Power Budget Planning

Managing Power Resources

When determining the types and quantity of terminals you will be using, it is important to remember there is a defined amount of I/O Bus Current supplied from the Bus Coupler. There are also defined limits for each external source.

The chart on the next page indicates the power supplied and used by each Protos X component. The chart below shows an example of how to calculate the power used by your particular system. These charts should make it easy for you to determine if the devices you have chosen will operate within the power budget of your system configuration.

If the I/O terminals you have chosen exceed the maximum power available from the Bus Coupler, you may be able to resolve the problem by using expansion terminals.

Power Budget Example

The example on the right shows how to calculate the power budget for a typical Protos X system. This example is constructed using a PX-MOD Bus Coupler and six I/O Terminals. It is recommended you construct a similar table for your system. Follow the steps below to determine your power budget.

1. Using a chart similar to this one, fill in columns 1 and 2.
2. Using the tables on the next page enter the current supplied and current used by each device (column 3).
3. Add together the current used by the system (row C) for column 3 and put the total in the row labeled "Maximum Current Required" (row D).
4. Subtract the calculated "Maximum Current Required" (row D), from the "Current Supplied" and place the difference in the row labeled "Remaining Current Available" (row E).
5. If "Maximum Current Required" is greater than "Current Supplied" in column 3, the power budget will be exceeded. It will be unsafe to use this configuration, and you will need to restructure your I/O configuration.

	Column 1	Column 2	Column 3
A	Terminal	Terminal Type	I/O Bus (from Coupler)
B	CURRENT SUPPLIED		
	PX-MOD	Bus Coupler	1000mA
C	CURRENT REQUIRED		
	PX-144	4 pt DC Discrete Input	5mA
	PX-172-1	2 pt AC Discrete Input	3mA
	PX-322-1	2 ch RTD Input	60mA
	PX-312	2 ch DC Analog Input	65mA
	PX-244-1	4 pt DC Discrete Output	9mA
	PX-412	2 ch DC Analog Output	75mA
D	Maximum Current Required		217mA
E	Remaining Current Available		783mA

Power Requirements

Power Supplied and Consumed

These tables show the amount of power supplied by each of the Bus Couplers and the amount of power consumed by each I/O device. The Power Consumed chart lists how much power is drawn from the I/O Bus, Terminal Power Bus (externally supplied) and from the Load (when using output terminals). Use this information when calculating the power budget for your system.

Power Supplied	
Device	**5V(mA) I/O Bus Supply**
Coupler	
PX-MOD	1000 Max
PX-TCP1	1000 Max
PX-TCP2	1750 Max
PX-EIP1	1000 Max
Bus Expansion Coupler	
PX-903	400 Max

Power Consumed			
Device	**5V(mA) from I/O Bus**	**(mA) from Terminal Power Bus**	**(mA) from Load**
Discrete Input Terminals			
PX-144	5	5	N/A
PX-148	5	2 (plus load)	
PX-149	20	N/A	
PX-172-1	3	6	
PX-172-2	3	6	
Discrete Output Terminals			
PX-244-1	9	N/A	30
PX-244-2	9		30
PX-248	18		60 (plus load)
PX-249	45		35 (plus load)
Analog Input Terminals			
PX-302	60	N/A	N/A
PX-304	85	Load	
PX-308	105	Load	
PX-312	65	N/A	
PX-314	100	N/A	
PX-318	140	N/A	
RTD/Thermocouple Input Terminals			
PX-322-1	60	N/A	N/A
PX-324-1	60		
PX-332-J	65		
PX-334-J	75		
PX-332-K	65		
PX-334-K	75		
Analog Output Terminals			
PX-402	60	N/A	50 (plus load)
PX-404	20		60 (plus load)
PX-408	25		50 (plus load)
PX-412	75		50 (plus load)
PX-414	75		50 (plus load)
PX-418	20		20
Relay Output Terminals			
PX-272-1	10	ON resistance max 100mΩ (plus load)	N/A
PX-272-2	80		
Combination In/Out Terminals			
PX-549	25 (additional 3mA for inputs)	15 (plus load)	N/A