TMR1F

(FLEX^{TM} TELEMETRY MESSAGING RECEIVER)

USER GUIDE AND

EVALUATION KIT MANUAL

TABLE OF CONTENTS:

1 TMR1F Product Features

1.1 Product Description

The TMR1F is able to receive alphanumeric messages and send via the RS232 serial output to any industrial standard display device. The RS232 port speed of 2400/4800/9600/19200 baud rate with even/odd/none parity option can be set through the TPS.

TMR1F supports both numeric and alphanumeric vector. However, there are some constraints in using numeric vector to send the control codes for both control and display data, which will be specified in the relevant sections.

1.2 Receiver Frequency

The TMR1F's receive frequency is normally set during the production of the units in accordance to customers' specifications. The receive frequency can be changed by using the TMR Programming Software (TPS) by programming the frequency synthesizer.

1.3 Multiple Addressing

The TMR1F can support up to 16 FLEX capcode addresses.

1.4 LED Indication

The following table describes the different indications of the LED for different conditions. The power on LED indication (01) is a programmable option.

S/No	LED Indication	Status	Condition
01	Continuously on	Reset is successful	After Power on
02	Blinking every half a second	EEPROM failure	After Power on
03	Blinking every 2 seconds until synchronization is restored	Lost synchronization or Out Of Range (OOR)	Power on and in Stand-by mode
04	Blinking every 0.3 second for up to 3 seconds	Receiving a new message	Power on and in Stand-by mode

TPS Option:
Power On LED: *enable/disable*

1.5   Output Control Codes

The TMR1F is able to control different industrial applications such as motor, relay, lighting and electronic-lock by sending the right control codes through its 8 output ports (1/0/k/s/r).

When a port control code sent is "1", the corresponding output port is set to high state or source state.

When a port control code sent is "0", the corresponding port is set to low state or sink state.

When a port control code sent is "k", the corresponding port's state remains unchanged from its previous state ("k" means "keep").

When a port control code sent is "s", the corresponding port is set to a state which is the opposite of the previous state ("s" means "toggle").

When a port control code sent is "r", the corresponding port is reset to high impedance state ("r" means "reset"). All 8 ports can also be reset to high impedance if the reset control code "r" is sent (refer to MESSAGE PROTOCOL section), or if the device is programmed with the TPS.

When the TMR1F is switched off and on again, the states of all the 8 output ports will remain unchanged.

For numeric vector, the control code supported is either "0" or "1", control code "k", "s" and "r" are not supported.

1.6   Output Display Message

The TMR1F is able to receive numeric and alphanumeric messages and send via the RS232 serial output to any industrial standard display device. The message buffer size is 7680 bytes and the maximum message length is 3560 bytes. For continuous receiving with collapse cycle 0 and 1, it can receive messages of 600 characters and 1000 characters respectively. The RS232 port speed of 2400/4800/9600/19200 baud rate with even/odd/none parity option can be set through the TPS.

1.7   Error Message

When the TMR1F detects any errors in a received message, it will discard the message, truncate the error message, or send the error message as it is without any truncation, depending on the TPS setting (error message handling option) programmed in the unit.

TPS Option:
Error Message: *Send/Truncate/Discard*

1.8   Configuring an Output as Source or Sink

Two (2) of the 8 output ports can support up to a maximum of 1A source current at High state or to sink a maximum of 1A drain current at Low state. The other 6 ports have a maximum current rating of 100mA for both source and sink (High and Low state).

1.9   Out Of Range Indication

If Out Of Range (OOR) Indication is enabled in the TPS, the TMR1F can indicate an OOR condition. The LED on the device will blink every 2 seconds until the OOR condition disappears or the device is back to synchronization with the network.

TPS Option:
Out of Range : *enable/disable*

1.10   Serial Interface (RS232 Port)

The serial interface used by the TMR is a half-duplex type. Both data and command information are sent over this interface. The serial interface can be reconfigured to match to the host equipment by means of some special paging codes. The TPS allows settings of the baud rate and parity bit to be changed.

TPS Options:
Parity: *Even/Odd/None*
Baud rate: *2400/4800/9600/19200 bps*

1.11   Flow Control

Communications between the TMR1F and the host is done asynchronously through the RS232 or TTL serial ports (TXD output). A signal is generated to alert the host equipment that a message is available. This is done by asserting the RTS line. There is also a clear-to-send (CTS) line from the host to the TMR1F that signals the host is ready to accept commands. The TMR1F is able to buffer around 7680 bytes of data before it overflows.

TPS Option:
Flow Control: *enable/disable*

1.12   Serial Data

To automatically send data out the serial port, the Flow Control programming option in the TPS must be disabled. If the Flow Control is enabled, the user can have more control over the message. These features are further described in the following sections.

1.13   RTS Control

This option allows the use of the RTS line to indicate to the external host device that there is a new page data ready to be sent out of the serial port. This line will turn to logic low when the TMR1F is ready to send data out of the serial port.

1.14   CTS Control

If flow control is enabled, the CTS line is used to determine if the host is ready to receive data from the TMR1F. When the host has received an RTS and is ready to receive the data, a logic high is asserted. If the host disables the CTS line while the complete message is not fully received, TMR1F will perform timeout for 10 seconds. If the host re-asserts the CTS line before timeout, the TMR1F will continue to send out the remaining message to the host. If the CTS line is asserted after timeout, the TMR1F will resend the entire message provided the message has not been overwritten by the incoming paging messages.

When CTS is asserted, TMR will delay for a programmable interval before sending out data. This programmable delay is a TPS option.

TPS Option:
CTS Response Delay: (0 – 10000ms)

1.15   Over-the-Air (OTA) Programming

Over-the-air (OTA) programming is a method of changing TMR1F settings without requiring the TMR1F to be physically connected to a PC. OTA programming commands are transmitted over the paging system as alphanumeric messages.

You can use the TMR1F TPS (Telemetry Programming Software) to generate the OTA strings that are to be sent to TMR1F. The TPS itself does not send the OTA strings; separate paging software is required for that. OTA reprogramming can only be used with TMR1F that had the OTA password field set when they were last programmed through a connection to PC.

Each TMR1F will only process OTA messages received on Capcode 1. The TMR1F will not process OTA messages received on other capcodes. Additionally, the TMR1F cannot process OTA messages where there was an error in transmission, or if the TMR1F is off.

Programming TMR1F from short to long address and vice versa requires special handling. Because a long address occupies two capcodes spaces, you must send both the desired address as

well the address following it, in order to have the TMR1F update correctly. For example, if Address 3 is a long address and you want to change it to short address, you need to send an OTA command that updates Address 3 follow by another OTA command that disable Address 4.

For more information on OTA programming, please refer to the on-line help file in the TMR1F TPS.

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Cautions: When an OTA string of incorrect password is received 8
times by a TMR, it will set
the RF Disable Bit in the EEPROM and disable the receiver
permanently. The only way out is to
erase the EEPROM and start afresh. If OTA is attempted with a
correct password prior to the 8th
incorrect password, the TMR will reset the OTA password count to
0, thus allowing 8 more tries.
A page is considered as a candidate for a valid OTA string as
long as the OTA header matches
")&)NP1". The purpose of such design is to prevent unauthorised
users from hacking the TMR
via OTA.
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1.16   Sub-Address Control

The TMR1F processes the received data only when the sub-address received is correct. The sub-address (4-characters: 0~9, a~z, A~Z) can be programmed via the TPS. For numeric vector, the sub-address is supported only from character "0" to "9".

TPS Option:
Sub-address Control: *enable/disable*
Sub-address: (*4 characters, char type: 0~9, a~z, A~Z*)

1.17   Message Header Control   (used for display data through the serial port)

For the convenience to display messages in different display devices, the TMR1F can send up to 40 pairs of Hex codes or 80 characters ("0"~"F") in total through its serial port There are two kinds of message headers. Header1 (up to 20 pairs of Hex codes) can be pre-programmed or disabled by the user in the TPS. Header2 (up to 20 pairs of Hex codes) can be sent out together with the message sent by the user or operator. For numeric vector, the 20 pairs of hex codes for header 2 is supported only from character "0" to "9". (Refer to Section 3 Message Protocol)

The header will be treated as displayed data under the following conditions: invalid hex code, hex codes not in pair, no "[[ ]]" pair, or more than 20 pairs of hex codes in either header 1 or header 2.

TPS Option:
Msg-Header Control: *enable/disable*
Msg-Header: *1~20 pairs, '0'~'F' characters (2~40 characters, must be even or in pairs)*

1.18   Message Trailer Control (used for display data through the serial port)

For the same reason above, the TMR1F can also send two kinds of message trailers through its serial port to different display devices. Trailer2 (up to 20 pairs of Hex codes) can be pre-programmed or disabled by the user in the TPS. Trailer1 (up to 20 pairs hex codes) can be sent out together with the message sent by the user. For numeric vector, the 20 pairs of hex codes for trailer 1 is supported only from character "0" to "9". (Refer to Section 3 Message Protocol)

The trailer will be treated as displayed data under the following conditions: invalid hex code or hex codes not in pair. If there are more than 20 pairs of hex codes in either trailer 1 or trailer 2, the excess characters will be truncated and the remaining 40 characters will be processed to determine whether it is a valid trailer.

TPS Option:
Msg-Trailer Control: user*/default/disable*
Msg-Trailer (when "user" is selected): *1~20 pairs '0'~'F' charactersr (2~40 characters, must be even or in pairs)*
Msg-Trailer (when "default" is selected): EOT (04)

1.19   Message Source ID Control

The TMR1F can send any index number of the 16 capcode addresses at the start of a message and this function can be enabled or disabled by the user in the TPS.

TPS Option:
Msg-Source ID: *enable/disable*

2   Message Protocol

2.1   Control Data Profile

This is used to send control commands to the 8 output ports for control purpose.

Message Format: (Sub-address) + Prefix + Control data

TPS Option:
Control Data Prefix: *"[" / "#"*

| Sub-address: 4 Characters (0~9, a~z, A~Z)

This Sub-address can be enabled or disabled via the TPS. | Prefix: "[[[" or "###" is a TPS programmable option. It is the label of output control code. | Control data: "[" + P1P2P3P4P5P6P7P8 + "]" are used to control the 8 output ports.

Note: "[ ]" pair must exist which is the sub-prefix of the control code.

P1~P8 represents the control code sent to the 8 corresponding ports and stands for either one of the characters: "1", "0", "k" or "K" or "s" or "S".

"1"- the corresponding output port set to logic high (source)

"0"- the corresponding output port set to logic low (sink)

"k" or "K" - the corresponding output port's state remains unchanged from the previous state

"s" or "S" - the corresponding output port toggles to the opposite state from the previous state

"r" or "R" - the corresponding output port is reset to high impedance state |

User can also send a shorter command to control the 8 output ports. However, the states of the 8 output ports will be identical after the control data is received successfully. The message format is the same, except the Control data.

| Sub-address: 4 Characters (0~9, a~z,, A~Z)

This Sub-address can be enabled or disabled via the TPS. | Prefix: "[[[" or "###" is a TPS programmable option. It is the label of output control code. | Control data: "[" + P + "]" are used to control the 8 output ports.

Note: "[ ]" pair must exist which is the sub-prefix of the control code.

P represents the control code sent simultaneously to the 8 corresponding ports and stands for either one of the characters: "1", "0", "k" or "K" or "s" or "S".

"1"- all the 8 output ports set to logic high (source)

"0"- all the 8 output ports set to logic low (sink)

"k" or "K" - all the 8 output ports' states remain unchanged from the previous states

"s" or "S" - all the 8 output ports toggle to the opposite states from the previous states

"r" or "R" - all the 8 output ports are Reset to high impedance state. This is the same state as when the TMR1F has just been programmed by the TPS. |

2.2 Display Data Profile

This is used to send control commands to the RS232 serial output port for display control purpose.

Message format: (Sub-address) + (Header1 + Header2) + (Source ID) + Display data + (Trailer1 + Trailer2)

Message Format of the message that the user sends:

| Sub-address: 4 Characters (0~9, a~z,, A~Z)

This Sub-address can be enabled or disabled via the TPS. | "[[" + Header2 + "]]"

Character type: "0"~"F" (2~40 characters, must be even or in pairs)

If there no "[[ ]]" pair, the TMR1F will treat the | Display data: Up to 3000 characters per message | "??" + Trailer1
Character type: "0"~"F" (2~40 characters, must be even or in pairs)

Note: Label "??" is the prefix of |

			Trailer1. This Trailer label will be selectable through the Windows TPS . For numeric message source, ('0' to '9', '*', 'U', '-', '[', or ']') can be used as the trailer delimiter.
	Header2 as display data.		

Message Format of the data that the TMR1F sends to the RS232 serial output port:

Header1 + Header2 (value is Hex 0~F) Header1 (up to 20 pairs of Hex codes) can be pre-programmed or disabled by the user in the TPS. Header2 (up to 20 pairs of Hex codes) is the one that is sent out by the user.	"(" + Source ID + ")" This is the index number of the capcode address and can be enabled or disabled by the user in the TPS	Display data: Up to 3000 characters per message	Trailer1 + Trailer2 (value is Hex 0~F) Trailer1 (up to 20 pairs hex codes) is the one that is sent out by the user. Trailer2 (up to 20 pairs of Hex codes) can be pre-programmed or disabled by the user in the TPS.

3   Examples

Assuming the Sub-address is "1234", Header1 is pre-programmed using the TPS as "00ff", Trailer2 is pre-programmed as "eeff", and the Source ID is enabled with the capcode index of the capcode address that the TMR1F is receiving the message as 4.

3.1   Example 1

If the user sends out the following page: "1234[[[[1011k0t1]"

Interpretation: This is to control the 8 output ports. Sub-address is "1234", ports P1, P3, P4 and P8 are set to logic high, ports P2 and P6 are set low, port P5's state remained unchanged, and port P6's state is toggled to the opposite state from the previous state.

3.2   Example 2

Assuming the Sub-address is now disabled through the TPS and if the user sends out the following page: "[[[[1011k0k1]"

Interpretation: This is to control the 8 output ports. Sub-address is "1234", ports P1, P3, P4 and P8 are set to logic high, ports P2 and P6 are set low, port P5's state remained unchanged, and port P6's state is toggled to the opposite state from the previous state.

3.3   Example 3

i) If the user sends out the following page: "1234 [[[[1]"

Interpretation: This is to control all the 8 output ports simultaneously and in this case, all ports will be set to logic High (source).

ii) If the user sends out the following page: "1234 [[[[0]"

Interpretation: This is to control all the 8 output ports simultaneously and in this case, all ports will be set to logic Low (sink).

iii) If the user sends out the following page: "1234 [[[[s]"

Interpretation: This is to control all the 8 output ports simultaneously and in this case, all ports will be set to the logic state which is the opposite of the previous state.

iv) If the user sends out the following page: "1234 [[[[k]"

Interpretation: This is to control all the 8 output ports simultaneously and in this case, all ports will be remain at the same as state as the previous state.

iv) If the user sends out the following page: "1234 [[[[r]"

Interpretation: This will Reset all the 8 ports to high impedance state

3.4   Example 4

If the user sends out the following page: "1234Daviscomms", without the prefix "[[["

Interpretation: Since there is no "[[[" prefix, it is not meant to control the 8 output ports. The display data is "Daviscomms". The TMR1F will send Header1 "00ff", Source ID "4", Trailer2 "eeff" and the message data "Daviscomms" to the RS232 serial output.

3.5   Example 5

If the user sends out the following page: "1234[[A25BF6]]Daviscomms??22446688AA", without the prefix "[[["

Interpretation: Since there is no "[[[" prefix, it is not meant to control the 8 output ports. The display data is "Daviscomms". The TMR1F will send Header1 "00ff", Header2 "A25BF6", Source ID "4", Trailer1 "22446688AA ", Trailer2 "eeff" and the message data "Daviscomms" to the RS232 serial output.

4. TMR1F HARDWARE AND SOFTWARE INSTALLATION

Installing programming software and connecting Evaluation cables are described in this section.

4.1 SYSTEM REQUIREMENTS

Please make sure your system meets the following requirements:
- Intel Pentium or better processor
- 16 MB of RAM
- Microsoft Window 98 2nd Edition, Windows 2000 or Windows XP operating systems

4.2 Software Installation

1. The programming software is downloadable from
    http://www.daviscomms.com.sg/pager_software.html
2. The current software installation file is TMR1F TPS1.10.EXE. Follow the step by step instructions on the screen during the installation.

4.3 Programming Kit Hardware

Please ensure you have the following programming hardware kit if you do not have the TMR Evaluation Kit:
• TMR1F
• Parallel cable (with DB 25 connectors)
• Programmer box (rectangular black box)
• Power adapter for programmer box
• Programmer cable (thin cable, 4-pin prong on one end, RJ11 on the other end)

4.4 Programming Kit Hardware Setup

1. Locate the parallel port (LPT1) on the rear of your computer, and connect the 25-pin parallel cable. If you have another device connected (such as a printer), please disconnect that device first.

2. Connect the other end of the parallel cable to the programmer box.

3. Connect the small end (RJ11) of the programmer cable to the programmer box (the connector looks like a phone jack).

4. Connect the power adapter to the programmer box, and plug it into a working socket. A green light on the box indicates it is functioning.

5. Connect the 4-prong end of the programmer cable to TMR1F by inserting it into the four gold contacts on the TMR1F, making sure that the notched end of the connector faces away from the

circuit board. It is not necessary to power on the TMR1F unit if you use the programmer box package.

Programming Kit Setup

Programmer Cable setup

5. TMR1F ELECTRICAL SPECIFICATION

S/No	Electrical Specifications	Range	Unit
01	Operating Frequency		
	VHF	135 – 175	MHz
	280MHz	278 – 286	MHz
	900Mhz	929 – 932	MHz
02	Channel Spacing	25	KHz
03	Frequency Deviation	±4.8	KHz
04	Frequency Step Size		
	VHF/280MHz	5	KHz
	900MHz	6.25	KHz
05	Frequency Stability		
	TMR1F	± 7.5	PPM
	TMR1F+ (900MHz only)	± 2.0	PPM
06	Paging Protocol		
	FLEX^{TM}	1600 / 3200 / 6400	Bps
07	Supply Voltage		
	To pager system	3V~5V, 8V~15V	V
	To interface circuit	3V~15V	V
08	Current Drain (with 3V supply voltage)		
	Peak Receive, I/O at high impedance	15	mA
	Receive off, I/O at high impedance	4	mA
	Maximum Allowable B+ Current	1	A
09	Temperature		
	Operating for VHF & 280MHz	-10 to +50	°C
	Operating for 900MHz	+5 to +40	°C
	Storage	-40 to +80	°C
10	Page Sensitivity @ 6400 Baud		
	VHF/280/900MHz (internal antenna with TEM CF =22.5)	-104	dBm
	VHF/280/900MHz (conducted through BNC/SMA for external antenna)	-116	dBm
11	EIA Selectivity @ 25kHz		
	VHF/280MHz	> 55	dB
	900MHz	> 50	dB
12	Image & Spurious Rejection		
	VHF/280MHz	> 50	dB
	900MHz	> 40	dB
13	Low level Intermodulation Rejection		
	VHF/280MHz	> 50	dB
	900MHz	> 40	dB
14	Image & Spurious Rejection		
	VHF/280MHz	> 50	dB
	900MHz	> 40	dB

S/No	Inputs / Outputs	
1	2 DC Power Supply Inputs	+3~5V or +8~15V
2	1 TXD Output for Serial Data Operation	RS232 or TTL Output
3	1 CTS Input 1 RTS Output	RS232
4	Serial Port Baud Rates (Bps)	2400, 4800, 9600, 19200
5	8 Customer Configurable Outputs	2 ports at 1A, 6 ports at 100mA. Current Source (logic 1) and Sink (logic 0)

S/No	General	
1	Physical Dimension	50mm x 50mm x 10mm (L x W x H)
2	Weight	30g
3	RF Input	Internal built-in Antenna (standard). External with BNC or OSX female connector (optional)
4	20-Pin Connector Interface	20-pin male connector for voltage supply, RS232, TTL, 8 I/O's and TPS programming
5	Programming Interface	4-pin pads or 20-pin Connector Interface to be used with Parallel Programming Kit supplied by Daviscomms

6. TMR EVALUATION KIT SET-UPS AND OPERATION

The TMR evaluation board is designed to facilitate the testing and evaluation of the TMR1F receiver modules. It contains the following features:
• Built-in regulated DC power supply
• LED status indicators for the digital outputs
• Jumpers to select power source for the TMR1F
• Jumpers to select serial port operating mode (RS232 or TTL)
• Connection to programming cable

6.1 Evaluation Kit Hardware

Evaluation Board
Power Adapter, 12Vdc, 1 amp
Serial Cable; D-Sub 9 male to D-Sub 9 female
Programming Cable, DB25 female to RJ45 8 pin

6.2 Evaluation Board Features.

- The Evaluation Board is designed to aid in programming, testing and to develop new applications for the TMR1F Module.
- The 8 LEDs monitor signals sent to the digital outputs, D0 to D7.
- An LED turns on when the output bit is set to Logic High.
- An LED will turn off when the output bit is set to Logic Low or to High Impedance.

See Section 1.3, Output Control Codes, for information on how to send messages to the TMR1F to control the digital output bits.

The Frequency and Capcodes can be programmed on the attached TMR1F module thru the Parallel Port on a PC. See Section 5.2 This will allow programming the TMR1F when it is connected to the Evaluation Board.
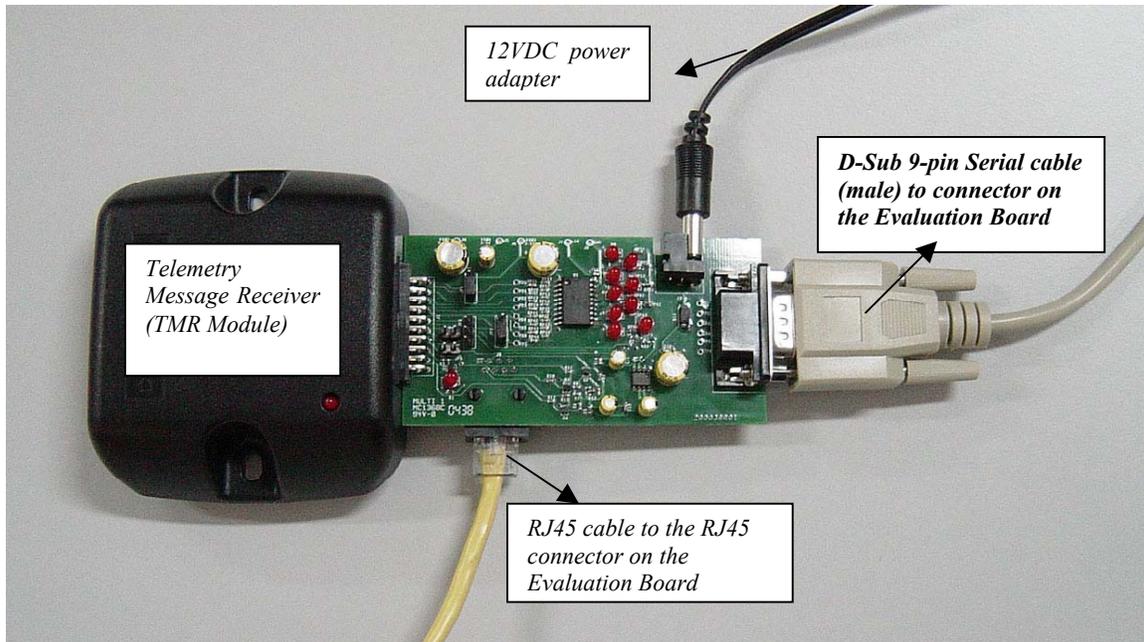
Figure 1. Evaluation Kit set-up with TMR module, Evaluation Board and various cables.

1. Plug the TMR module 20-pin connector into the Evaluation Board 20 pin connector (Fig. 1).

2. Connect RJ45 connector to the RJ45 Jack on the Evaluation Board (Fig. 1). Connect DB25-pin connector of the programming cable to Parallel Port on PC (Fig.2). (*This connection need only be made if the TMR will be re-programmed with a new frequency or CAP code*.)

3. Connect the male portion of the D-Sub 9-pins serial cable to connector on the Evaluation Board (Fig. 1). Connect female portion of the D-Sub 9-pins serial cable to the Serial Ports (COM ports) on PC (Fig.2).

4. Connect power connector (12Vdc adapter) into power jack on the Evaluation Board.

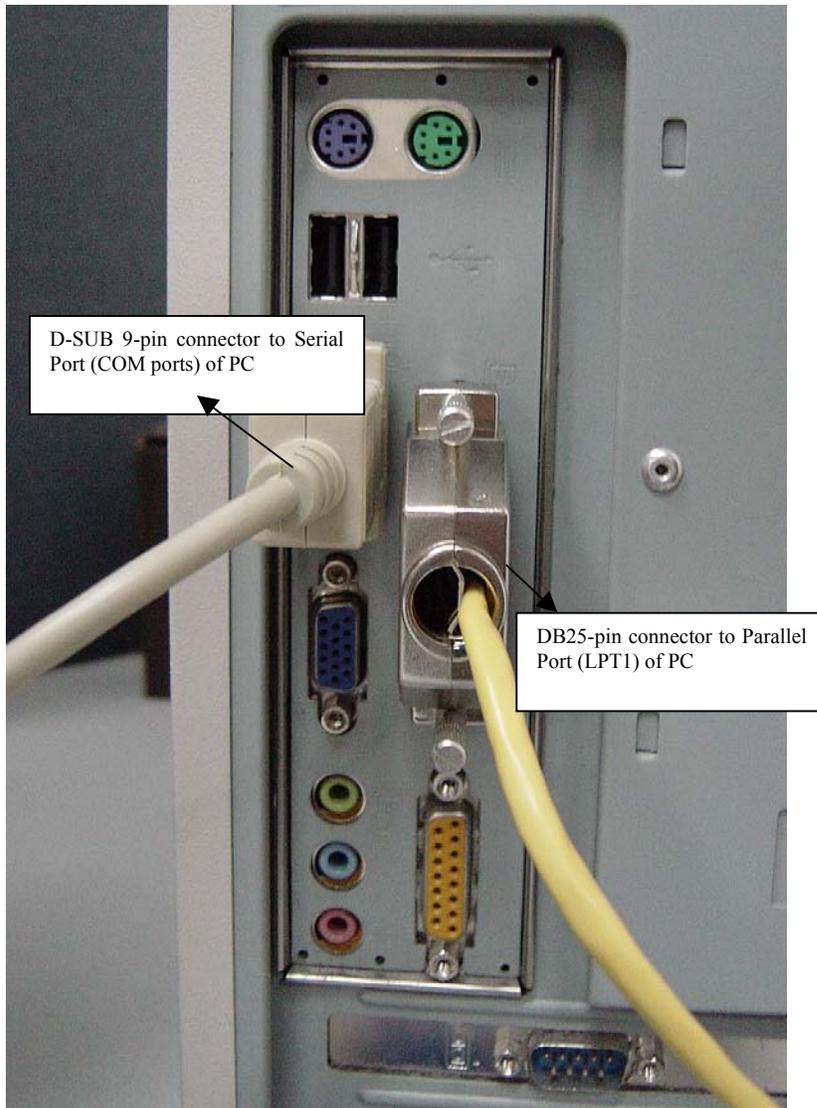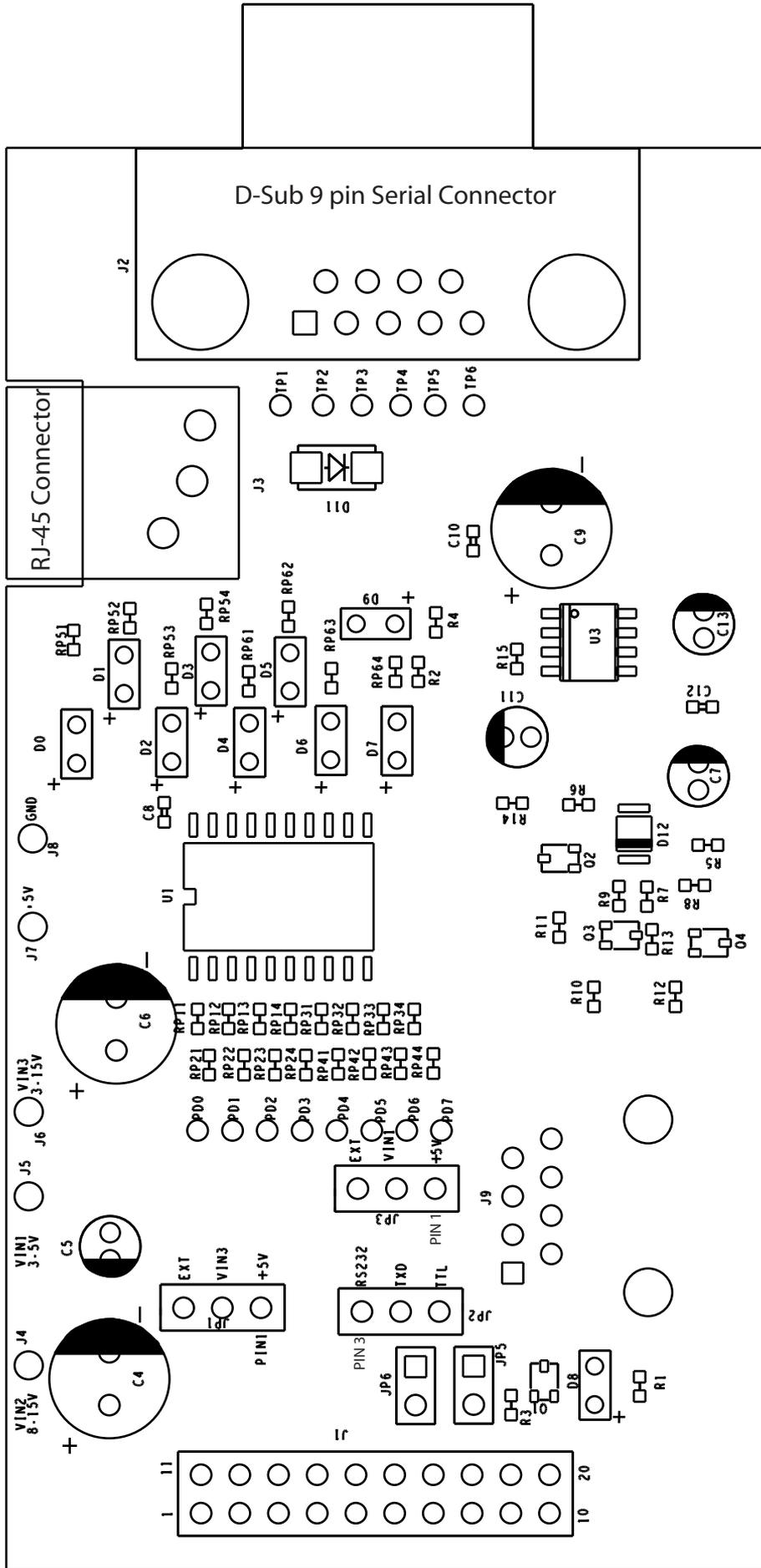5. The power LED will light up on the Evaluation Board and on the TMR module.

D-SUB 9-pin connector to Serial Port (COM ports) of PC

DB25-pin connector to Parallel Port (LPT1) of PC

Fig 2. Set-up at PC Side (Back of PC)

6.3 HARDWARE JUMPER SETTINGS FOR TMR EVALUATION BOARD

! *Warning, If VIN2 (J4) is used to power the TMR, then VIN1 (J5) should not be used and should be left open by removing the jumper at JP3or moving the jumper to pin3 position at JP3.*

Position	Description	Comments
JP1	VIN3 selection	Put jumper across pins 1-2 (default +5Vposition) to power the TMR digital outputs from the Evaluation Board +5VDC supply. Put jumper across pins 2-3 (EXT position) to power the TMR's digital outputs from an EXT 3 to 15 VDC power source connected to J6.
JP2	TTL/RS232 level select	Put jumper across pins 1-2 for RS-232 levels on the D-Sub 9 serial connection (default). Put jumper across pins 2-3 for TTL levels on the D-Sub 9 serial connection.
JP3	VIN1 selection, or Vin2 selection	Put jumper across pins 1-2 (default +5V position) to power the TMR from the Evaluation Board's+5VDC supply. Put jumper across pins 2-3 (EXT position) to power the TMR from external 3 to 5VDC power source connected to J5 for VIN1 input, or 8 – 15Vdc power source connected to J4 for VIN2 input.
JP5 and JP6	Flow control selection	Put jumper across JP5 and JP6 to enable flow control feature (Default)

TMR EVALUATION BOARD

D-Sub 9 pin Serial Connector

J2

RJ-45 Connector

J3

TP1 TP2 TP3 TP4 TP5 TP6

D11

C10
C9

C13

U3

R15

C12

C11

C7

R6

R14

D12

Q2

R5

R8 R7

R9

O3 R13 O4

R11

R10 R12

RP51 RP52 RP53 RP54 RP61 RP62 RP63 RP64

D0 D1 D2 D3 D4 D5 D6 D7

R4

R2

C8

GND
J8

.5V
J7

U1

C6

RP11 RP12 RP13 RP14 RP31 RP32 RP33 RP34
RP21 RP22 RP23 RP24 RP41 RP42 RP43 RP44

VIN3
3-15V
J6

J5

VIN1
3-5V

C5

EXT VIN3 +5V

JP1

PIN1

VIN2
8-15V
J4

C4

D00 D01 D02 D03 D04 D05 D06 D07

EXT VIN1 +5V

JP3

PIN 1

J9

RS232 TXD TTL

JP2

PIN 3

JP6 JP5

R3

D8

R1

J1

1
2

20
10

20 pin connector

When you connect power (8V to 15V) to the VIN2 connection at J4, the jumper at JP3 should be removed or placed in the EXT position with J5 (VIN1) left unconnected.

When you connect Power to J5 (3V to 5V), change the jumper block on JP3 to connect Pin 2 (VIN1) to Pin 3 (EXT) and leave J4 (VIN2) unconnected.

When you connect power to J6 (3V to 15V) Change the jumper block on JP1 to connect Pin 2 (VIN3) to Pin3 (EXT). If you are using a module that has TTL output, not RS232, switch both JP2 and JP4 to connect Pin 2 and Pin 3 (TTL).

6.4 TMR Evaluation Board Schematic

(Refer to the next page)

7. TMR1F 20-PIN CONNECTOR SPECIFICATION
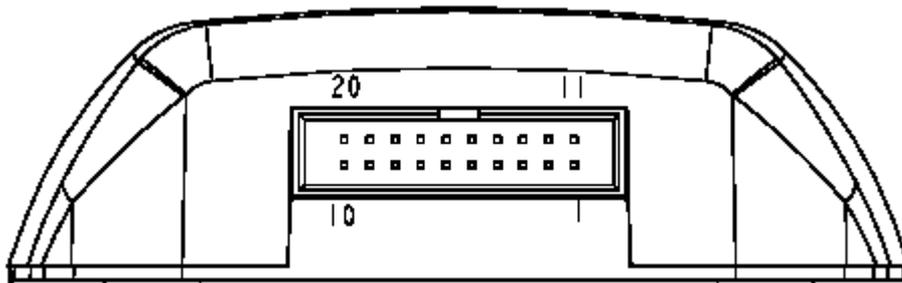
No.	Description	No.	Description
1	SDATA	11	VIN3
2	D0 - 1 Amp	12	D1 – 1 Amp
3	D2	13	D3
4	D4	14	D5
5	D6	15	D7
6	TX1-RS232 level	16	RTS
7	TXD-TTL level	17	CTS
8	VINI	18	LED
9	CLK	19	VIN2
10	GND	20	GND

VIN1 - Power Supply for Pager System, 3.0V-5.0V
VIN2 - Power Supply for Pager System, 8.0V-15.0V
VIN3 - Power Supply for Customer Configurable Ports, 3.0V-15.0V

Note: Please DO NOT use VIN1 and VIN2 at the same time

8. MODULE DIMENSIONS