plus 2nd stg T= 40
New limit = 170* F.

NOTE: Allows the supply air sensor to be installed in the supply air plenum, regardless of the coil/heat exchanger configuration. Allows the installer to fine tune virtually any 2 stage heating system!

Timer Reset BUTTON



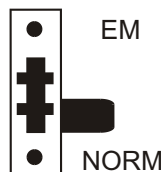
Momentarily pressing the TIMER RESET button will clear any Active Time Delay except the 15 minute fixed cool delay in "OAS" mode. This enables you to test and certify the installation faster. **NOTE:** Do not use sharp objects to press the button. Use your finger tip or the eraser head of a pencil.

CPU Reset BUTTON



Press & Hold the SYSTEM RESET button for 5 seconds. That will reset the Main & Expansion modules on a BMPlus Zoning System. **NOTE:** A 3 minute startup delay occurs whenever the CPU Reset button is pushed, upon any initial power up, or when a power failure has occurred.

Emergency Heat Switch



An On-Board Switch is provided that allows the user to set the system to the Emergency heat mode. *This switch is shown in the NORMAL position.*

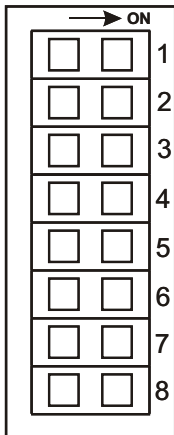
NOTE: An Emergency terminal is also provided at zone 1 terminal block, allowing an optional / illuminated Remote Emergency Switch (Part # RES), or a multi-function Heat Pump Thermostat, to be connected to the BMPlus 3000 Zone Control.

Selecting the Options Using the DIP Switches

***FS = Factory Settings

RECORD YOUR OWN DIP SWITCH SETTINGS HERE

Programming and setting up the BMPlus 3000 to control your HVAC system is very easy! Look below for an explanation of each dip switch function and choose your settings. Some functions may not apply to your application. Then use a pencil to mark/record your settings. If the settings get changed later on, you will have a record of the original settings.



HP < SYSTEM > GAS _{FS}
DF < HP > CONV _{FS}
ON < FAN DELAY > OFF _{FS}
90S < PURGE > 120S _{FS}
OAS < 2nd STAGE > TIMER _{FS}
_{FS} **OFF < 50%RULE > ON**
_{FS} **OFF < SAS > ON**
_{FS} **GAS < FAN > HYDRONIC**

HP < SYSTEM > GAS

Choose the type of HVAC system you want to control. Select **HP**, if your system is any type of heat pump. Select **GAS**, if your system is a standard Gas or Oil furnace. Also applies to straight electric furnaces or hydronic (hot water coil) heating systems.

DF < HP > CONV

Choose the type of Heat Pump you want to control. Select **DF**, if your system is a dual fuel heat pump with gas or oil furnace backup heat. Select **CONV**, if your system is a conventional heat pump with electric resistance backup heat. Also applies to Ground source/Geothermal heat pumps.

ON < FAN DELAY > OFF

Select **ON**, if you want the indoor blower forced ON at the end of a heat/cool call to assist the zone purge cycle. Selecting **OFF** will allow the HVAC system to operate the indoor blower, without interference from the BMPlus.

90S < PURGE > 120S

Select **90S** or **120S**, if you want the zone dampers to hold position for 90 seconds or 120 seconds at the end of any heat/cool call. This allows the HVAC system to purge the remaining hot/cold air, into the zone(s) that were calling for it.

OAS < 2nd STAGE > TIMER

Select **OAS**, if you want to delay 2nd stage heat based on the outside air temperature sensor. Select **TIMER**, if you want to delay 2nd stage heat & cool based on the adjustable on-board timer. **NOTE:** 2nd stage cool defaults to a 15 minute delay, when OAS is chosen. **NOTE:** An optional Outside Air Sensor (OAS) is required to use the OAS feature.

OFF < 50%RULE > ON

Select **OFF**, if you do not want to inhibit 2nd stage heat/cool based on the total number of zones calling. Select **ON**, if you want to inhibit 2nd stage heat/cool based on the total number of zones calling. More than half the total zones must be calling for the same mode, or 2nd stage will not activate. **NOTE: If HP has been selected at dip switch 1, Y2 is not available.** If **DF** or **OAS** has been selected, the 50% rule will apply to cooling operations only. 2nd stage heat will not be affected by this setting. The 50% rule will always dominate the 2nd stage timer unless Emergency mode is active.

IMPORTANTNOTE: The BMPlus 3000 Zone Control System allows a 2 stage heating thermostat to be wired to Zone 1 only! Energizing this terminal results in over-ride of any stage 2 heating delay. The BMPlus will remain in 2nd stage mode until that terminal is de-energized. If this occurs in dual fuel mode or emergency mode, the BMPlus will stay in 2nd stage until the heating demand is satisfied. On the next demand for heat, the BMPlus will attempt to activate 1st stage heat unless, Emergency Mode is still active, or the outdoor temperature is low and OAS / DF has been selected. This comfort over-ride feature provides true versatility to your zoning system, and gives the homeowner a level of comfort control over the system.

OFF < SAS > ON

Select **OFF**, if you do not want to use the supply air sensor included with the BMPlus Zone Control system. Select **ON**, if you intend to use the included supply air sensor. Refer to the data sheet included with the supply air sensor for details.

GAS < FAN > HYDRONIC

Select **GAS**, if your HVAC system is a gas or oil forced air furnace. Select **HYDRONIC**, if your HVAC system has a hot water coil, or straight electric heat with no indoor blower support. Useful when you need the indoor blower to run automatically in heat mode, just like it does in cool mode. **NOTE:** When you select **HP** on dip switch #1, the indoor fan mode is automatically set for you.

INSTALLATION INSTRUCTIONS and THERMOSTAT WIRING

Installation should be performed by qualified personnel only. Follow local & national electrical & mechanical codes. Use multi-conductor 18 awg solid copper conductors. Wire number to number or letter to letter on each control.

WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24VAC. DO NOT USE OTHER VOLTAGES! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE.

Mount the panel housing in a suitable/convenient location. Mounting hardware is provided. Use the knockouts provided on the panel housing as entryways into the housing. Strain relief fittings can be used if desired. Use care and do not damage the circuit board when making wire connections.

NOTE: The 24 vac power required to operate a BMPlus system must be supplied by a separate transformer. WARNING! DO NOT use the 24 vac power supply from the HVAC manufacturer's equipment.

NOTE: Unlike previous zone control systems, the BMPlus 3000 supplies power to all connected expansion modules. There is no need to power up the expansion modules separately or by jumping power from one module to another. This improved design simplifies the installation wiring and reduces the possibility of polarity reversal.

EMERGENCY MODE

Use the optional/Illuminated Remote Emergency Switch to activate Emergency heat, or use the On-Board Emergency Heat Switch, or use a multi-function Heat Pump Thermostat.

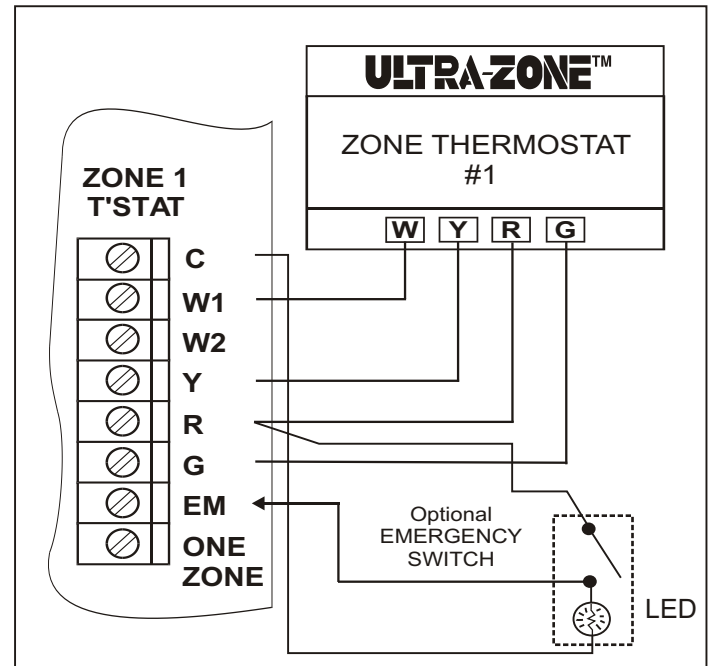


Figure 4 Wiring for heat pump application using a standard heat/cool thermostat in Zone 1, with an Optional Remote Emergency Switch. Part# RES.

POWER WIRING

A single 24vac, 40va UL Listed transformer can power the BMPlus 3000 Main module with one damper on each zone. A total of three zones and three dampers. See page 8 for more load and transformer data.

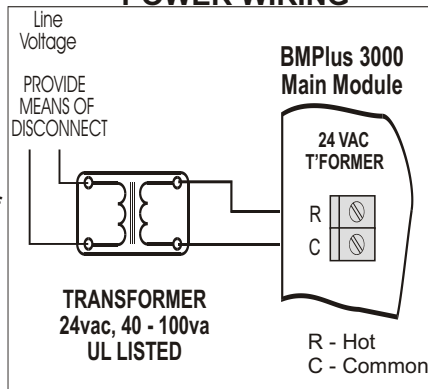


Figure 2 BMPlus 3000 Power wiring

HEAT PUMP THERMOSTATS

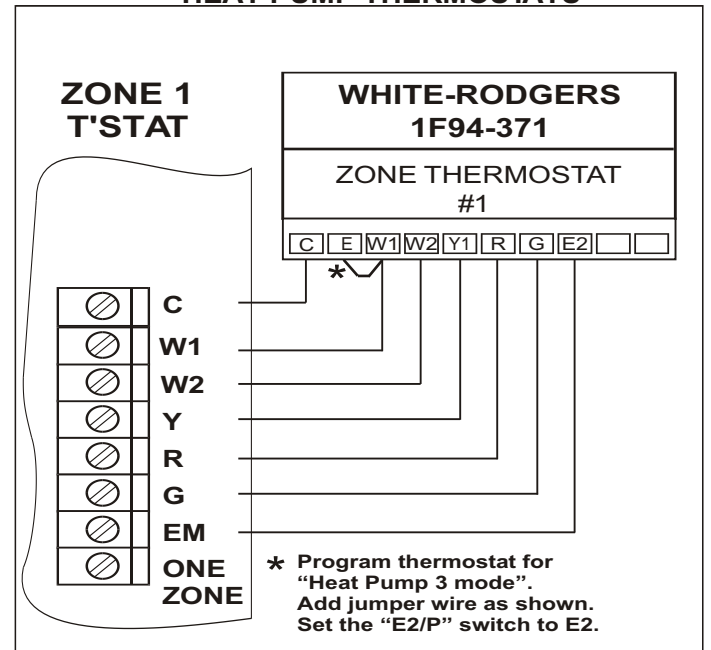


Figure 5 Zone 1 will accept White Rodgers Model 1F93-380 and 1F95-377 Multi-Mode thermostats. White Rodgers Model 1F94-371 and CTC Model 43403 are also compatible with the BMPlus 3000.

A Honeywell T-8011 programmable or T-8411 non-programmable can also be used. All of these versatile thermostats can be set up in Conventional mode, and still allow use of the Heat pump features. (i.e. Emergency Mode)

THERMOSTAT WIRING

Regardless of the type of HVAC system you intend to control, you only need to use regular Heat/Cool Thermostats on all zones. Use standard 4 or 5 wire mechanical or digital electronic thermostats that are simple to wire and easy to program.

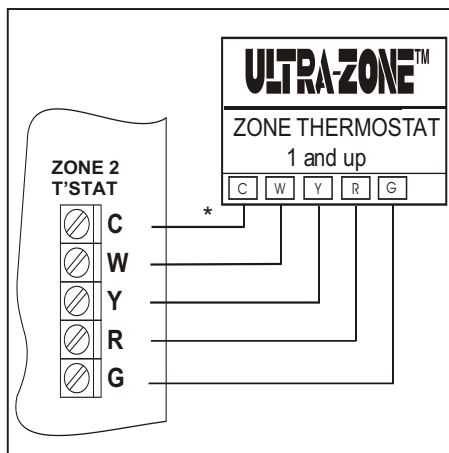


Figure 3 Typical heat/cool Thermostat wiring for Zones 1 thru 7.

* Common wire may not be required on your thermostats.

THERMOSTAT WIRING CONTINUED

HEAT PUMP THERMOSTATS

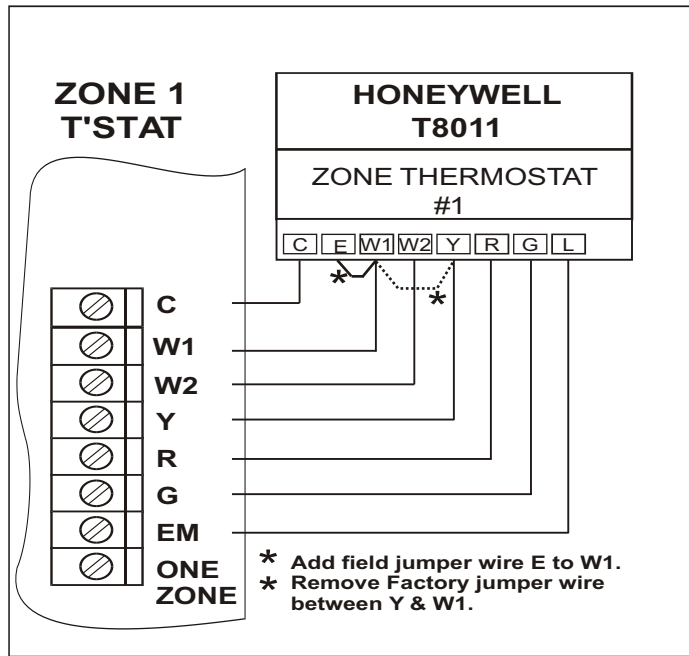


Figure 6 Zone 1 will accept heat pump style thermostats with a constant 24vac output during emergency mode, and separable W1 and Y terminals. These thermostats can be field configured to conventional heat / cool operation.

WIRING FOR "ONE ZONE" MODE

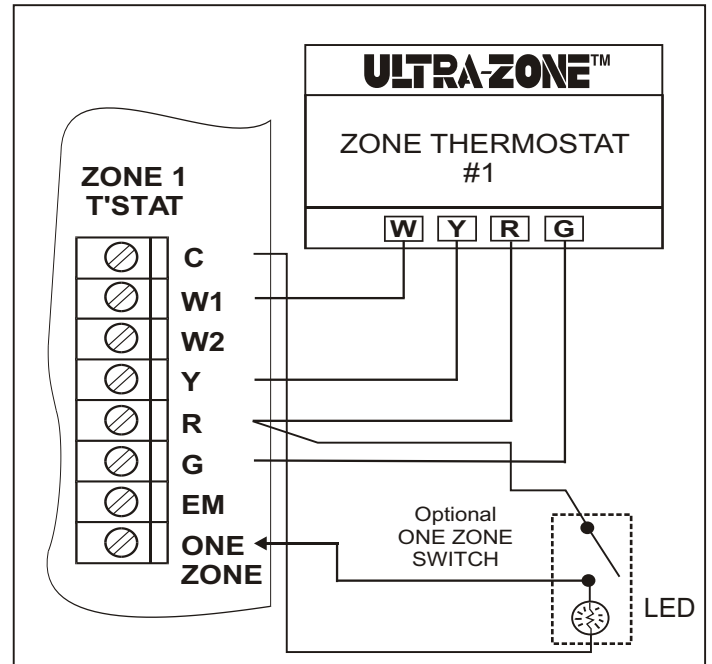


Figure 7 Wiring for manual activation of "One Zone" mode using a standard heat/cool thermostat in Zone 1. An Optional, Illuminated One Zone Mode Switch, Part# "VAC" is required.

WIRING FOR RADIANT FLOOR HEAT

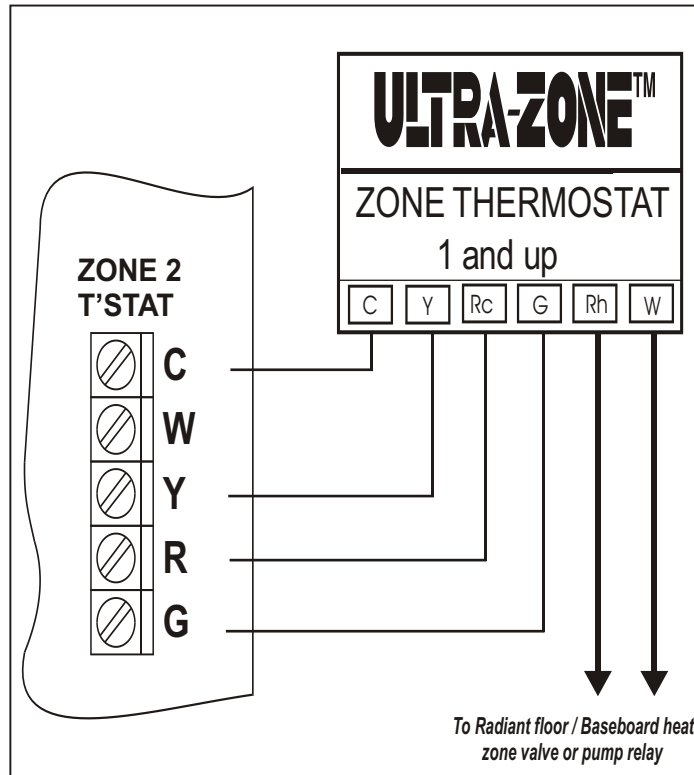


Figure 8 Wiring a split circuit thermostat to operate a Radiant floor heating or Baseboard heating Hydronic system. The BMPlus 3000 controls the cooling only, in this type of configuration.

WIRING FOR "ONE ZONE" MODE

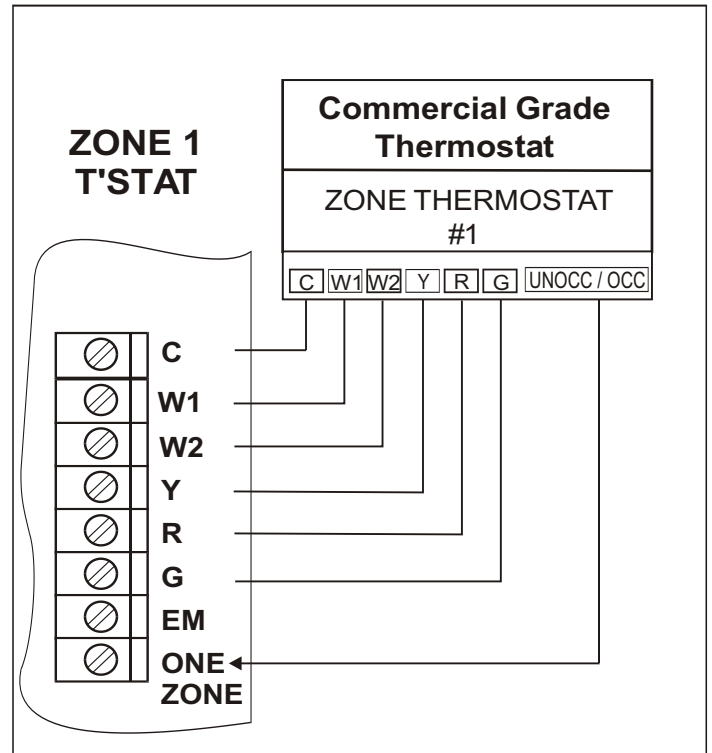


Figure 9 Wiring for automatic activation of "One Zone" mode using a commercial grade thermostat in Zone 1. Program or wire the thermostat to Energize (close contact) the One Zone Terminal and setback the temperature when the building is Unoccupied....When the building is Occupied, the thermostat will de-energize (open contact) the One Zone Terminal.

SYSTEM WIRING

Single Transformer Gas/Oil Systems 1 or 2 Stage Heat

Typical gas / oil system with A/C.
A jumper wire between Rc and Rh is provided. There is no need to install a jumper.

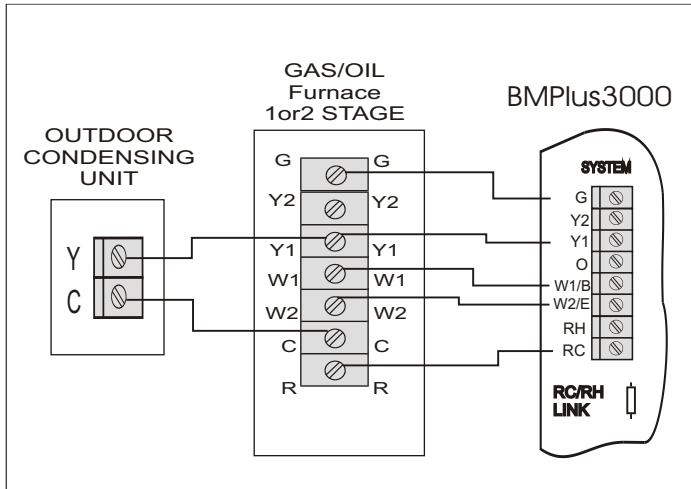


Figure 10 Single transformer Gas / A/C system.

Two Transformer Systems

Wiring diagram for a typical oil burner, hydronic zone / Air handler with A/C.
Cut the Rc / Rh link on the BMPlus Panel for systems requiring isolation.

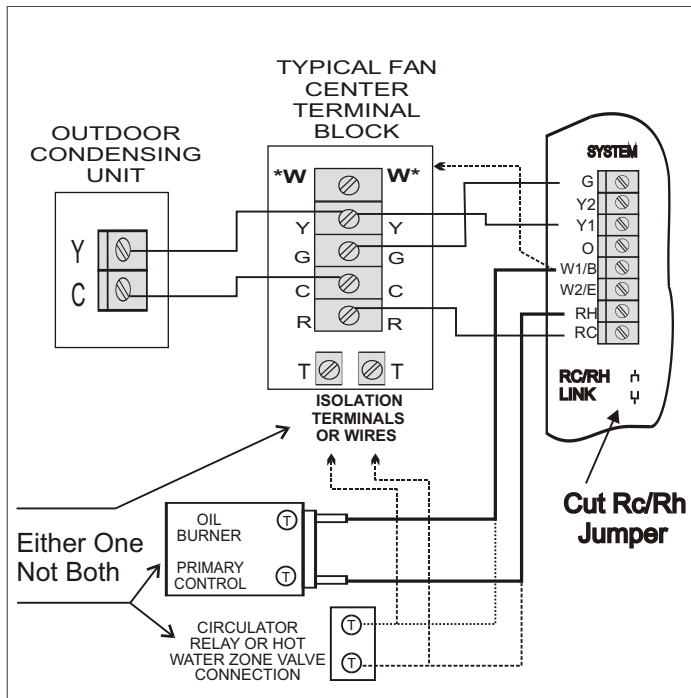


Figure 11 Two transformer Oil or Hydronic / A/C system.

*** Note:** Your Air Handler may include a W terminal. That means it may have it's own isolation circuit. If you can confirm this, simply connect the W1/B terminal to the W terminal on the air handler. Do not cut the Rc / Rh jumper. Wire up your Oil Burner, Circulator relay, or Hydronic Zone valve to the isolation contacts or wires provided in the air handler. The fan is controlled via time delay relay inside the air handler.

Conventional 1 stage Heat Pump with O or B Type Reversing Valve **

Typical heat pump system wiring with electric resistance backup heat. Wire up the reversing valve to either O or W1/B, depending on your type of system. Applies to air cooled or geothermal / ground source systems.

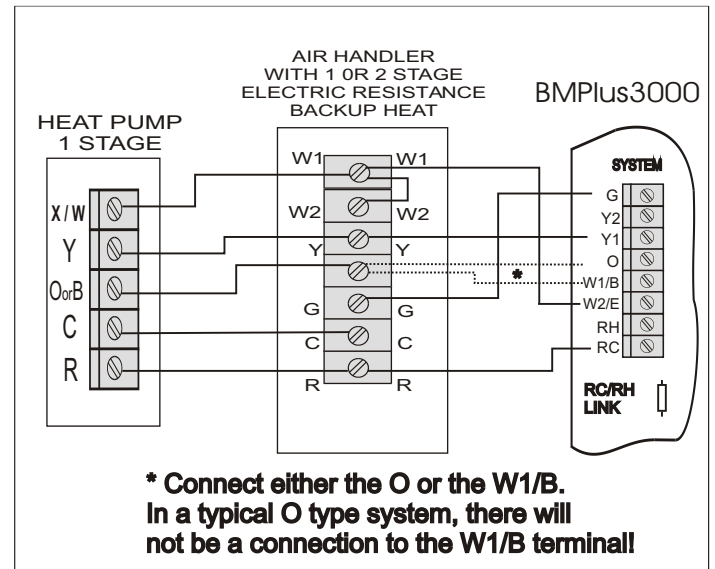


Figure 12 Conventional Heat Pump System

Dual Fuel Heat Pump with O Type Reversing Valve **

Typical heat pump wiring with Gas/Oil furnace backup heat. No dual fuel kit is required. Select to activate via the adjustable Timer or Outside air temperature.

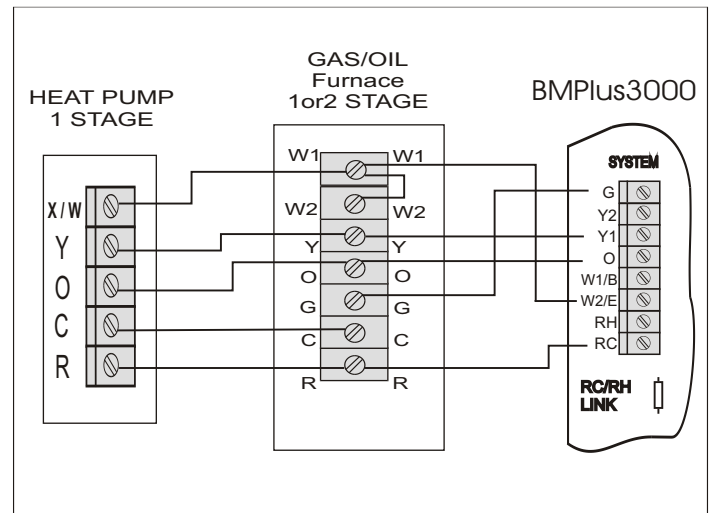


Figure 13 Single stage heat pump and 1 or 2 stage furnace.

**Note that a Conventional & Dual fuel heat pump wire up more or less the same. The difference is how 2nd stage heat operates. In a Conventional system, the indoor fan & the compressor continues to run when 2nd stage energizes. In a Dual Fuel system, the indoor fan & the compressor shuts down when 2nd stage energizes. The BMPlus 3000 will perform these functions automatically. All you have to do is set the dip switches to the correct settings. Select DF or CONV at dip switch #2. Choose to activate 2nd stage heat by TIMER or by OUTSIDE AIR TEMPERATURE. (Optional Sensor required) You can also use a 2 stage heat thermostat at Zone 1 that will over-ride the delays if the thermostat demands it. When the thermostat 2nd stage heat demand is satisfied, the BMPlus 3000 will stage down, unless DF/OAS has been selected and the outdoor temperature is lower than the OAS changeover setting. In that case the system will continue in FUEL mode, until the heating demand is fully satisfied.

SYSTEM WIRING CONTINUED

Single Transformer Gas w/A/C 2 stage heat 2 stage cool

Typical 2 stage gas furnace with 2 stage A/C. Constant or variable speed systems can be connected and controlled. Choose time or outside air to delay 2nd stage.

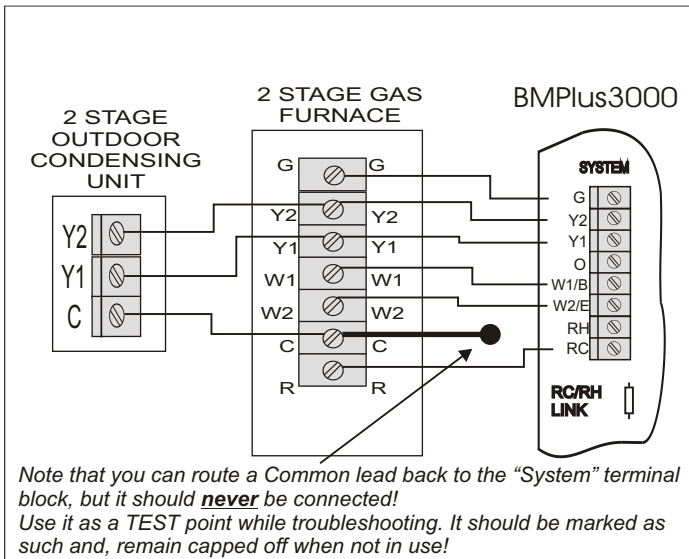


Figure 14 Single transformer 2 Stage Heat / AC system

Warning: All of the wiring diagrams provided are general in nature and may not perfectly match your particular application, due to differences in HVAC Mfr's design and terminal designations and functions! Variations on these diagrams and other System or Thermostat applications are available by contacting the EWC Technical Support Hotline.

HVAC system with OEM Voltage Control Circuitry

Some HVAC manufacturers are designing HVAC Systems with 5 - 18 vdc control circuits. Standard 24 vac thermostats will not work on these systems. These systems can only be controlled with their own thermostat. But the **SYSTEM** connections on a BMPlus 3000 are all dry contacts! Virtually any HVAC low voltage control circuit can be connected and controlled. All you have to do is ask the manufacturer which numbered terminal corresponds to the standard terminals. Theoretical diagram only shown below.

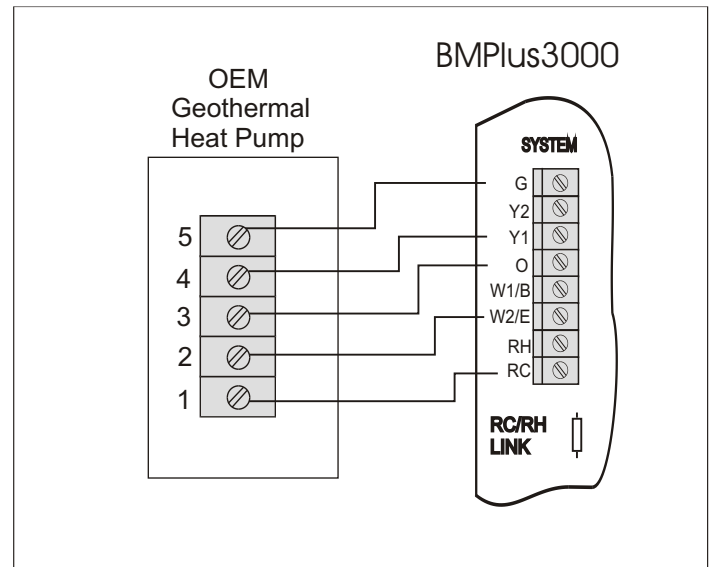


Figure 15 OEM system with 5 - 18 vdc control circuit.

ENHANCED FEATURES AND FUNCTIONS

MODULE TO MODULE FACTORY POWER WIRING

The BMPlus 3000 includes Factory Power Wiring on all expanded systems. The 24 vac power to the expansion modules is fed through the bus cable. This simplifies your wiring and minimizes the chances of reversing polarity.

DUAL FUEL COMPATIBLE

The BMPlus 3000 is compatible with Dual Fuel Heat Pumps. Dual Fuel kits are not required. Select staging based on Adjustable Time Delay or an Optional Outside Air temperature Sensor. The intelligent firmware does the rest.

SHORTED ZONE FEATURE FIRMWARE

The BMPlus 3000 Zone Control System includes the Shorted Zone Feature. This feature allows the BMPlus to ignore demands from a zone thermostat that is putting out simultaneous demands for heat & cool. A condition most likely due to a short in the field wiring, incorrect wiring, or a defective thermostat. The BMPlus will honor any legitimate demands from any other zone(s), except the shorted zone. When the problem is identified and repaired, the BMPlus 3000 will automatically recognize that zone.

* 5 TO 47 MINUTE 2ND STAGE TIME DELAY SETTINGS

*SECOND STAGE 50% ZONE RULE

* 5 to 47 DEGREE F. OUTSIDE AIR CHANGEOVER

* STATUS LED's ARE INCLUDED ON ALL MODULES

* W2 AUTOMATIC OVERRIDE VIA ZONE 1 THERMOSTAT

*ONE ZONE MODE CAPABILITY

* 2ND STAGE HEAT ADJUSTABLE LIMIT CONTROL

* SIMPLIFIED WIRING AND SYSTEM SETUP

DAMPER WIRING AND CONFIGURATION

Note: All zone dampers default to the "OPEN" position after a purge delay has occurred. Dampers also default "OPEN" during changeover & short cycle delays, and when all zone demands are satisfied, and no signals are detected from the thermostats.

REFERENCE THESE DIAGRAMS PRIOR TO INSTALLATION AND POWER WIRING. DOING SO WILL SAVE TIME AND LABOR LATER ON.

ZONE MODULE DAMPER MOTOR TERMINAL BLOCK DESIGNATION & FUNCTION

- Terminal M6 24vac to Close a damper(s)
- Terminal M4 24vac to Open a damper(s)
- Terminal M2 Constant 24vac HOT
- Terminal M1 Common 24vac

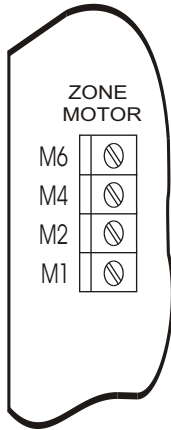
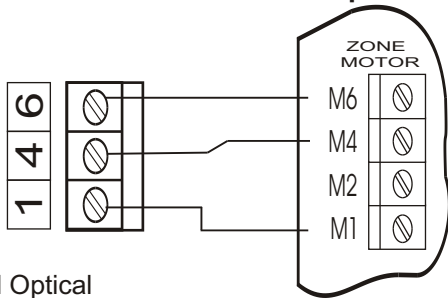


Figure 16

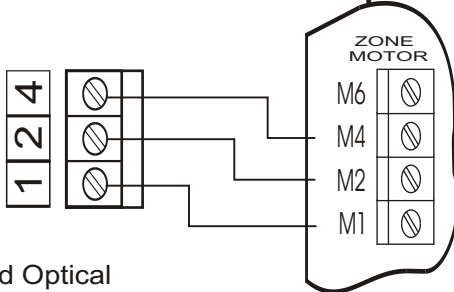
All Models MA-ND & MA-URD Damper Wiring



Patented Optical Damper Motor Actuators

Figure 17

All Models SMDL & BMDL Damper Wiring



Patented Optical Damper Motor Actuators

Figure 18

2 Wire Spring Return Motor Wiring

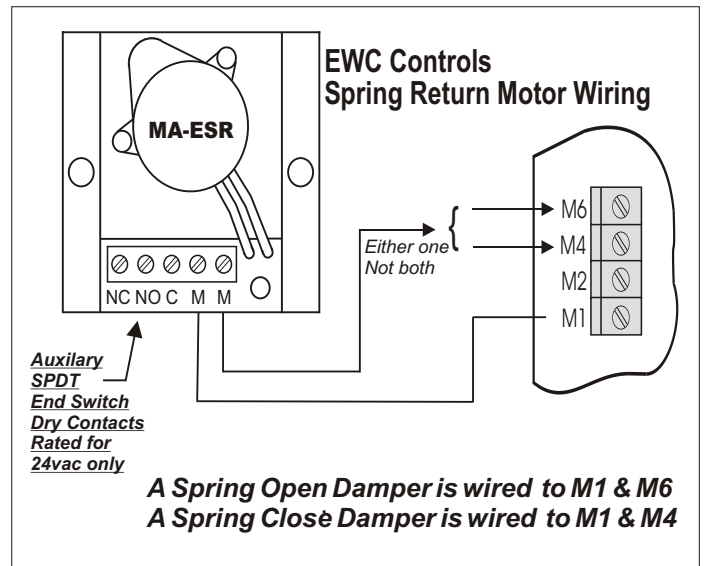


Figure 19

Multiple MA-ND & MA-URD Damper Wiring on a Single Zone

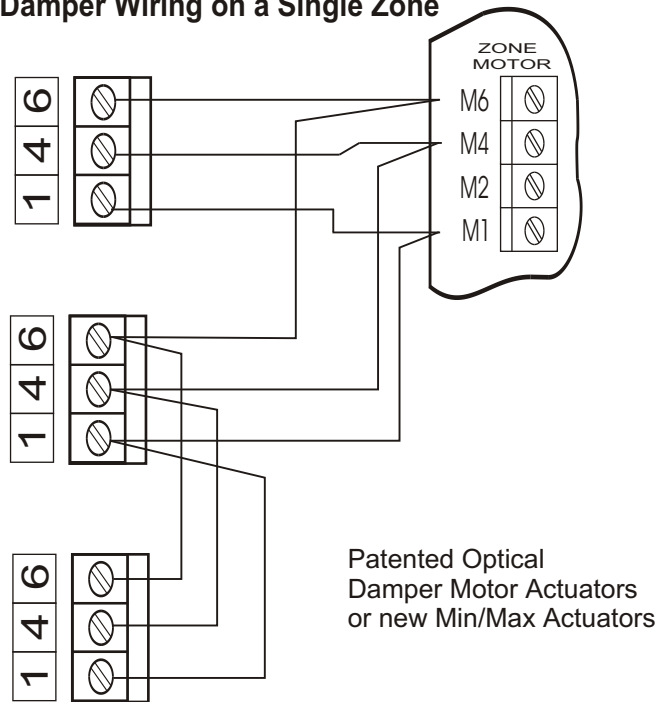


Figure 20

On all these dampers and most older style dampers, including competitor's dampers, always wire up number to number. Contact EWC Controls Technical Support when you are on the job site for assistance with damper wiring.

Do not overload your transformer!

DAMPER WIRING CONTINUED

If you need to connect numerous dampers to a single zone, or you are using dampers of unknown current draw, Isolation relays and separate power supplies will be required. Parallel as many dampers as you want as long the total current load of the motor actuators does not exceed the VA rating of the transformer. Other factors should also be considered, such as the full load amp rating of the isolating relay contacts, voltage drops from long wire runs and feeder conductor sizing to junction points.

NOTE: Some older style dampers and competitor's dampers cannot be paralleled and must be isolated or wired in tandem. Contact EWC Controls Technical Support for assistance.

Variations on this diagram and other damper solutions are available.

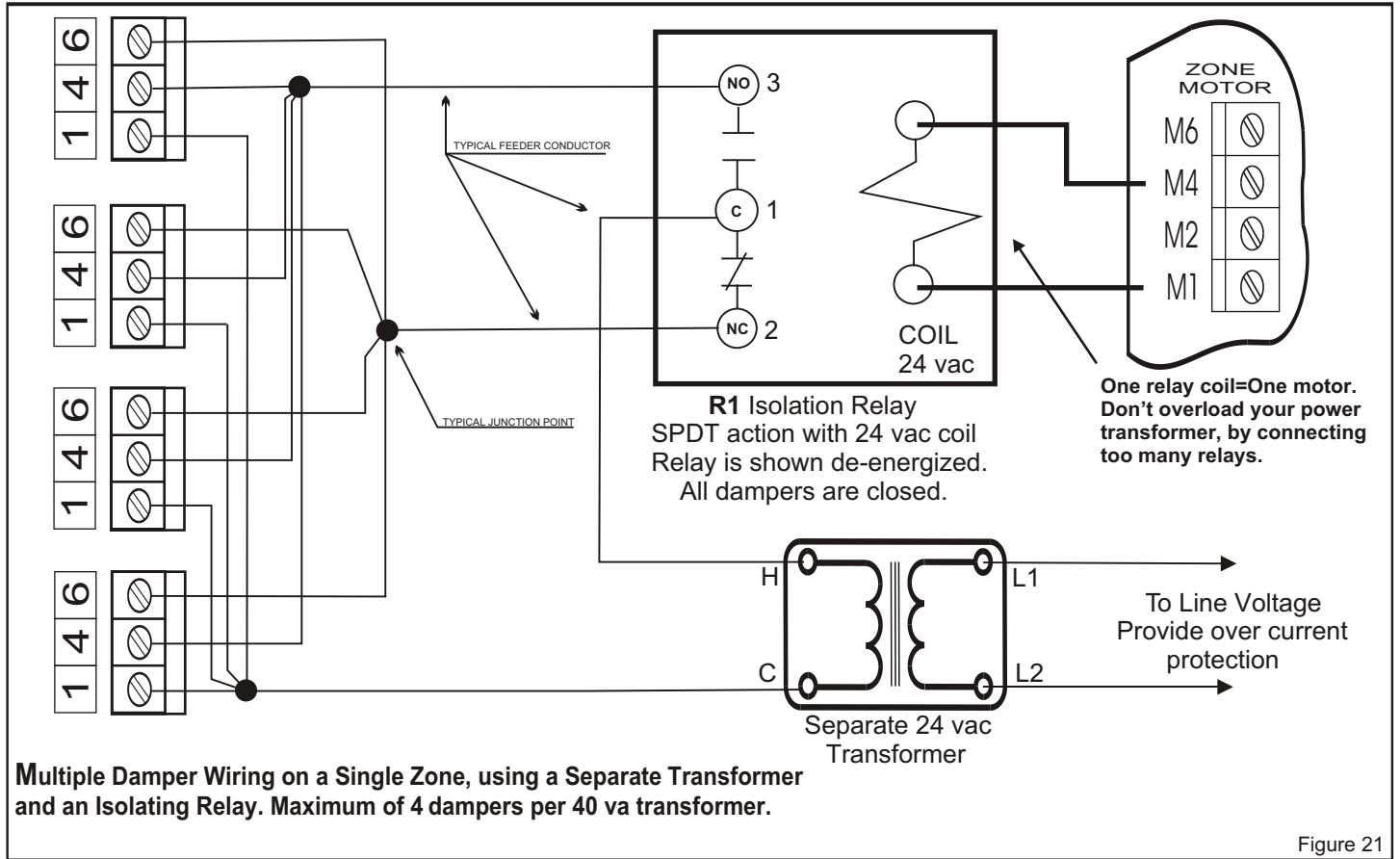


Figure 21

BMPlus 3000, 5000, 7000, Recommended Power Solutions

Number of Zones	Number of Dampers Directly Connected		
	1-3	4-5	6-7
3	40va	40va	50va
5	40va	40va	60va
7	40va	50va	75va

Use class 2 UL Listed 1585 inherently current limiting transformers only!

Number of Zones	Number of Dampers Directly Connected		
	1-3	4-5	6-7
3	40va	50va	75va
5	50va	60va	75va
7	50va	60va	100va

Non-inherently current limiting transformers must have field provided over-current protection on the secondary 24 vac output. The table values provided pertain to genuine ULTRAZONE Dampers and Competitors typical 24 vac Spring loaded dampers. Included in these VA load ratings are the correct number of thermostats, the BMPlus Zone System, and a 5% field factor. Spring loaded dampers draw higher currents & require more power.

TESTING DAMPER MOTORS

ND / URD / SMD / BMD Dampers - Connect 24vac common to terminal 1 and 24vac hot to terminal 4. Damper should Open. Remove 24vac hot from terminal 4 and apply to terminal 6. Damper should Close

RDN / SMDL / BMDL Dampers - Connect 24vac common to terminal 1 and 24vac hot to terminals 2 and 4. Damper should Open. Remove 24vac hot from terminal 4. Damper should Close.

SR / ESR Power Close / Spring Open Dampers - Connect 24vac common & hot to the two motor (M) terminals. Damper should Close. Remove 24 vac hot. Damper should Open.

SR / ESR Power Open / Spring Close Dampers - Connect 24vac common & hot to the two motor (M) terminals. Damper should Open. Remove 24vac hot. Damper should Close.

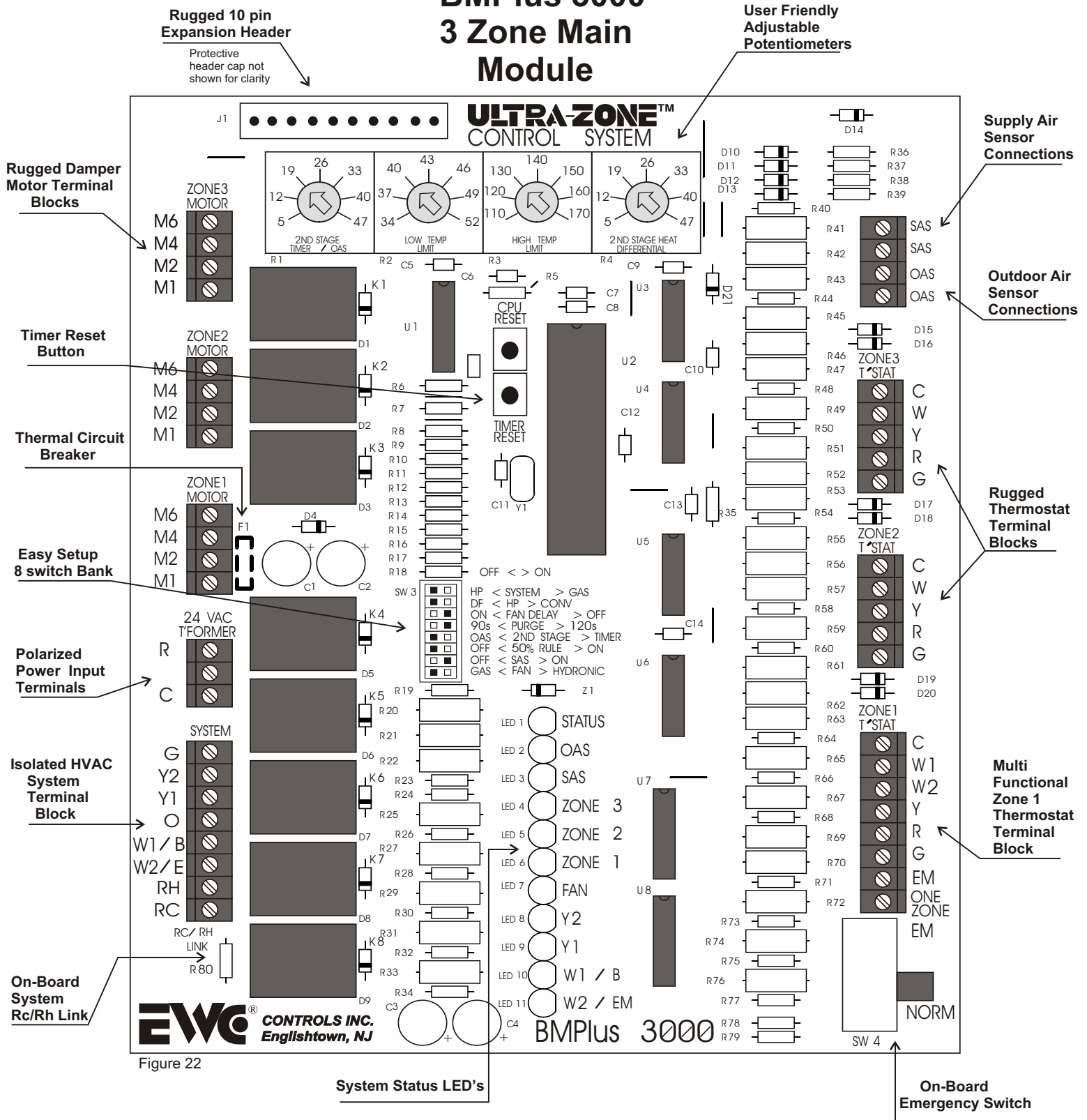
LED'S

BMPlus 3000 LED's The BMPlus 3000 is equipped with 11 LED's which indicate system operation and status. Familiarize yourself with the LED's definitions, in order to quickly determine the system status and mode of operation.

- RED STATUS** The STATUS LED pulses as a steady heart beat to indicate proper Microprocessor system status.
- RED OAS** OAS LED illuminates solid to indicate that the Outdoor Temperature has fallen below the chosen set point. LED will blink rapidly to indicate a malfunctioning Outdoor Air Sensor.
- RED SAS** SAS LED illuminates solid to indicate that the Supply Temperature has exceeded the chosen set point on either the HIGH TEMP LIMIT or the LOW TEMP LIMIT. LED will blink rapidly to indicate a malfunctioning Supply Air Sensor.
- RED ZONE 3** ZONE 3 LED will illuminate solid to indicate that damper(s) is energized open, and the Zone is active.
- RED ZONE 2** ZONE 2 LED will illuminate solid to indicate that damper(s) is energized open, and the Zone is active.
- RED ZONE 1** ZONE 1 LED will illuminate solid to indicate that damper(s) is energized open, and the Zone is active.
- RED FAN** FAN LED will illuminate solid to indicate a demand for fan operation, during COOLING, HEATING, PURGE, or CONTINUOUS FAN.
- RED Y2** Y2 LED illuminates solid to indicate 2nd stage of COOLING is energized.
The BMPlus Zone Control System is not compatible with 2 speed / 2 stage compressor Heat Pumps. (3 stage heat pumps).
- RED Y1** Y1 LED illuminates solid to indicate 1st stage of COOLING is energized in GAS/HYDRONIC or HEAT PUMP mode.
Y1 LED illuminates solid to indicate 1st stage HEATING in HEAT PUMP MODE.
- RED W1/B** W1/B LED illuminates solid to indicate 1st stage of HEATING is energized in Gas/Hydronic mode.
W1/B LED illuminates solid to indicate 'B' reversing valve is energized in HEAT PUMP operation.
- RED W2/E** W2/E LED illuminates solid to indicate 2nd stage of HEATING is energized in GAS/HYDRONIC or HEAT PUMP mode.
W2/E LED illuminates solid to indicate EMERGENCY HEAT is energized in HEAT PUMP mode.

NOTES:

BMPlus 3000 3 Zone Main Module



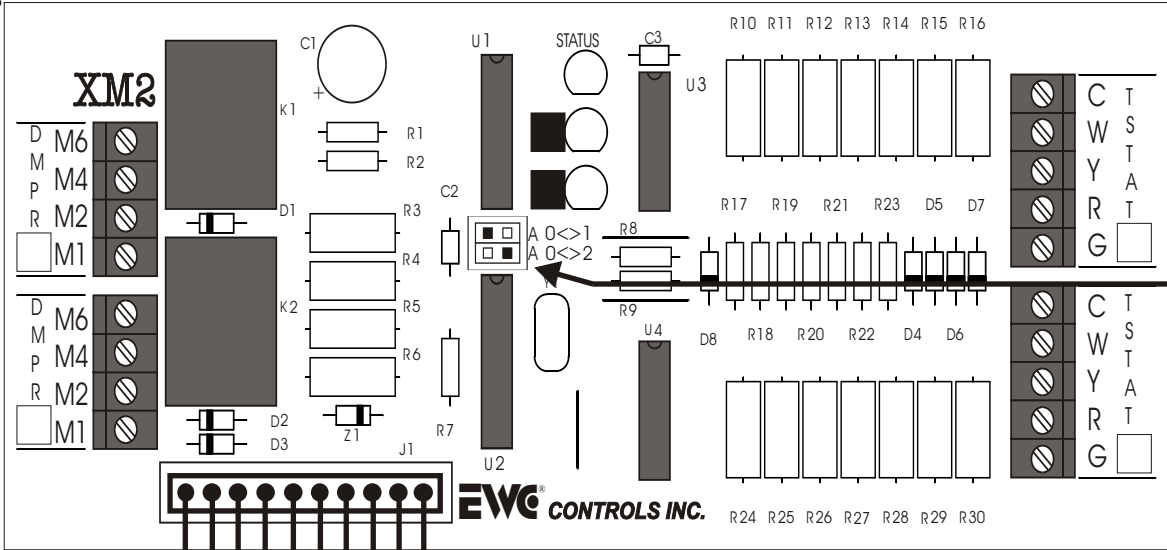
The BMPlus 3000 Zone Control System includes Module to Module Factory Wiring. We power up the Expansion Modules for you. The XM2 Expansion module includes a Status LED and Damper Status LED's. See page 11 and 12 for drawing representations of a 5 and 7 zone system and appropriate dip switch settings. All you have to do is:

1. Set the dip switches to your specific application.
2. Connect your thermostats, dampers and system wiring.
3. Power up the Main Module
4. Check System Operation.

Setting the XM2 Expansion Panel DIP Switches

BMPlus 5000

Each expansion module has a 2 position DIP switch. Factory set to insure the main module recognizes each expansion module in the proper sequence.



DIP switch settings for 1st Expansion panel. Zones 4 & 5

FACTORY SUPPLIED POWER & DATA POLARIZED BUS CABLE

Protective header caps not shown for clarity

Provide Over-Current Protection

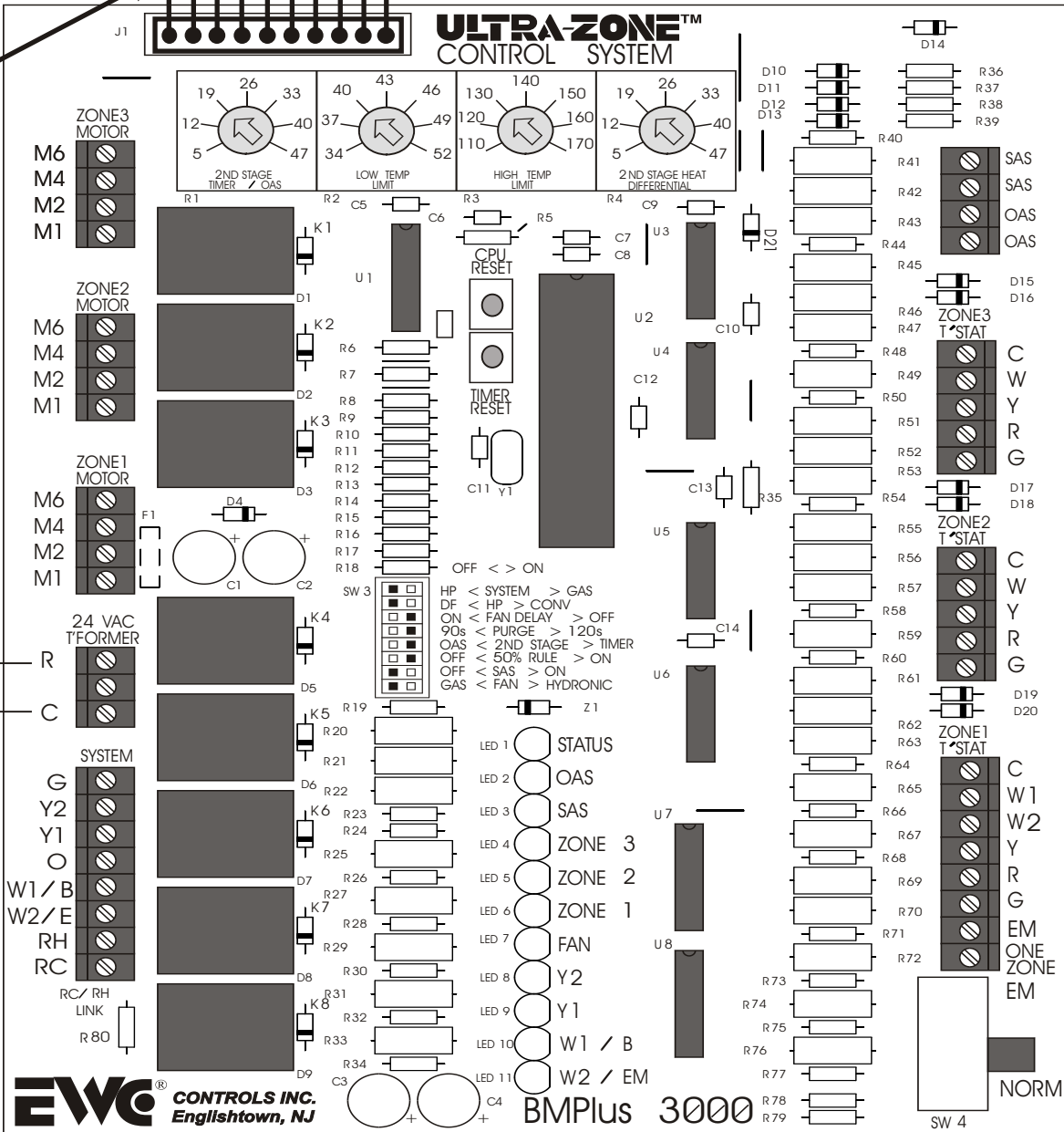
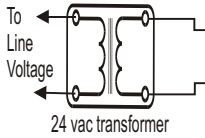
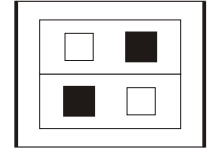
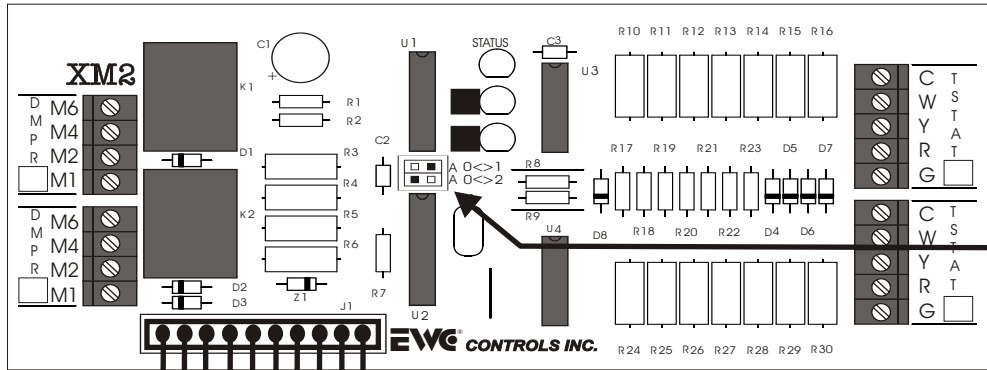


Figure 23

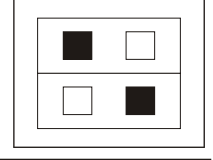
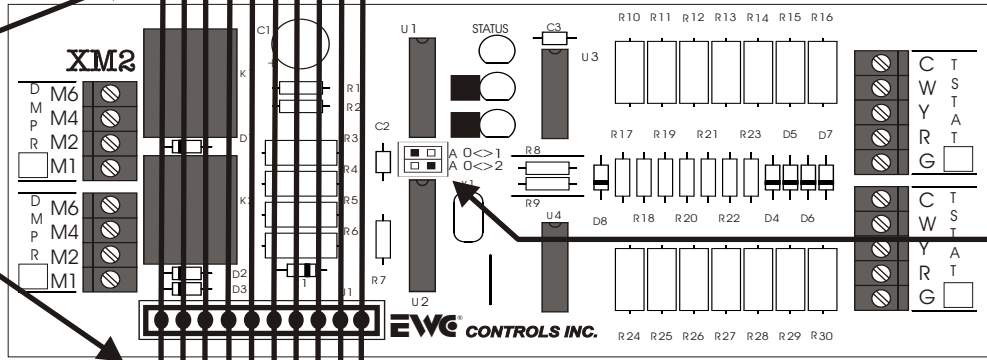
Setting the XM2 Expansion Panel DIP Switches

Each expansion panel has a 2 position DIP switch. Factory set to insure the main module recognizes each expansion module in the proper sequence.

BMPPlus 7000



DIP switch settings for 2nd Expansion panel. Zones 6 & 7



DIP switch settings for 1st Expansion panel. Zones 4 & 5

FACTORY SUPPLIED POWER & DATA POLARIZED BUS CABLE

Protective header caps not shown for clarity

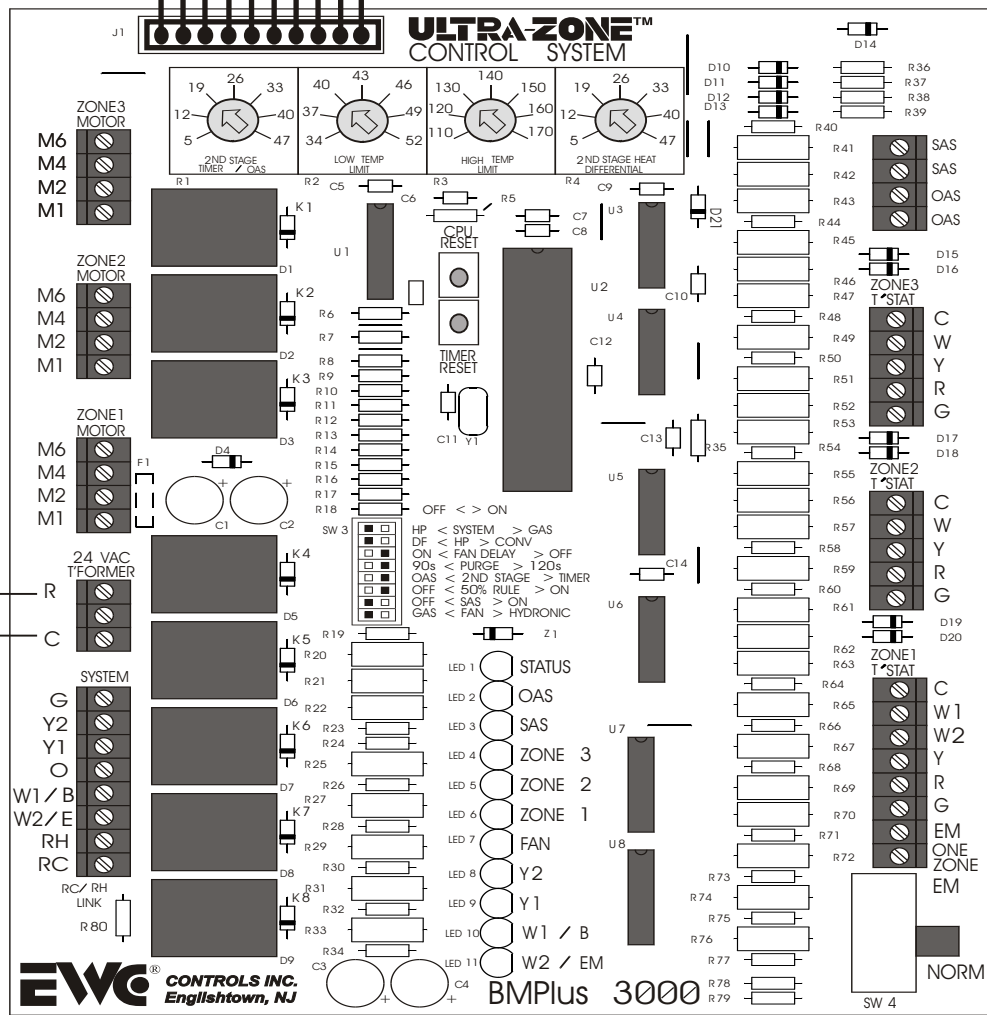


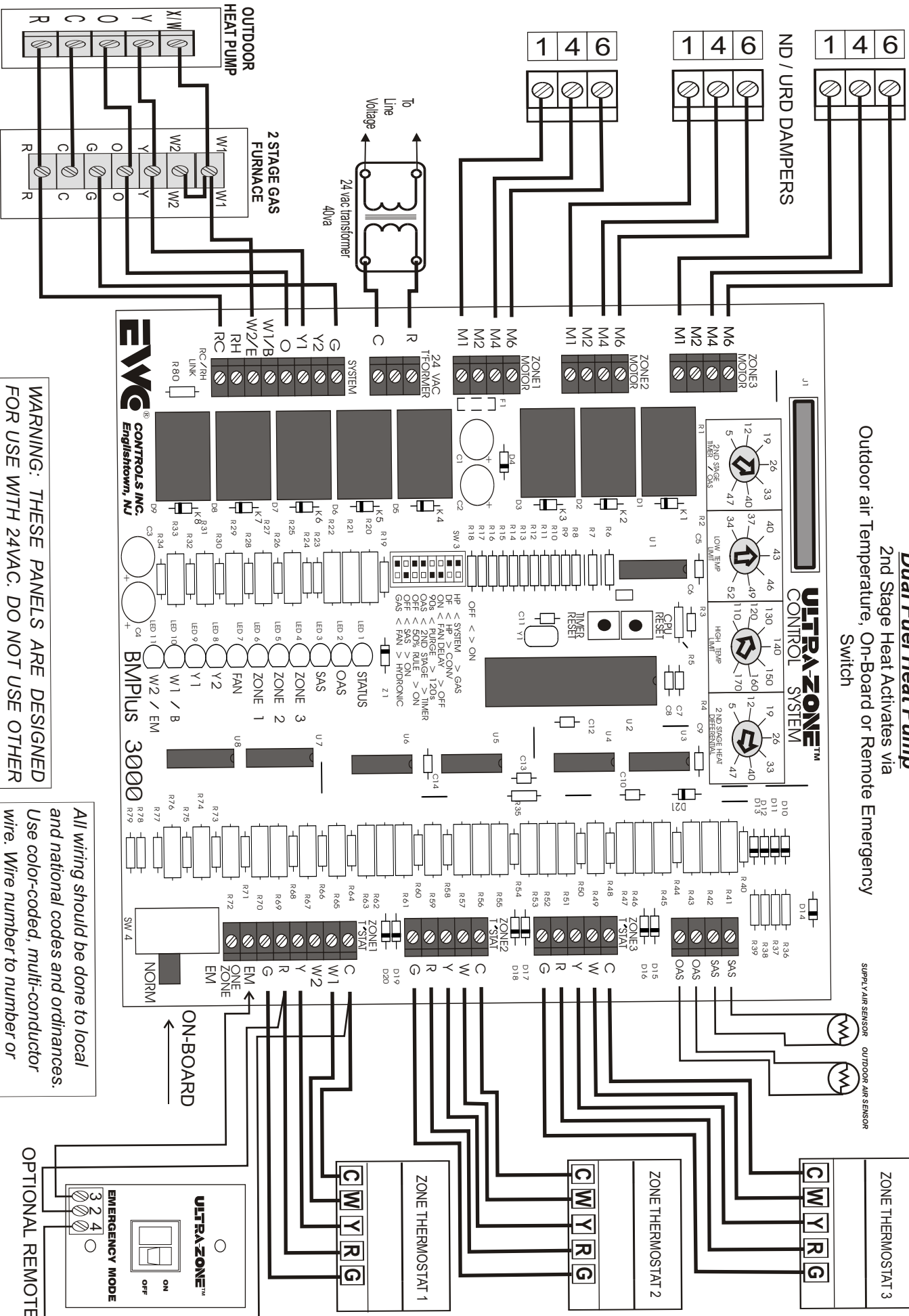
Figure 24

BMPlus 3000 Wiring Diagram

Dual Fuel Heat Pump

2nd Stage Heat Activates via Outdoor air Temperature, On-Board or Remote Emergency Switch

SUPPLY AIR SENSOR OUTDOOR AIR SENSOR



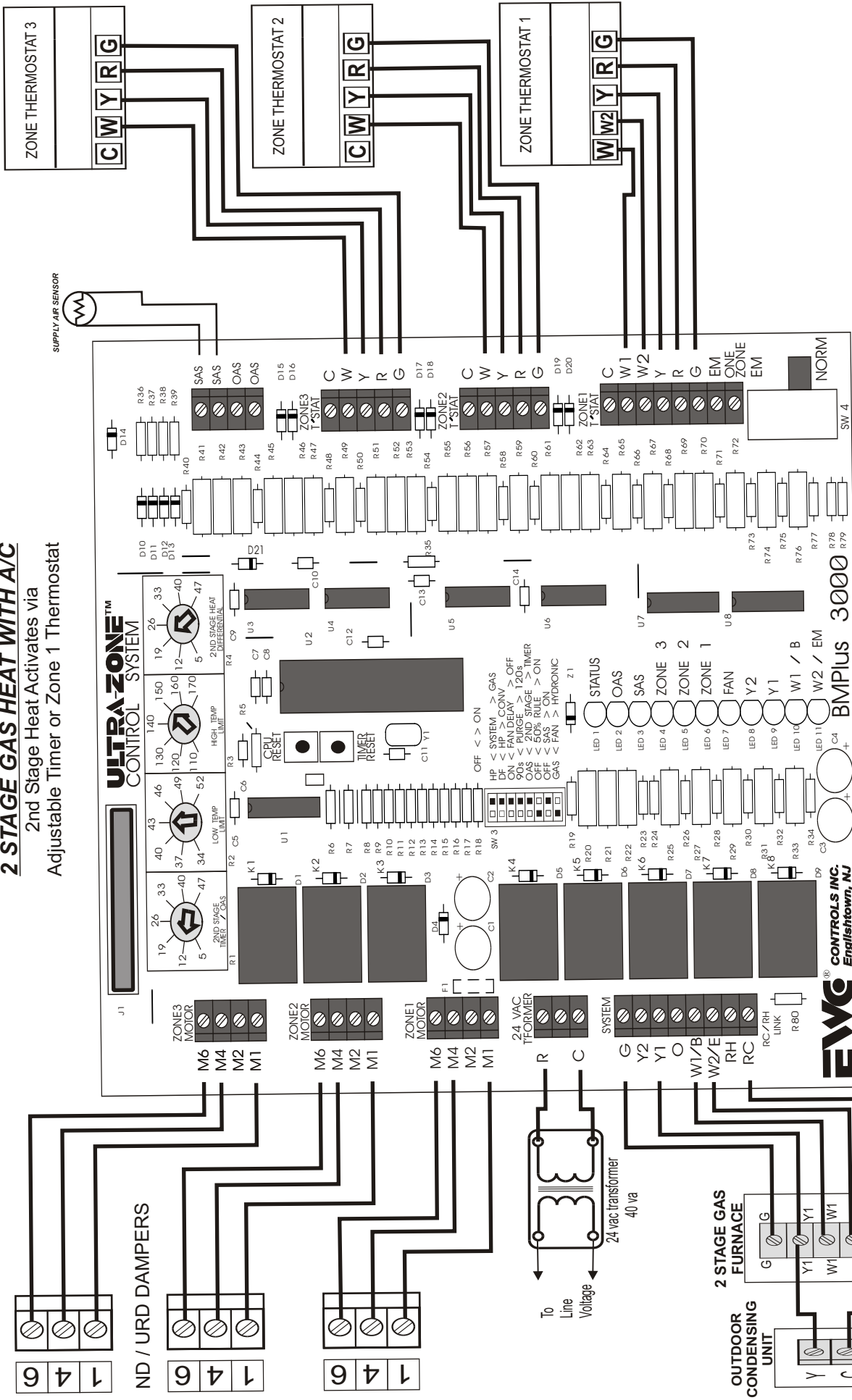
WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24VAC. DO NOT USE OTHER VOLTAGES! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE.

All wiring should be done to local and national codes and ordinances. Use color-coded, multi-conductor wire. Wire number to number or letter to letter on each control.

BMPPlus 3000 Wiring Diagram

2 STAGE GAS HEAT WITH A/C

2nd Stage Heat Activates via Adjustable Timer or Zone 1 Thermostat



EVC CONTROLS INC.
Englishtown, NJ

BMPPlus 3000

All wiring should be done to local and national codes and ordinances. Use color-coded, multi-conductor wire. Wire number to number or letter to letter on each control.

WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24VAC. DO NOT USE OTHER VOLTAGES! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE.

T R O U B L E S H O O T I N G

SYMPTOM	SOLUTIONS
LED'S are responding properly but HVAC system is malfunctioning.	Check HVAC system wiring for proper connections. Check HVAC system wiring for shorts/miswiring. Check HVAC System. Refer to Technical Bulletin for correct Setup/Wiring/Dip Switch settings.
LED's are not responding properly and HVAC system is malfunctioning.	Check HVAC system wiring for shorts/miswiring. Check HVAC system wiring for proper connections. Check HVAC thermostat for proper connections. Refer to Technical Bulletin for correct Setup/Wiring/Dip Switch settings.
LED's illuminate and HVAC system functions normally but dampers do not respond.	Check damper motor wiring for proper connections. Check damper motor 24vac transformer voltage/fuse/BMPlus circuit breaker. Check damper motor wiring for shorts/miswiring. Refer to Technical Bulletin for correct Setup/Wiring.
REFER TO THE DAMPER MOTOR TESTING PAGE 8	
LED's do not illuminate and HVAC system does not respond.	Check HVAC/BMPlus system transformer supply voltage. Check HVAC/BMPlus system 24vac transformer voltage/fuse/BMPlus circuit breaker. Check HVAC/BMPlus system wiring for shorts/miswiring.

CHECK YOUR WIRING

DETECTING 24vac SHORTS	SYMPTOMS: Module(s) appear to be dead!
HVAC system not responding and BMPLUS 3000 LED's are off.	If 24vac short has occurred, 24vac will be present at the <i>BMPlus 3000 Module Input terminals R & C</i> ; but 24vac will not be present at the <i>Thermostat R&C</i> .
Dampers not responding and THE BMPLUS 3000 LED's are off.	SOLUTIONS: Remove 24vac power from BMPlus 3000 and allow circuit breaker to cool! Find and repair short(s) in damper and/or thermostat field wiring. Restore 24 vac power.
ISOLATING 24vac SHORTS <i>F1 circuit breaker protects the BMPlus 3000 and reacts to a short in the damper motor or thermostat component and field wiring.</i>	Disconnect the wire(s) from the 'R' terminals on the <i>BMPlus 3000 thermostat terminal blocks</i> , and the "M2/M4/M6" terminals on the BMPlus 3000 damper motor terminal blocks. Restore power. If the short is no longer present, Ohm out the thermostat and damper field wiring for shorts/misconnections. Replace or repair wires as necessary. Restore power. Module(s) will resume operation.

TESTING THERMOSTATS

During a demand for heating, the thermostat should apply a 24vac hot signal to the W and or W2 terminals.

During a demand for cooling, the thermostat should apply a 24vac hot signal to the Y and G terminals.

During a continuous fan demand, the thermostat should apply a 24vac hot signal to the G terminal.

Check to make sure that the thermostat Rc and Rh terminals are connected together, unless your application requires separation of these circuits.

Use the (C) Common terminal provided at each thermostat terminal block to wire up full 24 vac hard-wired thermostats.

You should reference the (C) Common terminal when troubleshooting incoming thermostat demand signals, even if no wire is connected there.

TECHNICAL SUPPORT

EWC Controls provides superior toll free Troubleshooting Support for the BMPlus 3000 when you are on the job site!

Call 1-800-446-3110 Monday - Friday 8am to 5pm EST

Otherwise call 1-732-446-3110 for information on the BMPlus 3000 and other ULTRA-ZONE products..

When calling for Technical Support, please have a multi-meter, pocket screwdriver, and wire cutter/stripper handy.