



PRELIMINARY INFORMATION

PF8IDI OPERATION GUIDE

RS485/RS232 SERIAL ISOLATED DIGITAL INPUT BOARD

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Hardware Version PF8IDI Rev. A)

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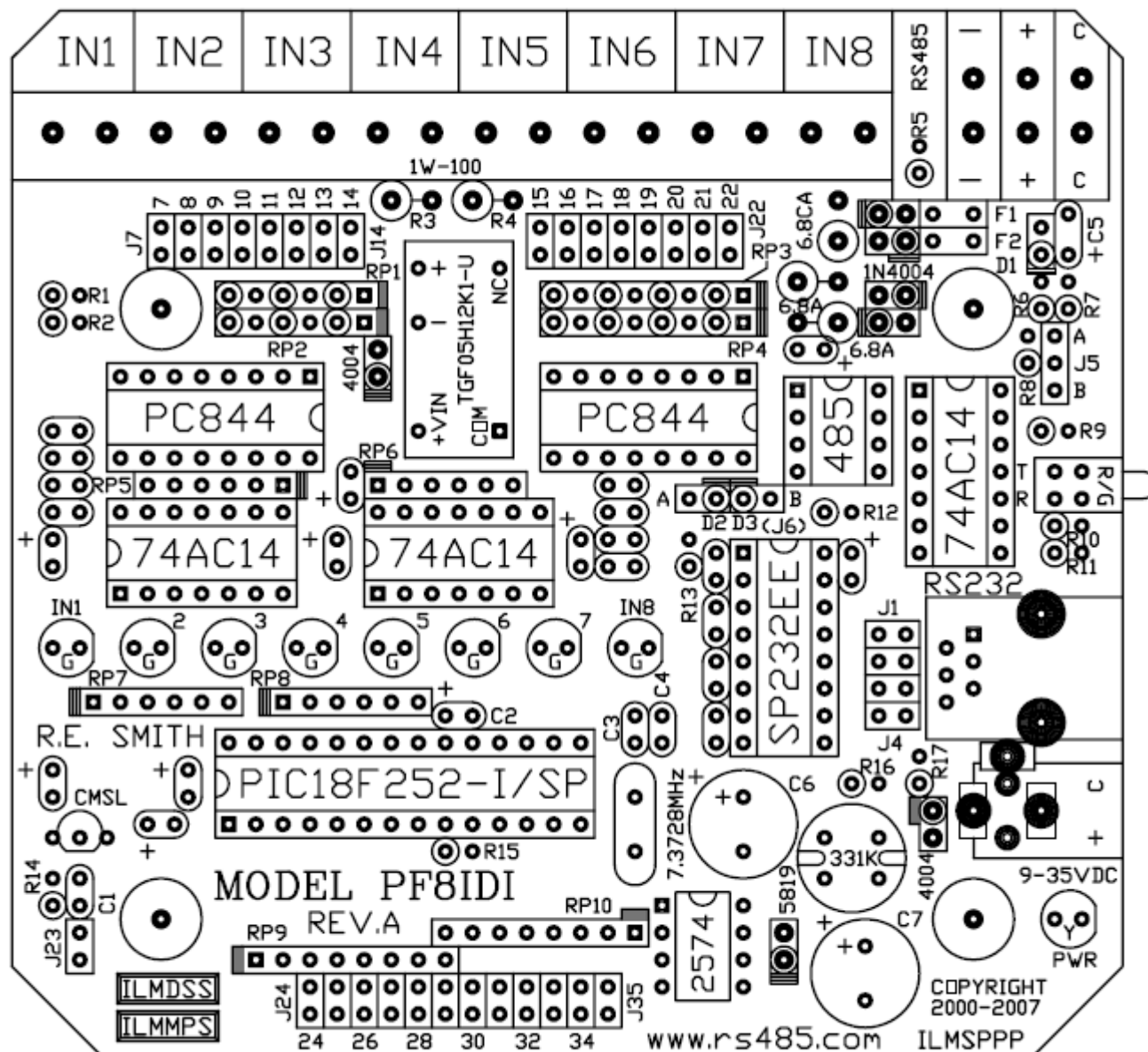
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INTRODUCTION

The PF8IDI Isolated Digital Input board has 8 isolated digital inputs that can be individually configured for AC or DC operation. The unit can be controlled by our simple/efficient command structure from a host computer (computer mode), such as a PC with standard firmware. The unit can communicate using RS485 or RS232, at data rates up to 115.2K bits/second. The PF-series devices have a unique feature being field upgradeable to new or custom versions of firmware while installed in a network.

The PF8IDI has an on board switching regulator for 9-35VDC (<2W) operation, LED indicators monitor data flow of the serial port and digital input status. 12 jumpers for communications address, Baud rate, mode control, etc.

The PF8IDI also has an on board isolated switching regulator for 12VDC operation that by factory default is configured to provide power for the bussed dry closure input setting.



R.E.SMITH COMMAND SUMMARY

All commands begin with the command start character '*' next is a three character op-code followed by the parameter list encased in parentheses. The first parameter will always be the unit address, which for this unit is configured via jumpers J28-J35.

Note: Commands listed below assume the board address is set to 0FH or J32-J35 installed.

Get I/O Status Command = *GET (0FH)

Get I/O Status command

This command will read the state of the inputs and outputs of the device.

*GET(0FH) returns GUNIT(0FH,I,O,J)-00XX₁₆-0000-0000#

Where XX₁₆ is a 2 digit hexadecimal encoded state of the 8 digital inputs.

I/O Read Command = *IOR(0FH)

This command reads the I/O status returning the inputs and outputs in a ASCII hexadecimal formatted string.

Example: *IOR(0FH) returns IOREAD(0FH,I,O)-00XX₁₆-0000#

Where XX₁₆ = Hex encoded state of the digital inputs

Locate Unit Command = *LOC(0FH)

LUNIT(0FH)-XXXX#<CR><LF> XXXX=FLAGS

The Locate command returns any flags which might be defined, currently the PF8IDI has no defined flags. This command is useful to scan a network to determine units present.

Version Command = *VER (0FH)

Get Version String Command

This command will return the software version string of the device.

FORMAT: *VER(0FH) returns VER-1.0A-20070421#

Reset Command - *RST(0FH)

This command forces a soft reboot of the processor.

Hardware Type Command = *TYP(0FH)

This command returns the board type identification string.

USER CONFIGURABLE OPTION COMMANDS

Read Options Settings Command = *OPT(0FH,READ)

This command reads the internal non-volatile option settings. The following output represents the boards response to this command, throughout the examples the three character parameter **0FH** is used, this is the hexadecimal encoded unit address value set on jumpers J28-J35 the possible range of unit addresses is between 00H and FFH hexadecimal, the character **H** in the address is required in all commands. Example, the address formed by J28-J34 removed and J35 installed would be represented by **01H**, leading zero is required.

```
OPTIONS-0FH,  
INDB-INPUT DEBOUNCE=50mS  
BSWAP-INPUT BITSWAP MSB=IN1  
TXIN-TX STATUS OF INPUTS=DISABLED  
EVNT-EVENT MODE=N  
AUTO-EVENT MODE AUTO SEND TIME=5S  
TDLY-TX DELAY=1 (*250uS) #
```

Input Debounce Setup Command = *OPT(0FH, INDB=dddd)

This command configures a user defined input debounce value in milliseconds. The maximum allowable value for this setting is 4000 or 4 seconds. The factory default value is 50 milliseconds.

Bit Ordering Setup Command = *OPT(0FH, BSWAP=Y|N)

This command sets the input bit ordering effectively assigning the most significant bit to either input IN1 or input IN8. The factory default is not to swap the bits which sets input IN1 as the most significant bit of the value read with the GET or IOR commands.

Stand-Alone (“Extension Cord”) Enable Command = *OPT(0FH, TXIN=Y|N)

This command enables or disables a special standalone or relay extension mode. When the TXIN command is enabled by setting TXIN=Y, using one PF8IDI unit and one PF8R unit connected via a serial link, all input changes that satisfy the input debounce value are reflected on the PF8R output relays.

Event Driven Operation Enable Command = *OPT(0FH, EVNT=Y|N)

This command enables or disables the event mode. The event mode is a mode of operation which the unit can generate up to three different types of event messages, the initial power on message, the periodic timed input report, and input change report.

The power on message is transmitted on power up over the serial link in the form “PWR-UP<cr><lf>”, where <cr> and <lf> are the two ASCII characters carriage return and linefeed.

The periodic timed input report is discussed below under the command *OPT(0FH,AUTO=dddd).

The input change report is transmitted any time the event mode is enabled and one or more inputs change state. The format of this message is “E-IN=XX<cr><lf>”, where XX is the ASCII hexadecimal encoded logical or’ed value of the inputs where IN1 = 80H, IN2 = 40H, ... IN8 = 01H. Therefore if input IN2 is asserted along with IN8 the input report would show a value of 41H.

Event Mode Auto Transmit Input Status Setup Command = *OPT(0FH, AUTO=dddd)

The periodic timed input report is enabled or disabled depending on the value of “dddd_{decimal}” in the option command *OPT(0FH,AUTO=dddd_{decimal}) where “0F” is the unit address set on jumpers J28-J35 and “dddd_{decimal}” is a decimal number of seconds(0-9999) between reports. Setting Auto=0 or EVNT=N disables the report.

The format of the periodic timed input report is “T-IN-XX<cr><lf>” where XX is the ASCII hexadecimal encoded logical or’ed value of the inputs where IN1 = 80H, IN2 = 40H, ... IN8 = 01H. Therefore if input IN2 is asserted along with IN8 the input report would show a value of 41H.

Response Transmission Start Delay Command = *OPT(0FH, TDLY=ddd)

This command configures a user defined transmit delay value in 250 millisecond increments. This value is useful in RS485 networks to add a small delay between the command and command response from the unit. Valid range for this item include ddd_{decimal}= 1 to 255.

Restore Factory Defaults Command = *OPT(0FH, RFDS=Y)

This command forces the user configurable settings to factory default values.

AUTO = 0	- Event mode auto transmit disabled
BSWAP = N	- <i>INPUT IN1 is MSB</i>
INDB = 50	- Input debounce 50 milliseconds
EVNT = N	- Event mode is disabled
TDLY = 1*250us	- Response transmission delay for RS485 250us
TXIN = N	- Standalone mode between PF8R and PF8IDI disabled

Jumper Configuration Table

Notes and abbreviations:

I = Install jumper (JX), **R** = Remove Jumper (JX), **XX** = don't care,

M/S = Master or Slave Mode, **M** = Master Mode, **S** = Slave Mode,

TX = Transmit, **RX** = Receive, * = Factory Default Setting,

HW = Hardware Setup, **SW** = Software Setup.

Table 1: RS232/RS485 Configuration Jumpers

JX	MODE	JUMPER FUNCTION AND NOTES				
J1-4	HW	J1	J2	J3	J4	RS-232 Port Configuration
		I*	I*	R	R	Computer Mode
		R	R	I	I	Modem Mode
J5	HW	120 ohm termination resistor, A -position termination enabled, B -position termination disabled, factory default setting (B)				
J6		Reserved				
J7-J22	SW	Digital Input Configuration See Figure 1&2				
J23	HW	Ground mounting post if installed				
J24-J27	SW	Baud Rate Selection Jumpers See Table 2				
J28-J35	SW	External Address (J28-msb : J35-lsb)				

MODEL PF8IDI—IDI REV. A

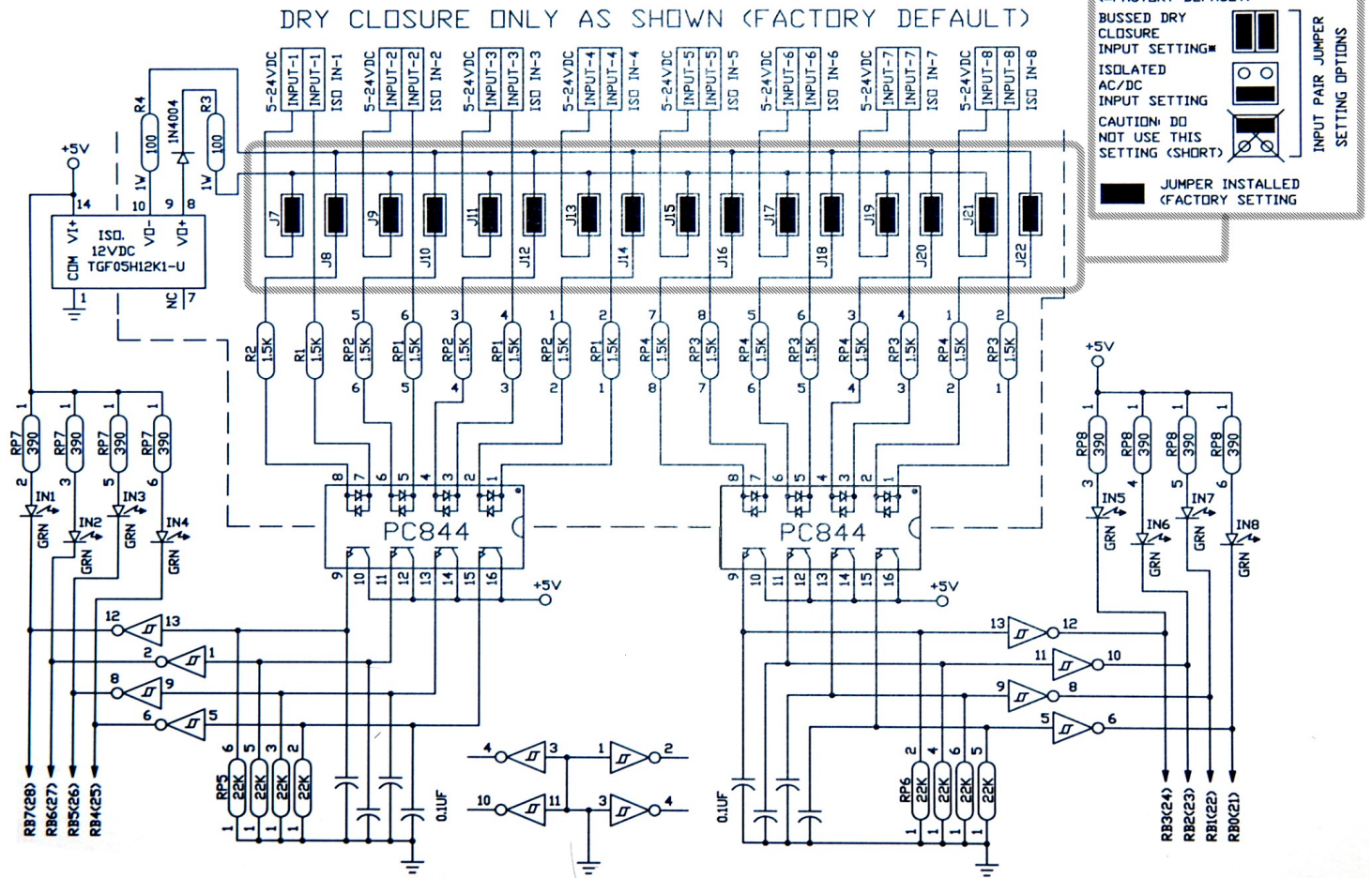


Figure 2. PF8IDI INPUT CONFIGURATION JUMPERS

User Selectable Jumper Settings

UNIT ADDRESS

The R.E.Smith Commands require an address which can be set on jumpers J28-J35. The address can be set to 256 values by either installing or removing jumpers from the range J28-J35. The address value is calculated by the following weighting of the jumpers, J28 installed equals +128, J29 installed equals +64, J30 installed equals +32, J31 installed equals +16, J32 installed equals +8, J33 installed equals +4, J34 installed equals +2, and J35 installed equals +1

To set the board address to 0Fhex which equals 15 decimal, install J7⁺⁸, J8⁺⁴, J9⁺², and J10⁺¹.

Examples

Address (0Fh) = J28-J31 removed and J32-J35 installed

Address (09h) = J28-J31, J33-J34 removed and J32+J35 installed

Address (01h) = J28-J34 removed and J35 installed

Address (00h) = J28-J35 removed

BAUD RATE

The PF8IDI baud rate can be set to several different settings using JP24 - JP27. The operating serial communications specification is N,8,1 or N-no parity, 8-8 bit characters, 1-1 stop bit.

Custom software can be built to utilize alternative communications specifications.

Table 2: RS-232 BAUD RATE SETUP

Baud Rate Selection in any MODE (J20 – J23) Note: Sampled on power-up only!					
HEX	J24	J25	J26	J27	Baud
F	I*	I*	I*	I*	9600
E	I	I	I	R	115.2K
D	I	I	R	I	9600
C	I	I	R	R	57.6K
B	I	R	I	I	38.4K
A	I	R	I	R	28.8K
9	I	R	R	I	19.2K
8	I	R	R	R	14.4K
7	R	I	I	I	9600
6	R	I	I	R	4800
5	R	I	R	I	2400
4	R	I	R	R	9600
3	R	R	I	I	9600
2	R	R	I	R	9600
1	R	R	R	I	9600
0	R	R	R	R	9600

Table 3: SPECIFICATIONS FOR COMMON COMMUNICATIONS STANDARDS:

SPECIFICATIONS		RS232	RS423	RS422	RS485
Mode of Operation		SINGLE-ENDED	SINGLE-ENDED	DIFFERENTIAL	DIFFERENTIAL
Total Number of Drivers and Receivers on One Line		1 DRIVER 1 RECVR	1 DRIVER 1 RECVR	10 DRIVER 10 RECVR	32 DRIVER 32 RECVR
Maximum Cable Length		50 FT.	4000 FT.	4000 FT.	4000 FT.
Maximum Data Rate		20kb/s	100kb/s	10Mb/s	10Mb/s
Maximum Driver Output Voltage		±25V	±6V	-0.25V to +6V	-7V to +12V
Driver Output Signal Level (Loaded Min.), (Unloaded Max.)	Loaded	±5V to ±15V	±3.6V	±2.0V	±1.5V
	Unloaded	±25V	±6V	+/-6V	±6V
Driver Load Impedance (Ohms)		3k to 7k	>=450	100	54
Max. Driver Output Current in High Impedance State	Power On	N/A	N/A	N/A	±100uA
	Power Off	±6mA @ ±2v	±100uA	±100uA	±100uA
Slew Rate (Max.)		30V/uS	Adjustable	N/A	N/A
Receiver Input Voltage Range		±15V	±12V	-10V to +10V	-7V to +12V
Receiver Input Sensitivity		±3V	±200mV	±200mV	±200mV
Receiver Input Resistance (Ohms)		3k to 7k	4k min.	4k min.	>=12k