PULIZZI ENGINEERING, INC.

INTELLIGENT POWER CONTROLLER™
IPC3401
IPC3401-NET
IPC3402
IPC3402-NET

PATENT NO. 5,923,103

OPERATION and APPLICATION MANUAL

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P/N 050-3402 Rev. B.

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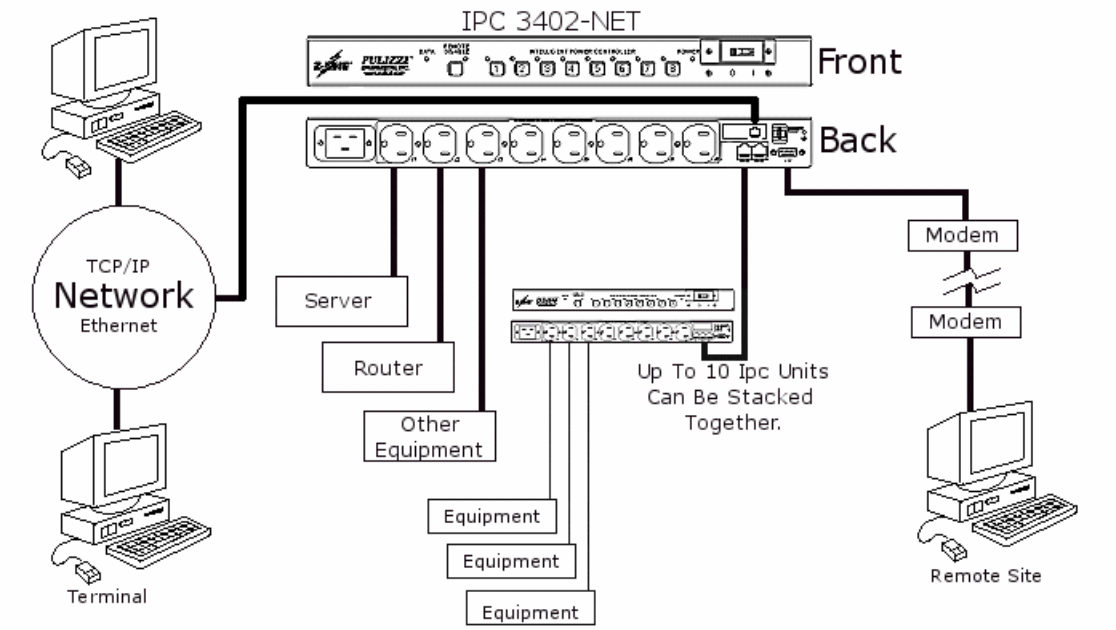

1.0 DESCRIPTION

1.1 Introduction

The Pulizzi Engineering Inc. Model IPC™ 34XX is an Intelligent Power Controller™ providing distribution of AC power to controlled devices. The IPC34XX series is designed to provide the user with high quality, yet simplified power control of remote equipment. The IPC 34XX series is an AC-line power distribution controller providing both local as well as remote control of up to 8 individual AC line receptacles (up to 80 outlets in the strapping mode).

Process Control/Automation: With a computer connected to a network of IPCs, users have a complete process control system at a very reasonable cost. The IPC can be used to control systems such as conveyor lines, factory processes, robotics, TV/CATV antenna head-end systems, pipeline valves, pumping stations, computers, peripherals, drives, printers, communications equipment, environmental equipment, refrigerators, medical equipment, and on and on.
Remote Reboot: The IPC34XX is also designed as a valuable tool for network managers to avoid downtime and save both time and money by preventing costly site visits to reboot “locked-up” computers and networking equipment.

All IPC34XX series can be controlled via a local terminal, or via a remote computer with modem, and comes with software commands noted in Table 3, page 15. The IPC34XX-NET versions can also be connected to an Ethernet (TCP/IP) network and controlled via Telnet.

If further information or assistance is required, a factory representative can be contacted at:

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1.2 Definition of Terms

AUTO-EVENT MONITOR: Command to automatically update outlet status of IPC34XX.

ETHERNET: An IEEE 802.3 standard, for PC/AT networking, using baseband contention access over coaxial cable and twisted-pair wires.

NULL MODEM: Adapter or cable which reverses pins 2 and 3 of serial cable (transmit data, receive data). Used when two PC/ATs are connected together, so that data transferred from one machine will be sent to the Data Receive pin on the other machine.

OUTLET: An AC power receptacle.

PORT: In this context, a port will refer to an addressable serial or parallel PC/AT port.

PULIZZI GUI INTERFACE: Graphical User Interface used to control the IPC34XX.

RS-232: Type of standard protocol for serial communications. Standard includes such specifications as voltage and pin configurations for communications functions. Transmission distance limited to 50'. Uses 9 or 25 pin connector configurations.

RS-422/RS-485: Type of standard protocol for serial communications which allows for higher speed transmission over distances up to 1000', instead of the 50' limit with RS-232. Uses RJ-45 connectors. Used with the IPC to "strap" multiple IPCs together.

STRAPPING: IPC 34XX mode which enables the user to connect, using the RS485 bus, multiple IPC34XXs together under one common address. Allows for control of up to 10 IPC34XXs, to be used to control up to 80 outlets through one interface.

TELNET: Communication protocol that uses port 23 (typically) to communicate to a network device. Most Terminal Emulators allow for a Telnet connection. Telnet is also an application that can be launched from DOS by typing TELNET.

TERMINAL EMULATION PROGRAM: Serial communications program such as PROCOMM PLUS™, PC Anywhere™, or WINDOW'S™ Hyperterminal which permit your personal computer or workstation to communicate with another computer or network as if it were a specific type of terminal directly connected to that computer or network

1.3 Features

Web Browser User Interface on –NET versions
Ethernet, TCP/IP, access on –NET versions
RS-232 Communication Port for Serial control or modem connection
Local control via front panel switches
1 Unit High 19” Rack Mount
Multi-position detachable mounting brackets
Vertical mounting brackets available separately
EMI/RFI Filtering
Spike/Surge Suppression
Circuit Breaker
Individually Addressable
Password Protection
Watch-Dog Timer Capability
User Defined Power Up/down Sequence
Strap Up To 10 IPCs (For Control Of 80 outlets at Same Address)
Auto-Event Monitor Of Receptacles
Data-Transfer Front Panel Indicator
Help Menu with Command-Set
One Year Warranty On Workmanship And Material

2.4 Operating Specifications

Electrical Specifications:

SPECIFICATIONS:	IPC3401	IPC3401-NET	IPC3402	IPC3402-NET	IPC3402-2756
Voltage Input/Output (50/60Hz):	120V~ or 240V~	120V~ or 240V~	120V~	120V~	120V~
Current Input:	20A @ 120V~ or 16A @ 240V~	20A @ 120V~ or 16A @ 240V~	20A	20A	30A
Current Output De-rated:	16A	16A	16A	16A	24A
Full Load VOLT-AMP De-rated:	1920VA @ 120V~ or 3840VA @ 240V~	1920VA @ 120V~ or 3840VA @ 240V~	1920VA	1920VA	2880VA
Outlets (rear panel):	IEC 320 Type C13	IEC 320 Type C13	NEMA 5-15R	NEMA 5-15R	NEMA 5-15R, 5-20R
Circuit Breaker:	20/20A	20/20A	15A	20A	20/10A
EMI/RFI Filter:	20A	20A	20A	20A	NA
Power Input:	IEC 60320(C20 Type)	IEC 60320(C20 Type)	IEC 60320(C20 Type)	IEC 60320(C20 Type)	NEMA L5-30P plug
Cable/Plug:	Order Separately	Order Separately	Order Separately	Order Separately	9 foot, 10/3 Cable

Spike/Surge Suppression: The IPC34XX utilize 275V metal oxide varistor (MOV) and TVS Line to Neutral. Response time is approximately 50 nanoseconds. Exceeds recommended specifications for High Exposure Areas per ANSI/IEEE C62.41-1980, Class B.

CAUTION: *If the maximum voltage across the MOVs (reference to ground) is exceeded according to table 1. below, they will immediately fail.*

Table 1. MOV Ratings:

MOV SPECIFICATIONS	
Continuous AC Voltage	270VAC
Continuous DC Voltage	360VDC
Maximum DC Leakage	200μA
Low Varistor Voltage Limit	389VDC
High Varistor Voltage Limit	453VDC
Nominal Varistor Voltage	424VDC
Current For Varistor Voltage	1mA
Maximum Clamp Voltage 8x20μs	680V
Maximum Clamp Voltage Test Current	100A
Peak Current Rating (1 Pulse) 8x20μs	10000A
Peak Current Rating (2 Pulse) 8x20μs	6500A
Energy Rating (10x100μs)	325J
Energy Rating (8x20μs)	325.00J
Capacitance	970pf
Impulse Response Time	50ns

Table 2. Filter Specifications:

EMI/RFI FILTERING

Rated Voltage/Current:
- 125V/20A UL and CSA
- 250V/16A UL, CSA and VDE

Operating Frequency:
- 50/60 Hz.

Hi-pot rating 1 minute:
- 2250 VDC Line-Ground
- 1450 VDC Line-Line

Maximum Leakage Current (each line-ground):
- .5 mA @ 250V~ 50Hz

UL #E72928, CSA #LR97784, VDE #1104884

COMMON MODE INSERTION LOSS
(Line to Ground in 50ohm circuit)

Mhz	.01	1	10	20	50	100
dB	8	29	40	50	68	40

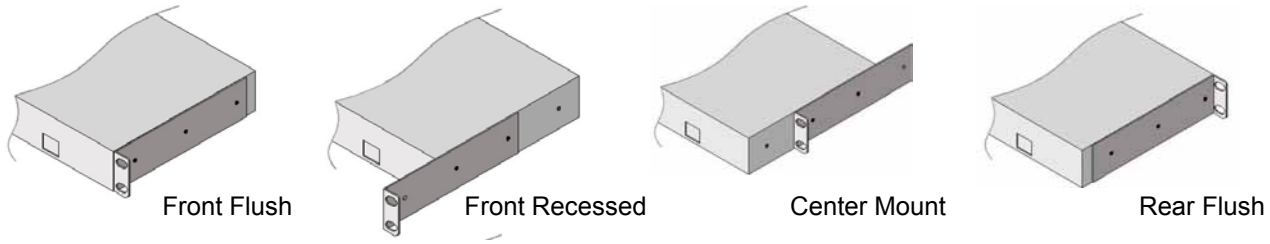
DIFFERENTIAL MODE INSERTION LOSS
(Line to Line in 50ohm circuit)

Mhz	.01	1	10	20	50	100
dB	8	23	45	58	32	28

Mechanical and Environmental Specifications:

Width:	17.5” (Standard 19.0” rack mount)
Height:	1.72” (1U rack space)
Depth:	9.5”
Approximate Shipping Weight:	19 lbs. (IPC3402-2756 is 27 lbs.)
Operating Temperature Range:	0 to 50 ° C
Storage Temperature Range:	-40 to 65° C
Operating Humidity Range:	0 to 95% RH
Storage Humidity Range:	0 to 95% RH
Power Usage (Control Circuitry)	120 watts max
Mounting:	Standard 19”, EIA Rack Mount, Adjustable Mounting Brackets
Chassis:	16 gauge steel, color black
Front Panel:	Overlay with embedded switches

Adjustable Mounting Options



1.5 Front and Rear Panel Features

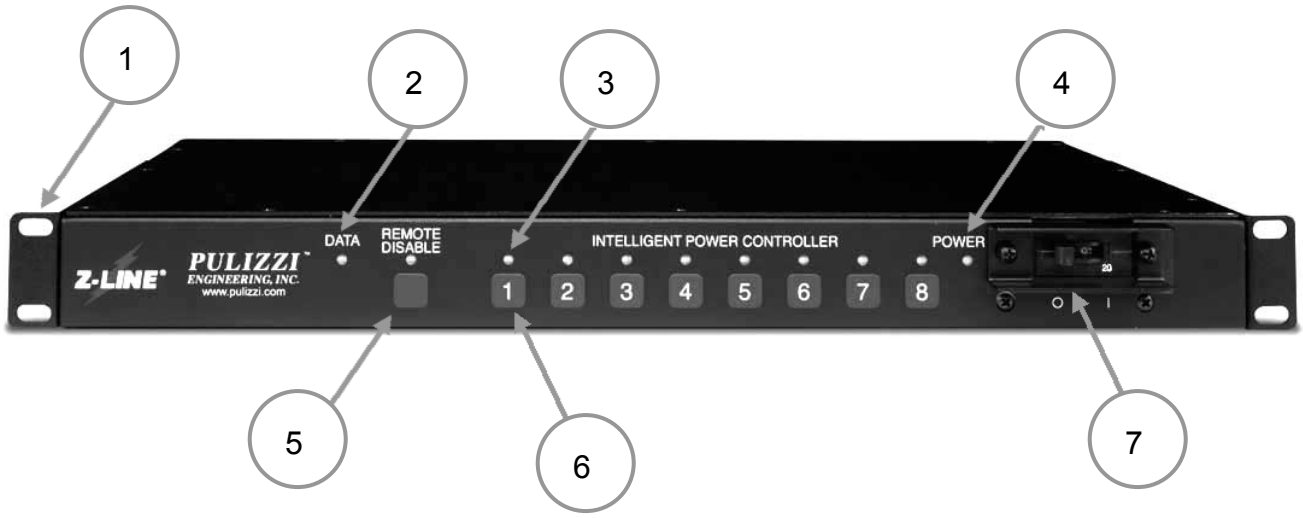
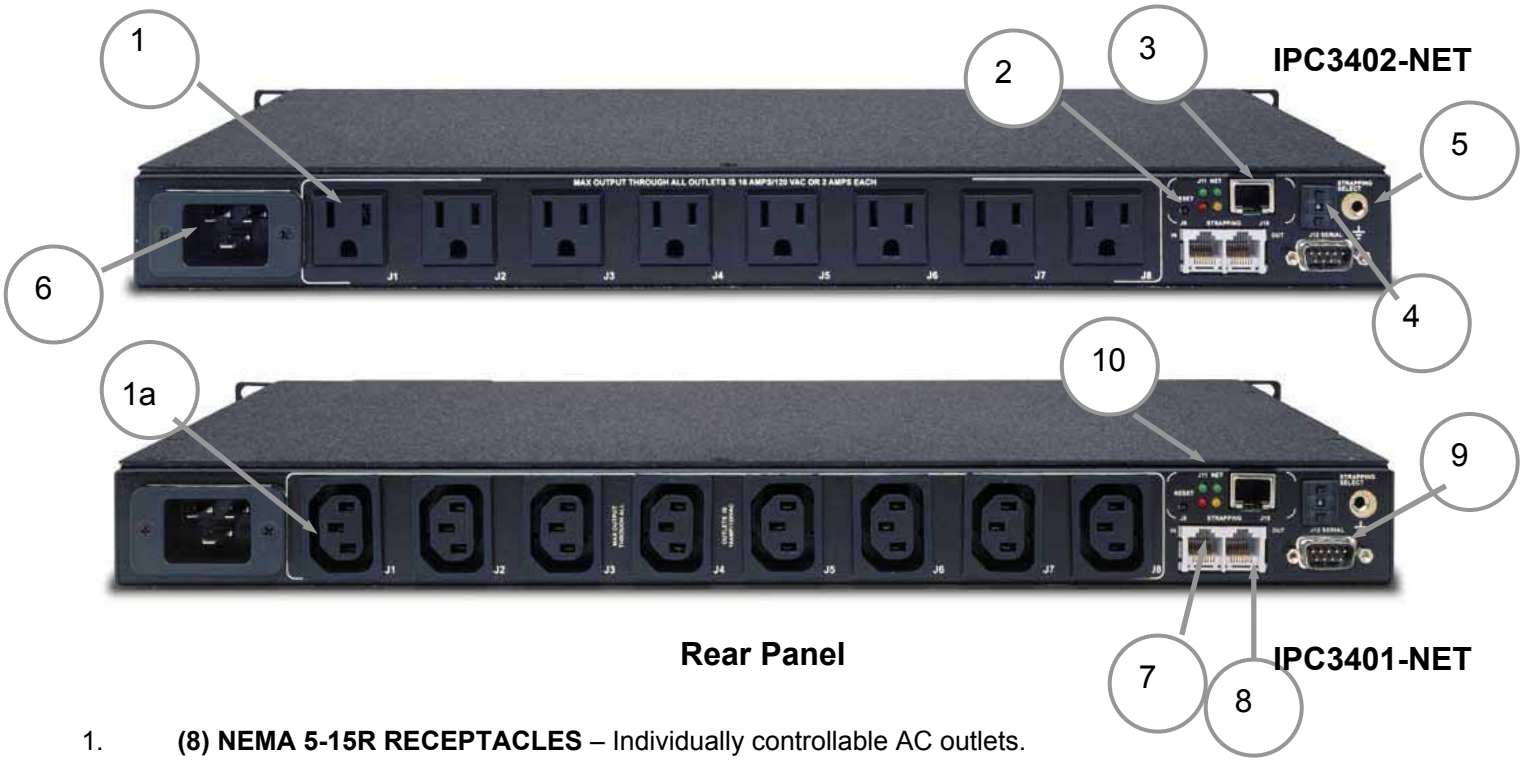


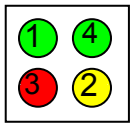
Figure 1. Intelligent Power Controller Model IPC34XX – Front Panel

1. **DETACHABLE MOUNTING BRACKETS** – Can be positioned for front/rear, flush/recessed, or center rack mounting. Vertical mounting brackets also available, see accessories.
2. **DATA LED** – Indicates data traffic between the IPC and controlling PC/AT.
3. **(8) LED INDICATORS** – Shows individual outlet status.
4. **POWER ON LAMP INDICATOR** – Illuminated when AC power is available at inlet and circuit breaker is in the ON position.
5. **REMOTE DISABLE SWITCH/LED** – Enables or Disables Remote capability. LED illuminates for disable.
6. **(8) MANUAL RECEPTACLE SWITCHES** – Individually overrides remote control of outlets.
7. **MAIN POWER SWITCH/MAGNETIC RESETTABLE CIRCUIT BREAKER** – UL 489 Listed circuit breaker, Applies AC power to unit.



Rear Panel

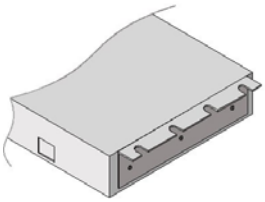
1. **(8) NEMA 5-15R RECEPTACLES** – Individually controllable AC outlets.
   a. **(8) IEC C13 RECEPTACLES**
2. **RESET BUTTON** – Resets the Ethernet interface card.
3. **ETHERNET CONNECTOR** – Network connection (–NET versions only).
4. **STRAPPING OPTION ADDRESSING SWITCH** – D2-Switch sets each IPC, strapped together, to a unique address. Allows power control of up to 80 outlets using 10 individual IPCs under one address. The first unit in the stack should be set to "0". THIS SWITCH MUST BE SET TO "0" IF THE IPC34XX IS NOT BEING STRAPPED TO OTHER UNITS.
5. **GROUND –** 8/32 chassis mounted nut for ground connection.
6. **IEC 60320-C20 POWER INLET –** Application specific power cables available, see accessories.
7. **RS-485/422 SERIAL INTERFACE CONNECTORS** – (Labeled J9, IN) Connector for RS-485/422 from IPC34XX to IPC34XX (for connecting IPC to IPC, not intended for ETHERNET connection).
8. **RS-485/422 SERIAL INTERFACE CONNECTORS** – (Labeled J10, OUT) Connector for RS-485/422 from IPC34XX to IPC34XX (for connecting IPC to IPC, not intended for ETHERNET connection).
9. **9 PIN DSUB SERIAL INTERFACE CONNECTORS** – Connector for RS-232 from PC/AT or modem to IPC34XX (Labeled J12)
10. **ETHERNET INTERFACE CARD INDICATOR LIGHTS**- Four indicator lights to the left of the RJ45 Ethernet connector indicate status of the network connection.



LED		
1	**Network Communications-** Lights solid green when communications is idle and blinks when connected to the network and active.	
3	**Diagnostics-** Blinks or lights solid red in combination with the green (1) LED to indicate diagnostics and error detection. **Red blinking, green (1) blinking:** 4x: Faulty network connection 5x: No DHCP response received	**Red solid, green (1) blinking:** 1x: EPROM checksum error 2x: RAM error 3x: Network controller error 4x: EEPROM checksum error 5x: Duplicated IP address on the network 6x: Software does not match hardware
4	**Network Link Status-** Lights solid green to indicate network port is connected to the network.	

1.6 Optional Accessories

Power Cords		
010-0026	C19 to Bare Wire (Pigtail) 8 foot, 1.5mm/3 Harmonized cable	
010-0034	C19 to Bare Wire (Pigtail) 8 foot, 12/3 SJT cable	
010-9334	NEMA 5-15P to C19 (125V, 15A) Straight Blade 8 foot 14/3 SJT cable	
010-9335	NEMA 5-20P to C19 (125V, 20A) Straight Blade 8 foot 12/3 SJT cable	
010-9336	NEMA 6-15P to C19 (250V, 15A) Straight Blade 8 foot 14/3 SJT cable	
010-9337	NEMA 6-20P to C19 (250V, 20A) Straight Blade 8 foot 12/3 SJT cable	
010-9338	NEMA L5-15P to C19 (125V, 15A) Twistlock 8 foot 14/3 SJT cable	
010-9339	NEMA L5-20P to C19 (125V, 20A) Twistlock 8 foot 12/3 SJT cable	
010-9340	NEMA L6-15P to C19 (250V, 15A) Twistlock 8 foot 14/3 SJT cable	

010-9341	NEMA L6-20P to C19 (250V, 20A) Twistlock 8', 12/3 SJT cable	
010-9342	C20 Male to C19 (20 AMP) 8 foot 12/3 SJT cable	
010-9343	CEE7-7 to C19 (250V, 16A) EUROPE 2.5M, 1.5mm/3 Harmonized cable	
010-9344	BS546A to C19 (250V, 15A) BRITISH 2.5M, 1.5mm/3 Harmonized cable	
010-9345	AS/NZS 3112 to C19 (250V, 15A) AUSTRALIAN 2.5M, 1.5mm/3 Harmonized cable	
010-9346	SI32 to C19 (250V, 16A) ISRAELI 2.5M, 1.5mm/3 Harmonized cable	
010-9347	CEI23-16 to C19 (250V, 16A) ITALIAN 2.5M, 1.5mm/3 Harmonized cable	
010-0025	IEC 60320, 8' cord, C14 to C13	
010-0027	IEC 60320, 6' cord, C14 to C13	
010-0028	IEC 60320, 4' cord, C14 to C13	
010-0029	IEC 60320, 2' cord, C14 to C13	
010-0001	Serial DB9 Female to DB9 Female Straight through cable for direct serial connection, 6 feet long	
001-1928-1	Vertical mount bracket, 2 required	

2.0 OPERATION

2.1 Setup

2.1.1 Equipment Location

The Pulizzi Engineering, Inc. Intelligent Power Controller Model IPC34XX is housed in a 19" steel chassis intended for mounting in a cabinet or rack that accepts standard EIA 19" wide spacing. The power controller requires 1.75" (1U) of vertical mounting space and extends approx. 9.5" into the mounting rack of the cabinet. For convenience, the power controller should be mounted as close as possible to the units it controls.

The Pulizzi Engineering, Inc. Intelligent Power Controller, Model IPC34XX is typically mounted at a convenient height enabling the operator to locally operate the IPC34XX with ease. The unit is designed to support its own weight, **ONLY**. It is recommended that support brackets, which are available from most cabinet/rack manufacturers, be used.

Vertical mounting brackets are also available separately that enable the IPC34XX to be mounted vertically in a rack, on a wall, or mounted under a desk or table top. Please see the accessories section.

2.1.2 AC Power Connection

All wires, cables, cords, and connectors to be used with the IPC34XX should conform with the Uniform Safety Code of your local, state, and federal agencies. The IPC3401 & IPC3401-NET are powered by a standard 120 VAC 60Hz or 240 VAC 50/60 Hz line. The IPC3402 & IPC3402-NET are powered by a standard 120 VAC 60Hz. Do not defeat the third-wire ground as it is necessary for proper shielding, operation, and safety. An 8-32 PEM nut is provided on the rear of the chassis for additional grounding. Input power cables are sold separately.

2.1.3 RS-232 Connection (Serial access/control)

Hardware Configuration:

To connect the IPC34XX to the COM port (RS-232) of the computer requires a serial female 9 pin DSUB to female 9 pin DSUB straight-through cable. Connect one end to the PC/AT, sometimes labeled COM 1 or COM 2, and the other end to J12 connector labeled "Serial" on the rear panel of the IPC34XX. NOTE - DTR must be HI for RS232 communication (DB9 connection only).

Software Configuration:

The IPC34XX is designed to be used with Pulizzi's GUI terminal emulation software, down-loadable from the Pulizzi.com Web Page, or third party terminal emulation software such as PROCOMM PLUS™, PC-Anywhere™, or Hyper Terminal™. The settings in the terminal emulation software must be:

Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

The transfer protocol is ASCII. The COM port you address in software must correspond to the COM port you are connected to on the back of your computer.

2.1.4 Ethernet TCP/IP Network Connection (LAN or WAN access/control)

Hardware Configuration:
Connect CAT-5 straight-through network cable to R45 jack, J11 NET, found on the back panel of the IPC34XX.

Software Configuration:
The IPC34XX-NET will come from the factory with an IP address of 192.168.168.168. Consult your network administrator for an IP address that is compatible with your network. To assign the new IP address to your IPC34XX-NET use the ARP method. The ARP method is available under UNIX and Windows based systems. The IPC34xx network card will set its address from the first directed TCP/IP packet it receives.

a. In a Windows based system, open a MS DOS prompt.
(In a UNIX system, skip step 1 and 2)

b. In order for the ARP command to work in Windows, the ARP table on the PC must have at least one IP address defined other than it's own. If the ARP table is empty, the command will return an error message. Type ARP -A at the DOS command prompt to verify that there is at least one entry in the ARP table.

```
arp –a
```

If the local machine has only one entry, ping another IP address on your network to build a new entry in the ARP table. The IP address you ping must be a number other than the machine on which you are working.

c. Once there is at least one additional entry in the ARP table, use the following command to ARP an IP address to the IPC34xx. The first number is the IP address you wish to assign to your IPC34xx. The second number is the MAC address of the IPC34xx located on the bottom of your unit:

```
arp –s xxx.xxx.xxx.xxx 00-20-4a-xx-xx-xx
```

(In a UNIX system enter the arp command as follows:)

```
arp –s xxx.xxx.xxx.xxx 00:20:4a:xx:xx:xx
```

d. Now open a Telnet connection to port 1. The connection will fail quickly (3 seconds), but the IPC34xx will temporarily change its IP address to the one designated in this step.

```
telnet xxx.xxx.xxx.xxx 1
```

e. Open a Telnet connection to port 9999 to set the required parameters. Once the setup screen opens, you will need to press enter quickly.

```
telnet xxx.xxx.xxx.xxx 9999
```

f. After pressing enter you will see a setup menu. Select **0** for **Server Configuration**. You will be prompted for the IP address, 3 characters at a time. Enter the IP address that you would like to assign to the IPC34xx. Enter through all the other settings.

g. You will return to the main menu. Select **1** for **Channel 1 Configuration**. Enter through the choices, until prompted for the **Port No?** Enter the desired port number. Port 23 is the standard Telnet port number, which the unit is default set to. Enter through all the other settings.

h. You will return to the main menu. Select **9** to **Save and Exit**. Your IP address and Port number are now saved in memory.

i. You are now ready to open a Telnet session with the IPC34xx at the specified IP address and port number.

2.1.5 Modem Connections with the IPC34XX

Hardware Configuration:
At the remote site, the modem connects to the IPC34XX through a NULL MODEM cable/adapter and the modem connects to phone line. When you are using a modem with the IPC34XX, the IPC will automatically initialize the modem to Auto Answer on Ring. As a recommended option, the user can manually initialize the modem to Auto Answer by entering ATS0=1 in terminal emulation mode. The AA light (on the modem), will remain on unless power to the modem is removed. The IPC34xx will then wait for the phone to ring and will answer the line when you connect from a remote site.

2.1.6 Strapping (RS-485/RS-422 network for control of up to 10 IPC's)

Hardware Configuration:
To connect an IPC34XX to another IPC34XX using the available RS-422/485 network connectors, requires an RJ45-RJ45 (straight through) cable, not supplied. Simply connect J10 OUT of the first IPC to J9 IN of the next IPC, and so on through the entire stack of IPC units. The RJ45 networking cable should be 24 AWG twisted pair category-5 wiring with RJ-45 modular plugs on each end. This cable should NOT be a crossover cable. You can connect up to 10 IPC34xx together for control of up to 80 outlets at one address.

The advantage of RS-485/422 over RS-232 is the distance the cable can be run: RS-232 up to 50 ft., RS-485/422 up to 1000ft. Unit #0 in the stack must be on-line for communications with "strapped" IPCs.

2.2 Interconnect Cables

2.2.1 Standard RS-232 Cables

A standard serial cable passes all the RS-232 signals straight through, i.e. the "transmit data" pin on one end of the cable goes to the "transmit data" pin on the other end of the cable. This is the type of cable used to connect the IPC34XX to the PC/AT.

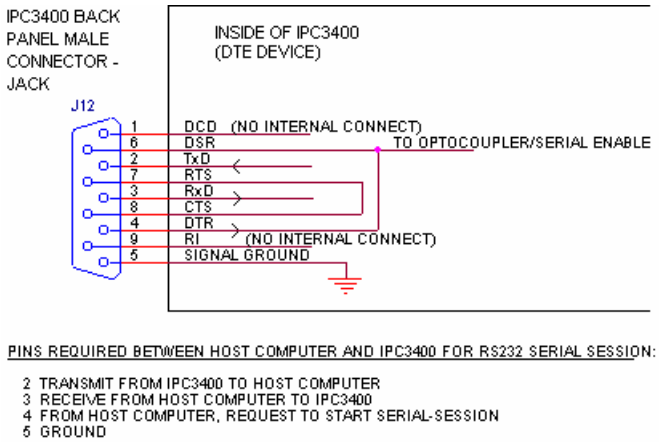
For the model IPC34XX the RS-232 is connected through a DB-9 female connector and "Daisy-chained" via the RJ-45/RS-485 connectors on the rear panel. The pins to be concerned with are the TD Pin 3, RD Pin 2, Pin 4 (tied internally to pin 6, IPC34XX RS232 Enable) and SG Pin 5. The RJ-45/RS-485 is configured to use pins 1 and 2 as Transmit Data+ and Transmit Data- respectively, pins 3 and 6 as Receive Data+ and Receive Data- respectively. Pins 4,5,7, and 8 are not used.

The RS-232 connection looks like a modem to the PC/AT computer so cables are readily available. If you are connecting a PC type computer directly to the IPC's RS-232 port, a standard pin to pin wiring configuration will work. For those computers with 9 pin connectors, a standard DB-9 to DB-25 cable designed for the PC/AT computer is required.

2.2.2 Null-modem cables

A null-modem cable passes some signals straight through, e.g. "signal ground," but switches other signals. For example, the ``send data" pin on one end goes to the ``receive data" pin on the other end. If you need to make your own cables, below is a table showing a recommended way to construct a null-modem cable for use between the IPC34XX and Modem. This table shows the RS-232 signal names and the pin numbers for various RS232 connectors.

IPC Female DB-25 Connector = Male	IPC Female DB-9 Connector = Male	Computer (PC/AT) DB-25 Female	Computer (PC/AT) DB-9 Female	Modem to IPC Female Conn. = DB 25 Male
Pin 2 Receive Data	Pin 3 Receive Data	Pin 2 Transmit Data	Pin 3 Transmit Data	Pin 3 Transmit Data
Pin 3 Transmit Data	Pin 2 Transmit Data	Pin 3 Receive Data	Pin 2 Receive Data	Pin 2 Receive Data
Pin 4 Data Term. Ready	Pin 4 DTR	Pin 20 DTR	Pin 4 DTR	Pin 20 DTR
Pin 5 Signal Ground	Pin 5 Signal Ground	Pin 7 Signal Ground	Pin 5 Signal Ground	Pin 7 Signal Ground



2.2.3 Network (RJ45) Cable

A network cable is a CAT 5 type cable with RJ45 type connectors on each end of the cable. This cable is a straight through cable (1-1, 2-2, 3-3, etc.) A network cable is used for connecting the IPC34xx to your network port (hub or switch). A network cable is also used to interconnect IPC34xx in a strapping network. This network is an RS422/RS485 network, which is a high speed serial protocol.

2.3 Communicating and Controlling the IPC34xx

A communications software program with terminal emulation capability must we used to communicate with the IPC34xx. Examples of compatible programs include: PROCOMM PLUS™, PC Anywhere™, Microsoft™ Hyper Terminal or Pulizzi's IPC GUI. Units shipped after June 2002 have web browser user-interface capability for TCP/IP configuration and outlet control.

2.3.1 Terminal Emulator Control (Text Commands)

After making a connection to the IPC34xx, the unit must be addressed. Addressing is the process of initializing a particular IPC34XX for communication. Each individual IPC34XX is factory preset with address @@@@. This can be changed by the user (refer to command set, table 3, page 15). NOTE: If any characters other than the commands in the command set are entered, an "INVALID" is echoed to the user and communication is terminated with the IPC. The user must then re-address the IPC. Also, in some communications software, the CR/LF option must be disabled as it will send multiple CR/LF to the IPC and result in the above mentioned "INVALID" condition.

If multiple IPC34xx units are strapped together, the rear panel "Strapping Select" switch must be in position "0" on unit #1, #0 being the designation for the first IPC in the stack. This the normal default position for non-strapping (single IPC) applications. Rear Panel "Strapping Select" switch on unit #2 should be set to "1", to would provide access to the outlets on unit #2 (now referred to as 9-16), position "2" on unit #3 would provide access to outlets (now referred to as 17-24) and position "3" on unit #4 would provide access to outlets (now referred to as 25-32), etc. *Once again, the IPC serially-connected directly via the PC-com-port, Modem, or Ethernet Connection must be online with the controlling software for communicating with other IPCs in the "stack ."*

2.4 Addressing and Control Commands

All commands are <u>UPPER CASE ONLY</u>, followed by (↵) key ("Enter", "Carriage Return" or "Line Feed").

1. Type the unit name and press Enter. (Default unit name is @@@@ from the factory)
2. The unit will respond with IPC@@@@. You can now execute any of the following list of commands:

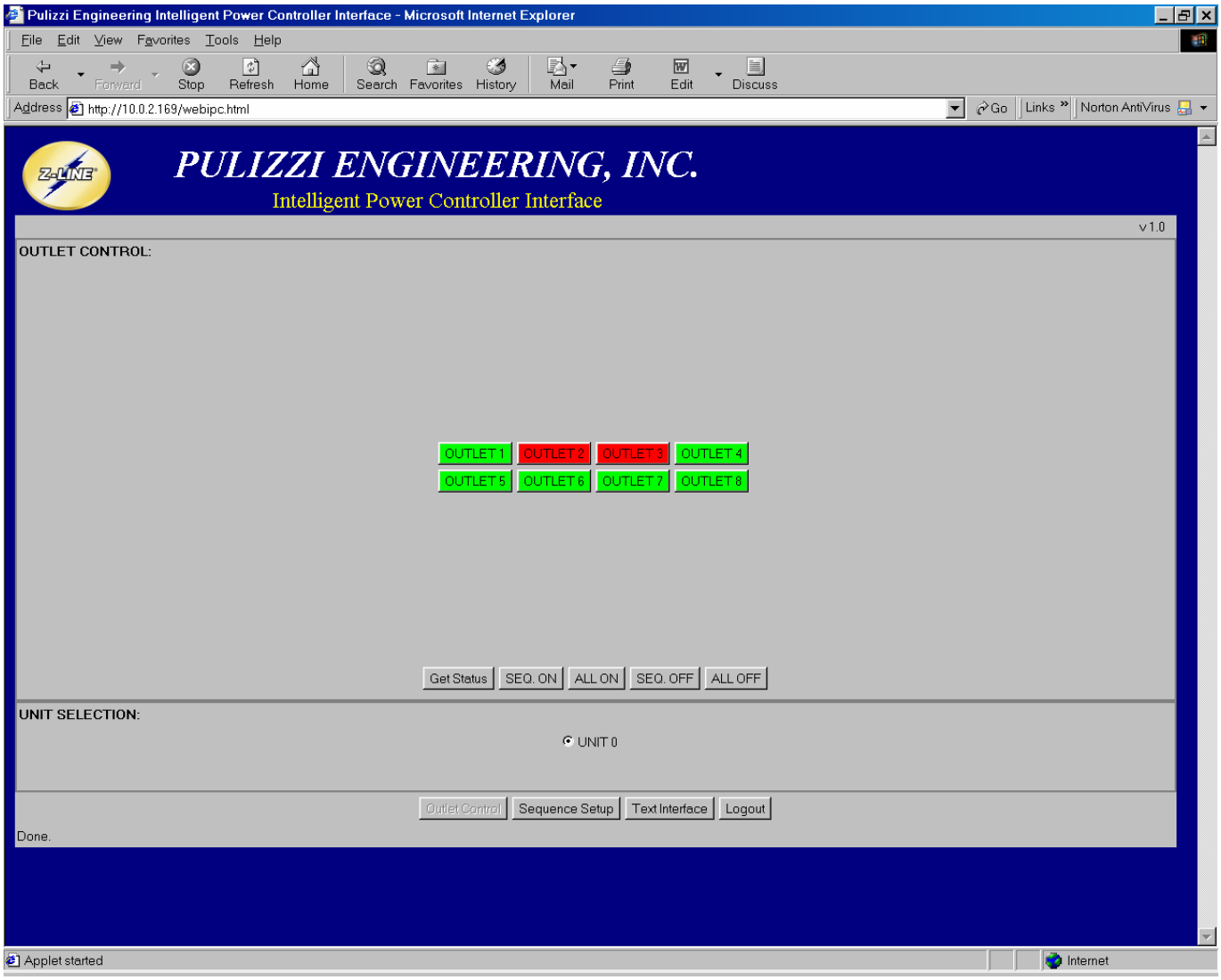
Commands must be entered in all capital letters. **<Enter>** is required after each command.
"xx" represents the outlet number "01" to "80", if no units are stacked, this is "01" to "08"
"n" represents the unit stack number "0" to "9", if no units are stacked, this number is "0"

Command	Description
A1n	Turns all outlets ON for any unit "n" in the stack
A0n	Turns all outlets OFF for any unit "n" in the stack
Nxx	Turn ON any outlet "xx" in the stack individually
Fxx	Turn OFF any outlet "xx" in the stack individually
S1n	Sequence all outlets in unit "n" ON with preset delays, lowest first
S0n	Sequence all outlets in unit "n" OFF with preset delays, highest first
ADn	Enter new IPC user name, any 4 characters
ISn ---------- P D	Set the power up/down sequence in unit "n". Unit will prompt for (P) Preset or (D) Default. This will determine how the unit powers up after a cycling the main power. Preset will allow you to enter the power up delay for each outlet, 000 will reset the outlet to the OFF position. E.g. enter 001 for a 1 second delay, 002 for a 2 second delay, etc. up to 999 seconds. Default will power outlets on in the same state they were before main power was removed.
DXn	Displays the outlet status (ON/OFF), watchdog status and remote status for unit "n" in the stack.
AEn ---------- Y N	Auto enable status update for unit "n" in the stack. Unit will prompt you for (Y) yes or (N) no. Yes - Unit will update status after each change. No - Unit will not update status automatically after each change.
WE0	Watchdog enable for unit "0" in the stack. This will turn on the watchdog feature, which will reboot unit "0" if no communication is detected with the IPC34xx for the preset time - see WT0 command.
WT0	Watchdog timeout sets the timeout period for unit "0" in the stack. Unit will prompt you for the time period. Enter a number "0" to "9". Each number represents 30 seconds. "0" is 30 seconds, "1" is 60 seconds, "2" is 90 seconds, up to "9" is 300 seconds. Unit will monitor the communications and will reset if no communication is detected within this set time period.
WD0	Watchdog disable for unit "0" in the stack. This will disable the watchdog feature.
PWn	This will turn on the password protection for unit "n" in the stack and will prompt the user for a 3 character password. Any 3 characters can be used.
PDn	This will disable the password protection for unit "n" in the stack.
SR0	System reboot for outlet J1 in unit "0" in the stack. This command will power off and on outlet J1 with a 5 second reboot period.
LO	Log out will end your session with the IPC34xx. This command must be entered twice to log off from more than one unit in the stack.
?	Display the command menu.

2.5 Web-Browser Controller Interface (Available on units after June 2002)

TCP/IP Configuration using a Web Browser:
IPC34XX units shipped after June 2002 come with web-browser access capability. To access the IPC34XX from your web browser software, e.g. Windows Explorer™ or Netscape™, in the URL entry box enter http://xxx.xxx.xxx.xxx/**index.html** (xxx.xxx.xxx.xxx represent the user's IP address). The Web Manager Page launches giving the user access to the setup configuration regarding the network connections of the IPC34XX. Unit Configuration, Server Properties, Port Properties, and Update Settings are the choices offered on this page.

Controlling the IPC34XX Outlets using a Web Browser:
IPC34XX units shipped after June 2002 come with web-browser access capability. To access the Intelligent Power Controller Interface (shown below, this page) from your web browser software, e.g. Windows Explorer™ or Netscape™, in the URL entry box enter http://xxx.xxx.xxx.xxx/**webipc.html**. After Pulizzi Engineering's IPC34XX Web Interface Page launches, enter your IPC Login: e.g. @@@@ , Port 23, check the stacked or un-stacked box based on your system setup, then click on Connect. After a brief initialization period, Pulizzi Engineering's IPC34XX Outlet Control Page (shown below, next page) will be displayed in the browser with self-explanatory radio buttons for outlet control. *** Password must be disabled in order to use the browser interface***



The above screen capture shows the control page on the browser interface. Click on the Outlet that you want to turn on or off and it will toggle the status. If the outlet is green it is on and red is off. The Get Status button will allow you to update the status of the outlets. This will allow you to check if the outlets have been turned on/off locally and it can also be used to verify power status. It is recommended that you Get Status any time an outlet appears not to toggle correctly. (The outlet may have changed state and the status change may not have been read correctly due to line noise.)

3.0 Programmers Guide (Scripting)

3.1 Introduction:

You can easily write programs and scripts to control the IPC34xx series using any language that supports serial and or TCP/IP communications. The IPC34xx series is very easy to create scripts for because of its DOS like interface. The unit responds to basic commands. Please refer to the command structure below.

3.2 Programming Overview:

Basic Program Flow:

Scripts communicating with the IPC34xx should follow this basic program flow.

1) Open communications to the unit (either serial or TCP/IP session)
2) Login to the IPC34xx
3) Send Commands / Requests to the IPC34xx
4) Log Off the IPC34xx
5) Close the communications

Step 1 – Opening communications:

- Open the communications (Serial or TCP/IP) using the correct protocol for the programming language you are using

Step 2 – Login to the IPC34xx

- Send the user name (@@@@ by default)
- Wait for a response containing “IPC ONLINE!”
- If a response is not received retry at least once before failing as there may have been characters left in the buffer from the last communications that were not cleared

Step 3 – Sending Commands

- Send the desired command from the table below
- Wait for a response from the command as shown in the table below

Step 4 – Log off the IPC34xx

- Send the command ‘LO’
- Wait for a response containing ‘LOGGED OFF’

Step 5 – Close Communications

- Close the communications (Serial or TCP/IP) using the correct protocol for the programming language you are using.

3.3 Communications Suggestions:

- Some versions of the IPC34xx code may send random character 0 (Null) in its response. Any null characters should be ignored
- The IPC34xx only requires character 13 (Return) at the end of a command. Any character 10 (Line Feed) will be ignored.
- If programming for multiple versions of firmware do not depend on counting lines or characters as this may vary from firmware to firmware version. Rather have the code look for a word in the response such as DONE from the IPC34xx.
- If an incorrect command is sent to the unit, the unit will simply not respond
- The IPC34xx does not echo back characters sent to it
- Give the IPC34xx at least .5 seconds to respond fully to a command request before retrying or returning a failure. If a command fails twice try logging on again (step 2)
- All commands are case sensitive

3.4 Commands / Response Table:

Commands must be entered in all capital letters. **<Enter>** is required after each command.
"**xx**" represents the outlet number "01" to "80", if no units are stacked, this is "01" to "08"
"**n**" represents the unit stack number "0" to "9", if no units are stacked, this number is "0"

Command	Description	Response
A1n	Turns all outlets ON for any unit "n" in the stack	See 1
A0n	Turns all outlets OFF for any unit "n" in the stack	See 1
Nxx	Turn ON any outlet "xx" in the stack individually	See 1
Fxx	Turn OFF any outlet "xx" in the stack individually	See 1
S1n	Sequence all outlets in unit "n" ON with preset delays, lowest first	See 1
S0n	Sequence all outlets in unit "n" OFF with preset delays, highest first	See 1
ISn	Set the outlet power on state for unit "n" in the stack. Options are (D) = Default or the state the outlets were in before power was removed (P) = Preset sequence. Preset will require the input in seconds for delay, 1 second = 001	See 10
ADn	Prompts for new IPC user name, any 4 characters	See 3
AEn	Auto enable status update for unit "n" in the stack. Unit will prompt you for (Y) yes or (N) no.	See 4
DXn	Displays the outlet status (ON/OFF), watchdog status and remote status for unit "n" in the stack.	See 2
WE0	Watchdog enable for unit "0" in the stack. This will turn on the watchdog feature, which will reboot unit "0" if no communication is detected with the IPC34xx for the preset time - see WT0 command.	DONE
WT0	Watchdog timeout sets the timeout period for unit "0" in the stack. Unit will prompt you for the time period. Enter a number "0" to "9". Each number represents 30 seconds. "0" is 30 seconds, "1" is 60 seconds, "2" is 90 seconds, and up to "9" is 300 seconds. Unit will monitor the communications and will reset if no communication is detected within this set time period.	See 5
WD0	Watchdog disable for unit "0" in the stack. This will disable the watchdog feature.	DONE
PWn	This will turn on the password protection for unit "n" in the stack and will prompt the user for a 3 character password. Any 3 characters can be used.	See 6
PDn	This will disable the password protection for unit "n" in the stack.	DONE
SR0	System reboot for outlet J1 in unit "0" in the stack. This command will power off and on outlet J1 with a 5 second reboot period.	See 7
LO	Log out will end your session with the IPC34xx. This command must be entered twice to log off from more than one unit in the stack.	LOGGED-OUT!
?	Display the command menu.	See 8
CNnx	Outlet name entry 8 characters where "n" is the unit number and "x" is the outlet of that unit **1	See 9
DNn	Displays the outlet status with outlet names (ON/OFF), watchdog status and remote status for unit "n" in the stack	See 2B

3.5 Detailed Responces:

The response examples below are taken from a unit with firmware V1.32 C

Response 1

The unit will respond back with the phrase DONE.

If *Auto Enabled Status Update* is enabled then the DONE response will be followed by a status **response 2B**

Response 2 – Outlet Status without Outlet Names

Below is an example of what a response may look like. Outlet ON/OFF Status will change as configured. This is compatible with units made prior to units with outlet naming capabilities.

```
OUTLET 1 ON ( UNIT#0 J1 )
OUTLET 2 OFF ( UNIT#0 J2 )
OUTLET 3 ON ( UNIT#0 J3 )
OUTLET 4 ON ( UNIT#0 J4 )
OUTLET 5 ON ( UNIT#0 J5 )
OUTLET 6 OFF ( UNIT#0 J6 )
OUTLET 7 OFF ( UNIT#0 J7 )
OUTLET 8 ON ( UNIT#0 J8 )
```

Response 2B– Outlet Status with outlet Names

Below is an example of what the response could look like. Outlet ON/Off status and names will change as configured.

```
OUTLET 1 ON ( UNIT#0 J1 )Web Serv
OUTLET 2 OFF ( UNIT#0 J2 )SQL Serv
OUTLET 3 ON ( UNIT#0 J3 )APP Serv
OUTLET 4 ON ( UNIT#0 J4 )FTP Serv
OUTLET 5 ON ( UNIT#0 J5 )Firewall
OUTLET 6 OFF ( UNIT#0 J6 )Modems
OUTLET 7 OFF ( UNIT#0 J7 )Aux 1
OUTLET 8 ON ( UNIT#0 J8 )Aux 2
```

Response 3 – New Unit Name

Below is an example, user input is in blue, unit response is in red

```
AD0

ENTER NEW USERNAME:DEMO

IPC DEMO
```

Response 4 – Auto Enable (Y/N)

Below is an example, user input is in blue, unit response is in red

```
AE0
```

```
AUTO EVENT? (Y/N): Y

DONE
```

Response 5 – Set Watch Dog Timer

Below is an example, user input is in blue, unit response is in red

```
WT0

TIME PERIOD?(0-9): 2

DONE
```

Response 6 – Set Password

Below is an example, user input is in blue, unit response is in red

```
PW0

ENTER NEW PASSWORD  UNIT#0:123
RE-ENTER NEW PASSWORD  UNIT#0:123

DONE
```

Response 7 – Set Password

Below is an example, user input is in blue, unit response is in red. After the response below if *Auto Enable Status Update* is enabled the unit will send the response 2B

```
SR0
DONE


OUTLET 1 OFF ( UNIT#0 J1 )Web Serv
OUTLET 2 OFF ( UNIT#0 J2 )SQL Serv
OUTLET 3 ON ( UNIT#0 J3 )APP Serv
OUTLET 4 ON ( UNIT#0 J4 )FTP Serv
OUTLET 5 ON ( UNIT#0 J5 )Firewall
OUTLET 6 OFF ( UNIT#0 J6 )Modems
OUTLET 7 OFF ( UNIT#0 J7 )Aux 1
OUTLET 8 ON ( UNIT#0 J8 )Aux 2

DONE
```

Response 8 – Help Menu

Below is an example, user input is in blue, unit response is in red. Please note the firmware Version and rev are on the first line of the help menu response. IE `Revision C. 1.32`

```
?

Pulizzi Engineering Stack Version IPC 3400 Revision C. 1.32 (c)2004
CAPS ONLY! xx=01-80   n=Unit #
 Unit #0 In Stack Is The MASTER of SLAVE Units 1-9
 @@@@| @@@@ Is The IPC Stack USERNAME/Enables All Units In Stack @@@@
  A1n| Turn All Outlets ON
  A0n| Turn All Outlets OFF
  Nxx| Turn ON Any Individual Outlet "xx" In Stack
  Fxx| Turn OFF Any Individual Outlet "xx" In Stack
  S1n| Sequence All Outlets In Unit-n ON With Preset Delays, Lowest First
  S0n| Sequence All Outlets In Unit-n OFF With Preset Delays, Highest First
  ADn| Enter New IPC UserName Any 4 New Characters (xxxx)
  ISn| Enter Power-ON Updown Sequence. IPC Will Ask For (P)RESET Or(D)EFAULT?
       (D)= Previous Setting, (P)= Enter New
  DXn| Display Outlet & Unit Status
  DNn| Display Outlet Status & CUSTOM NAMES
  AEn| Auto Status Update Enable (Y)/(N). If Y,Any Change In Status Updated Auto
  WE0| Watchdog Enable Unit #0 Only
  WT0| Watchdog Timeout Set. Enter Number 0-9 0=30s 1=60s...
  WD0| Watchdog Disable Unit #0 Only
  PW | Enter 3-Character Password Unit #0 ONLY
  PD | Password Disable
  SR0| OUTLET-1 Re-Boot 5 Sec. Unit #0 Only
 CNnx| OUTLET-NAME ENTRY 8-CHARS n-UNIT# x-OUTLET#
  LO | LOG-OUT
  ?  | Display Command Menu
```

Response 9 – Set/Change Outlet Name

Below is an example, user input is in blue, unit response is in red.

```
CN01
ENTER NEW OUTLET 1 NAME 8-CHARS MAX:Test1
DONE
```

Response 10 – Set outlet power on state / sequence

Below is an example, user input is in blue, unit response is in red. If you want an outlet to remain off you can do so by specifying a time of 000.

```
IS0
PRESET OR DEFAULT POWER ON SEQUENCE? (P/D): P
OUTLET 1: 001
OUTLET 2: 002
OUTLET 3: 003
OUTLET 4: 004
OUTLET 5: 005
OUTLET 6: 006
OUTLET 7: 007
OUTLET 8: 008
DONE
```

IE 2 Below is an example, user input is in blue, unit response is in red.

```
IS0
PRESET OR DEFAULT POWER ON SEQUENCE? (P/D): D
DONE
```

4.0 TROUBLESHOOTING

Serial Problems:

Problem	Suggestions
The IPC does not respond when I connect to it via the serial port Ethernet Strapping Switch  Strapping Ports DB9 Serial port	• Make sure your settings are correct: Baud=9600, Data Bits=8, Parity = None, Stop Bits = 1, Flow Control = None • Make sure you have a straight through cable (Null modem cables will not work). When you open the com port to the IPC, you should hear the unit click. • The unit will not prompt you for a user name or password you must type your user name ('@@@@' by default from the factory) and press 'Enter'. The unit should respond back IPC Online at this point (You may have to enter it twice). • It is recommended that you turn on Local Echo because the IPC will not echo back the charters that you type. • Make sure the strapping Selector switch on the back of the unit is set to 0 • If you have checked all of these things and the unit is still not responding you may have a bad cable. The red data light on the front of the IPC should blink briefly whenever you type a characters.

Telnet Problems:

Problem	Suggestions
I am having trouble assigning the unit an IP Address (unit does not respond to the ping command)	• The IP Address must be in the same class as the rest of your network. For example, if your computer has an IP address of 10.0.2.150, then your IPC unit must also have the same prefix of 10.0.2.xxx (where xxx is a free IP address on your system). • If you have a windows OS you may also download Device Installer from our website. See our tech support section on our website for the program and more instructions.
I have assigned the unit an IP Address but the unit does not respond in a telnet session.	• The unit will not prompt you for a user name, you must type the 4 character user name ('@@@@' by default) and press 'Enter' at which point the IPC will respond IPC Online! (You may have to enter it in twice). Turn on Local Echo as the IPC does not echo characters you type. Type a '?' and press ''Enter' for a list of commands. • Make sure your 'Caps Lock' is activated • Make sure the strapping selector switch on the rear of the unit is set to 0. • Make sure that you are not trying to connect to the unit through the serial port. You may only control the unit via serial or Ethernet (Serial takes priority over Ethernet). • Telnet to the unit on port 9999 and make sure that Channel 2 configuration is set to port 23 (if your unit only has Channel one make sure Channel 1 is set to 23) • If the unit still does not respond, check the connections. The data light should blink on the IPC when you send characters to the unit.

4.0 TROUBLESHOOTING (CONTINUED)

Web Browser Problems:

Problem	Suggestions
How do I use the web browser interface?	• Once you have setup your IPC direct your web browser to http://xxx.xxx.xxx.xxx/webipc.html where xxx.xxx.xxx.xxx is the IP address you assigned to the unit. Login to the ipc with your user name ('@@@@' factory default) and port number (23) (factory default). Do not click the stacked button unless you have multiple IPC unit chained together. • You must use **Internet Explorer 4.0 or Netscape 7.0 or newer**. This interface may not work correctly on any other browsers. • You must have the latest version of Java (Available from www.java.com)
You receive the error message "Connection refused – another use may be connected"	• Make sure that you are not logged on through a telnet or serial session (only one interface may be used at a time). • Make sure your setup is correct and you can telnet to port 23 (see Telnet Troubleshooting above).
You receive an error that the page cannot be displayed	• Make sure you typed in the correct IP Address • Verify that setup is correct by trying to telnet to the unit (See Telnet Troubleshooting above)

Strapping Problems:

Problem	Suggestions
How do I connect (strap) units together?	• You can connect up to ten units together using standard Cat5 jumper cables. Simply connect the 'OUT' connector of an IPC to the 'IN' of the next IPC. • Each unit MUST have its strapping switch set to a unique number. Having multiple units on the stack with the same 'Strapping Select' number will cause many communication problems. • All units must have the same log-in ('@@@@') by default from the factory. If any unit has a different name you will not be able to communicate with that unit. • Connect only the head unit (0) to the control source (Ethernet, or serial). The other units should only be connected through the daisy-chained ports.
I am able to connect to unit 0, but I'm not able to get any of the other units to respond	• You may have the wrong type of cable between the units. You can check this by making sure that the data light on all of the units flash when sending commands.

Are you unable to solve your problem?

If you are unable to get the units to work, don't hesitate to give us a call or send us an E-Mail at Sales@Pulizzi.com. We are happy to help you solve any problems you have with your unit. Our office is open M-F 8:00AM – 5:00PM Central time.

5. TERMS AND CONDITIONS

1. **CHANGES:** Pulizzi Engineering, Inc. (PEI) reserves the right to make specifications and price changes on standard catalog items, without prior notice. Please consult the factory for current product and price information.
2. **PRICING**
   A. Quotations are firm for a period of thirty (30) days unless otherwise specified.
   B. Prices will remain firm for all scheduled releases. Unscheduled releases may be subject to pricing

changes.

C. Pulizzi Engineering does not "discount back" product already shipped when purchase order quantities are increased.

D. A "bill-back" will apply on product previously shipped, if committed quantities are not shipped during the period of the contract, or purchase order. The amount billed will be equal to the difference in discount between the actual quantity shipped and that quantity to which the contract/order was committed.

E. Pulizzi Engineering, Inc. reserves the right to enforce a $50.00 minimum on all orders.

3. **SHIPMENT SCHEDULE:** Change Orders, defined as increases, decreases or reschedule requests pertaining either the ship date or quantity, require a written thirty (30) day notice, prior to the confirmed scheduled ship date for standard catalog items. Custom item rescheduling periods vary by model. Please consult the factory. There is a $50.00 per purchase order change required on the updated purchase order.

4. **DELIVERY:** Delivery will be FOB ORIGIN (PEI plant Santa Ana, CA). Purchaser will be responsible for all subsequent charges. All shipments are to be made FREIGHT COLLECT on client specified carrier and account number. If requested and stated on clients purchase order, freight can be prepaid and added to invoice with prior approval from Pulizzi Engineering. Purchase order must also state the carrier to be used. Pulizzi Engineering, Inc. will ship uninsured. Purchaser hereby grants Pulizzi Engineering a security interest in the products and in any proceeds (including accounts receivable) as security for its obligations hereunder, and will execute any documents required to protect this security interest.

5. **DAMAGED SHIPMENTS:** All outgoing shipments are FOB ORIGIN (PEI plant Santa Ana, CA). Therefore. all damage claims must be collected by the consignee. Do not return damaged merchandise prior to establishing a claim. If damage is suspected, notify delivery carrier immediately. It is necessary to have the entire shipment inspected by carrier, regardless of the condition of containers. When a claim has been established and a RMA is granted, the damaged material may be returned for repair or replacement. Invoice for repair charges may then be collected by the customer from the carrier. **DO NOT** DESTROY PACKING MATERIAL OR BOXES UNTIL CARRIER'S AGENT HAS EXAMINED THEM.

6. **CANCELLATION:** All orders are subject to cancellation charges and/or restocking fees. All applicable partial Non-Recurring Engineering (NRE) fees and/or set up fees will be invoiced and are payable in full upon order cancellation. Special orders for items and/or quantities not normally stocked are non-cancelable and non-returnable.

7. **PAYMENT:** Terms are Net thirty (30) days from invoice date for U.S. operating companies only, on approved credit, unless otherwise stated. All others shall be via money wire transfer prior to shipment. Accounts are reviewed periodically and terms are subject to change as a result of this review, without notice.

8. **TAXES:** Prices are exclusive of, and purchaser is responsible for, all sales, use and like taxes.

9. **WARRANTY**

A. Products are warranted against defects in workmanship and materials for a period of one (1) year from the date of shipment. Extended warranties are available, at time of purchase only, at the rate of 15% of the product price per each additional 12 month period.

B. Pulizzi Engineering's sole responsibility under this warranty shall be to either repair or replace, at its option, any component which fails during the applicable warranty period. A failure shall only be due to faulty workmanship or material, or both.

C. Exclusions:

1. Metal Oxide Varistors (MOV's) are protection devices which are intended to self-destruct in cases of **extreme** voltage spikes or surges, and repairs relative to these devices are not covered under this warranty.
2. External physical damage (not shipping related) to any units **NOT** reported within thirty (30) days of receipt of the product.
3. Shipping damage (See FOB under [4] **DELIVERY** and [5] **DAMAGED SHIPMENTS**.).
4. Test failure for tests not authorized by Pulizzi Engineering. Test procedures are available upon request.

D. Pulizzi Engineering will honor the warranty at a Pulizzi Engineering repair facility in the United States as specified by Pulizzi Engineering, provided all procedures are followed. Purchaser will return units(s) at its own expense and only with prior authorization from the factory. Instructions will be given by an authorized factory representative at the time an inquiry is made. Transportation charges will be paid by Pulizzi Engineering to all US destinations (including Alaska and Hawaii) via surface freight or other method (excluding Air Freight). Expedite delivery charges are to be paid by the customer.

E. If Pulizzi Engineering determines that units returned are not defective under the terms of the warranty, customer will be responsible for all evaluation, test, repair and handling charges or $90.00, whichever is greater, as well as all incoming and outgoing freight charges.

F. EXCEPT FOR THE EXPRESS WARRANTIES STATED HEREIN, PULIZZI ENGINEERING DISCLAIMS ALL WARRANTIES ON PRODUCTS FURNISHED HEREUNDER, INCLUDING, WITHOUT LIMITATION,

ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS; and the stated express warranties are in lieu of all obligations or liabilities connected with the performance of the products.

10. **RETURN MATERIAL AUTHORIZATION (RMA) POLICY:** In order to return material to the manufacturer, a Return Material Authorization (RMA) number is required as well as a customer assigned purchase order number in order to cover the costs of the RMA. This PO shall authorize either: (A) $90.00 per unit fee for no trouble found (NTF) on warranty units or (B) 50% of the purchase price or $125.00 which ever is greater, for repair of non-warranty units. If the repair cost turns out to be greater than this estimate, customer will be notified prior to repairing unit. Otherwise, customer will be billed actual repair cost, not exceeding item (B) above. The RMA number must appear on all shipping labels and packing slips. Failure to do so will result in refusal of shipment. A written description of the fault is also required. The more detailed the failure description, the faster the repair and return will be. Please refer to the **WARRANTY** section **D** for shipping procedures. Shipments sent "FREIGHT COLLECT" will be refused. NOTE: Every effort will be made to correct problems over the phone before a RMA is issued. RMA numbers are good for 30 days only. If shipment is not received by Pulizzi Engineering, Inc. within 30 days of issue, please call for a new RMA number if still required.
11. **EVALUATION UNITS:** All Test and Evaluation units will be invoiced like a normal shipment, except the terms will be Net sixty (60) days. If the unit is returned within the thirty (30) day test and evaluation period, and is received in a "like new" condition, in the original packaging, a full credit, minus the shipping charges and a $75.00 restocking fee, will be applied to the customer's account. The customer is responsible for **ALL** shipping cost.
12. **EXPORT:** Regardless of any disclosure made by Purchaser to Pulizzi Engineering, Inc., of an ultimate destination of the products, purchaser will not export, either directly or indirectly, any products or systems incorporating such product without obtaining a license from the United States government, as required.
13. **GENERAL PROVISIONS:** In the act of accepting a purchaser's order, Pulizzi Engineering will form an agreement subject only to these TERMS and CONDITIONS. These TERMS and CONDITIONS will supersede any previous communications, representations, or agreements by either party whether verbal or written, including any Terms and Conditions on Purchaser's order. Any modification to these TERMS and CONDITIONS must be in writing and signed by authorized representatives of Pulizzi Engineering, Inc. and Purchaser. This agreement is governed by and construed under the laws of the State of California.
14. **PROPRIETARY DESIGN:** Pulizzi Engineering, Inc. reserves all patent, copyright, proprietary design, manufacturing, reproduction, and sale rights to all products that the company manufactures. The copying of any products or documents without the written consent of Pulizzi Engineering, Inc. is a violation of federal and state laws
liabilities connected with the performance of the products.
15. **EXCUSABLE DELAY:**
A mutually agreed-upon delivery date extension shall be negotiated in the event of any delay in the delivery of the products services by Pulizzi Engineering, Inc. which is caused by, but not limited to, earthquake, acts or omissions of the buyer, riot, acts of God, civil strike, unsuitable weather, labor dispute, transportation delays, energy shortage, government or military authorities or any event beyond the reasonable control of Pulizzi Engineering, Inc.