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PRELIMINARY INFORMATION

PF8R OPERATION GUIDE
PF8R RS485/RS232 SERIAL REMOTE RELAY BOARD
(Software Version 1.5A, April 1, 2006)

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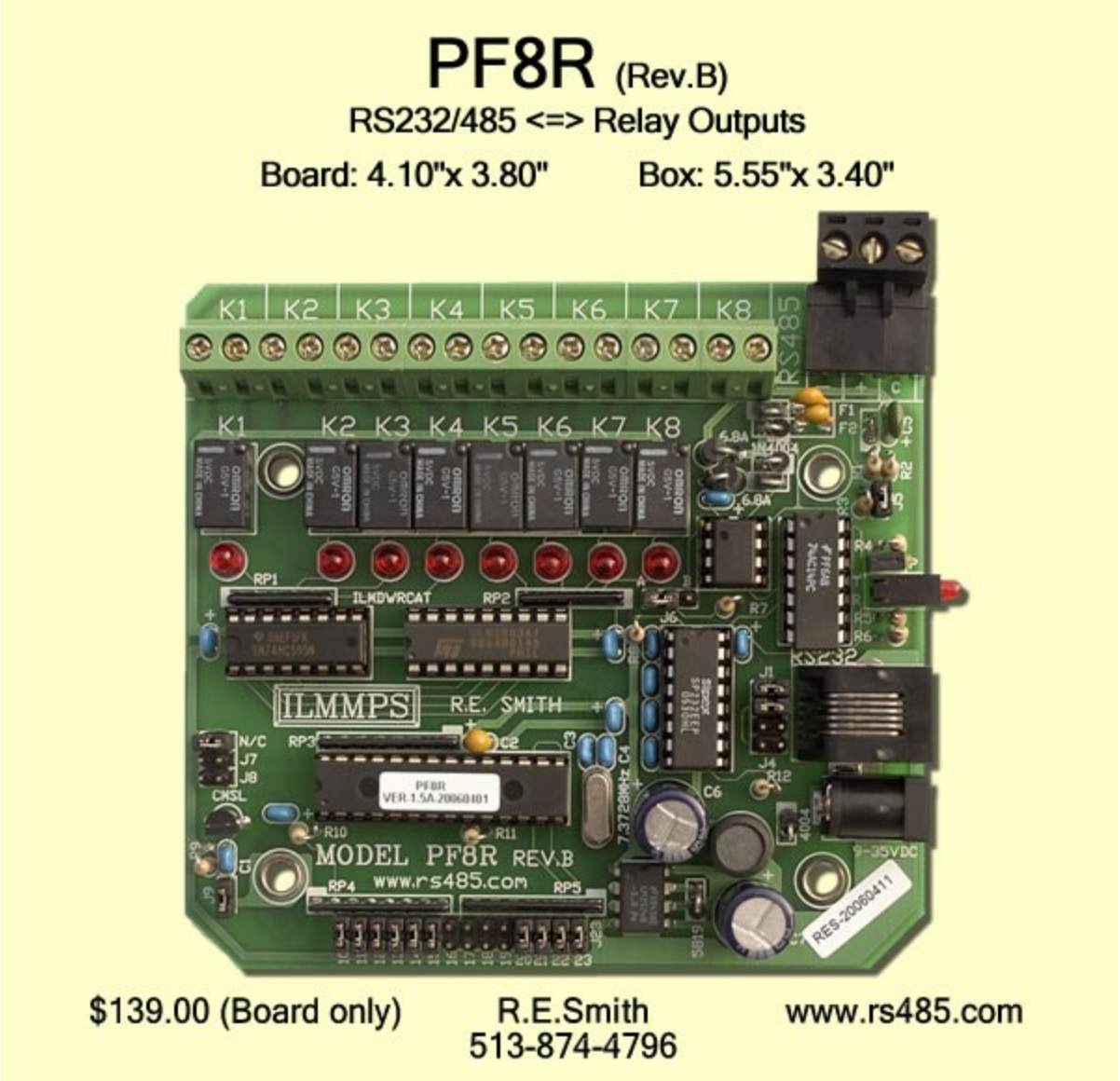
INTRODUCTION

The PF8R Remote Relay Board has 8 relay outputs. 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 upgraded to new or custom versions of firmware while installed in a network.

The PF8R has an on board switching regulator for 9-35VDC (7.5W) operation, LED indicators monitor data flow of the serial port and relay status. 22 jumpers for communications address, Baud rate, mode control, etc.

Figure 1. PF8R



COMMAND STRUCTURE

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 settable to 00H through FFH using jumpers J16(msb)-J23(lsb).

USER COMMANDS

Important Note! Table below assumes the address set on J16(msb)-J23(lsb) is set to 0FH or J20,J21,J22, and J23 installed. Also, in the table any variable input is shown in lowercase, the user would provide uppercase hexadecimal encoded characters in place of the lowercase input.

Table 1: USER COMMANDS

COMMAND FORMAT	*RESPONSE FORMAT*	*DESCRIPTION / NOTES*
***LOC(0FH)**	LUNIT(0FH,F)-0000#	LOCATE COMMAND (0FH – UNIT ADDRESS SET WITH J16-J23). RETURNS PF8R FLAGS CURRENTLY RETURNS 0000, RESERVED FOR FUTURE DEVELOPMENT
***GET(0FH)**	GUNIT(0FH,I,O,J)-0000-00XX-0000#	GET I/O STATUS (I,O,J)-INPUTS,OUTPUTS,JUMPERS. XX – HEX ENCODED STATUS OF THE 8 RELAYS
***KXX(0FH,AAH,mmH)**	KSTAT-00XX#	mm – HEX ENCODED MASK OF DESIRED OUTPUT CONFIGURATION, RELAYS ARE ACTIVATED/DEACTIVATED UNTIL COMMANDED OTHERWISE. XX – HEX ENCODED STATUS OF THE 8 RELAYS AFTER COMMAND EXECUTION
***KXX(0FH,kkH,ttttH)**	KSTAT-00XX#	RELAY NUMBER kk=01..08 IS ACTIVATED FOR HEX ENCODED TIME (tttt) * 100MS PER COUNT
***KAT(0FH,mmH,ttttH)**	KSTAT-00XX#	ALL RELAYS TIMED COMMAND WITH MASK, 8 BIT ASCII HEX MASK mmH IS USED 1 BIT PER RELAY K8(msb)-K1(lsb) TO ACTIVATE WHEN BIT IS 1 FOR THE HEX ENCODED TIME (tttt) * 100MS PER COUNT, WHEN THE MASK BIT ASSOCIATED WITH RELAY IS ZERO THE RELAY TIMER IS CLEARED AND THE RELAY IS DEACTIVATED.
***KAX(0FH,mmH,ttttH)**	KSTAT-00XX#	ALL RELAYS TIMED COMMAND WITH MASK, 8 BIT ASCII HEX MASK mmH IS USED 1 BIT PER RELAY K8(msb)-K1(lsb) TO ACTIVATE WHEN BIT IS 1 FOR THE HEX ENCODED TIME (tttt) * 100MS PER COUNT, WHEN THE MASK IS ZERO THE ASSOCIATED RELAY IS UNAFFECTED.

Table 2: USER COMMANDS (CONTINUED)

COMMAND FORMAT	*RESPONSE FORMAT*	*DESCRIPTION / NOTES*
***IOR(0FH)**	IOREAD(0FH,I,O)-0000-00XX#	READ THE INPUT/OUTPUT STATUS, XX HEX ENCODED STATUS OF THE 8 RELAYS K1-K8
***OPT(0FH)**	OPTIONS-0FH TDLY-TX DELAY=dddd (*500uS)	READ THE USER CONFIGURABLE OPTIONS
***OPT(0FH,TDLY=dd)**	OPTIONS(0FH,TRANSMIT DELAY=dd)#	FOR RS485 A MINIMUM DELAY OF DECIMAL 0-255 (*500uS) BEFORE THE COMMAND RESPONSE IS TRANSMITTED
***VER(0FH)**	VER-1.5A-20060401#	RETURNS THE FIRMWARE VERSION STRING
***TYP(0FH)**	TYPE-PF8R-REV-B#	RETURNS THE UNIT TYPE STRING
***TST(0FH)**	0000-00XX-0000-0000#	TEST COMMAND RETURNS THE STATE OF THE OUTPUTS XX ASCII HEX ENCODED VALUE. OTHER VALUES ARE DONT CARE FOR THIS PRODUCT.
***TMR(0FH)**	TIMERS(0FH, 1:XXXX 2:XXXX 3:XXXX 4:XXXX 5:XXXX 6:XXXX 7:XXXX 8:XXXX	RETURNS THE CURRENT COUNT IN A HEX ENCODED STRING FOR ALL 8 TIMERS CONTROLLING THE 8 RELAYS

CONFIGURATION TABLES

Notes and abbreviations:
I = Install jumper (JX), **R** = Remove Jumper (JX),
TX = Transmit**, RX** = Receive**, *** = Factory Default Setting,
HW = Hardware Setup, **SW** = Software Setup.

Table 3: RS232/RS485 CONFIGURATION

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	RS485 Speed up install for baud rates above 38400				
J6	HW	A – RS-232, B* – RS-485				
J7	HW	Special binary relay control function[*1] enabled if installed.				
J8	HW	Reserved				
J9	HW	Ground mounting post if installed				
J10	SW	Monitor Mode if removed, if removed on power up baud is fixed to 9600 otherwise baud is jumper selected.				
J11-J14	SW	Baud Rate Selection Jumpers See Table 2.				
J15	HW	Reserved				
J16-J23	SW	External Address (J16-msb : J23-lsb)				

[*1] – If enabled, with J7 installed, sending the 8bit binary code equal to 2^{n-1} enables relay K_n for 5 seconds. If before 5 seconds the unit receives the 8bit binary code equal to 2^{n-1} the time is reset to 5 seconds for relay K_n to be enabled. Example: Send binary 01 activates relay K1, send binary 128 activates relay K8, etc. Note this mode disables all commands of the normal command structure, to re-flash new firmware the jumper on J7 must be removed prior to re-flashing.

Table 4: RS-232 BAUD RATE SETUP

Baud Rate Selection in any MODE (J11 – J14) Note: Sampled on power-up only!					
HEX	**J11**	**J12**	**J13**	**J14**	**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

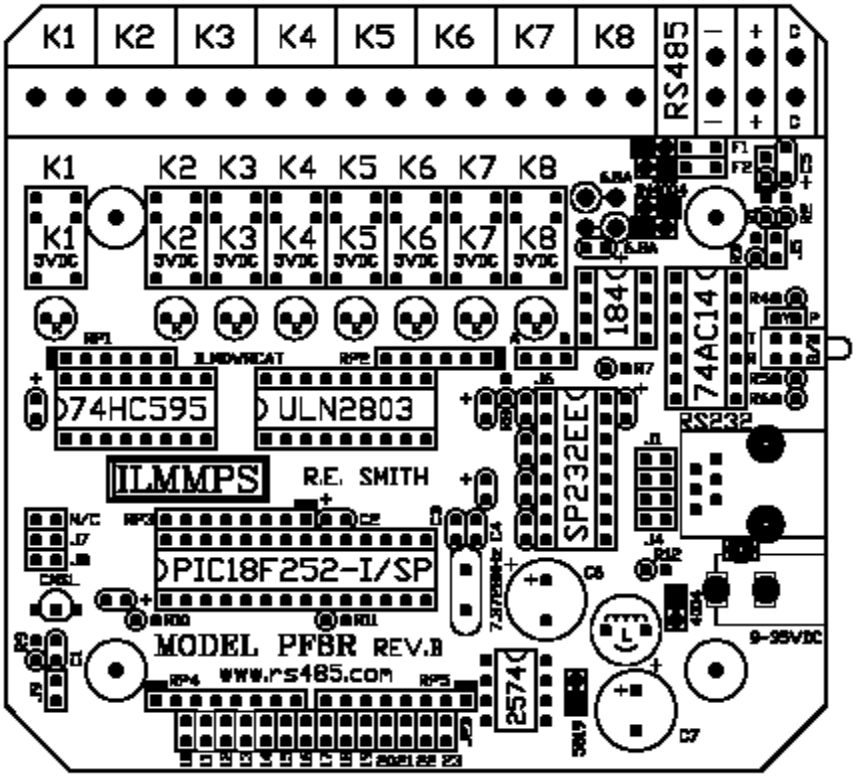


Figure 2: COMPONENT SCREEN

Table 5: TABLE OF SPECIFICATIONS FOR COMMON COMMUNICATIONS STANDARDS

SPECIFICATIONS		RS232	RS423	RS422	RS485
Mode of Operation		SINGLE-ENDED	SINGLE-ENDED	DIFFER-ENTIAL	DIFFER-ENTIAL
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