User Instruction Manual

TDM Manual

Telemetry Remote Display/Controller

Telemetry
wireless range

PCM

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TDM Handheld Telemetry Device

Telemetry Device Range Overview

The Procter & Chester (Measurements) Ltd range of telemetry devices allow data acquisition and control over a radio link. Devices can talk to each other as well as special dedicated function devices such as a hand held reader or a PC interface.
Although no one can guarantee perfect radio communications our three-stage error detection protocol will ensure that if data is received it is correct and readings and values can be relied upon.
Low power sleep modes ensure that battery life is maximized for applications where only occasional communications is required and where devices are placed in hard to access locations.
The devices use a text based communications protocol so you can communicate just as easily using a serial terminal program (such as HyperTerminal) as when integrating the supplied driver into your own applications.
Devices are available in a choice of European 868MHz or USA 915MHz frequencies.

TDM Overview

The TDM offers a handheld display of data from the telemetry device range. This battery powered handheld device makes remote monitoring simple. The ability to display peak, trough and a frozen reading adds to the usefulness. The TDM is also capable of calibrating remote devices that support it.
Holding up to twenty device IDs in memory makes switching between multiple remote devices a breeze.
The TDM does not expose itself to the radio interface. I.e. other devices cannot talk to the TDM.

- Store up to 20 device IDs for quick selection of different devices.
- Read back the Gross value from a device in either primary or secondary engineering units. (The secondary unit scaling can be programmed from the TDM)
- Select from 3 update rates: 3 per second, 1 per second or 1 every 3 seconds.
- Perform various functions on the reading such as Hold, Peak Hold, Trough Hold, Peak/trough Reset, Gross/Net.
- Send a device to sleep (low power mode) or wake a device.
- Operate remote Shunt Cal output (If supported by the remote device).
- Calibrate a remote device using Manual, Automatic or Table driven methods.
- Display remote error indication and remote battery low indication.
- Retrieve the remote Error Status from a device and optionally reset the errors.

Communications Overview

The telemetry devices each have a unique device ID which must be used for all communications either with a master or other devices within the system. The ID is fixed at production and is referred to in hexadecimal format. The range covered is from **000001** to **FFFFFF** which gives an address range of **1** to **16777215** decimal. With 16 million addresses it can be guaranteed that no two devices will have the same ID.

Installation

Connections
There are no connections to the TDM as it is a handheld device.
General Radio Operational Notes
Radio devices should be mounted at least 1.5 meters above the ground.
Radio will not pass through water or metal.

Antennas

Each device is supplied with a factory fitted antenna. The antenna should not be moved, twisted or otherwise distorted.
To fit an external antenna please contact Procter & Chester (Measurements) Ltd for details.

Channels and SysID Explained

Each telemetry device has properties for the radio **Channel**, which specifies the exact frequency it uses for communications, and a System ID (**SysID**) which encrypts the transmitted data so only devices on the same channel and SysID will be able to communicate.

Devices on different channels will not communicate or even receive each others transmissions. However, devices on the same channel but different IDs will receive the transmissions but not be able to decode and act on them.

Because most communications are made device to device the only real use for the SysID (apart from data security) is that devices on the same channel will only act on broadcast transmissions from devices with the same SysID.

For example two groups of devices could be working on separate SysIDs but the same channel. Each group could be updated with broadcast transmissions which would not affect the other group.

Generally the Channel and SysIDs would be changed on a system of devices to segregate them channel-wise from other devices and to add data security by selecting a different SysID to the factory default of zero.

Note that setting a group of devices to new channel and SysID settings must be a carefully controlled exercise as once the remote devices have been changed the device that changes them (usually a TCM) can no longer communicate with them until its own settings have been changed to match those of the remote devices

Setting Channels and SysIDs

When devices are shipped from the factory the Channel and SysID settings are set to a default value. It is recommended that the devices are configured to a different channel and/or SysyID than the defaults to ensure that any newly acquired devices do not interfere with any existing in-place devices.

Remember that the Channel determines the frequency that the devices work at and that the SysID affects data encryption and stops devices on the same channel reacting to transmissions with an incorrect SysID.

To change a remote devices channel and or SysID the following technique is recommended. A TCM or equivalent device is required. The Channel and SYSID of both devices can be configured using Telemetry Toolkit software available from Procter & Chester (Measurements) Ltd.

If the Channel or SysID of a remote TSC device is ever forgotten the devices do offer a digital input which when active while the device powers up will reset the Channel and SysID to zero. Refer to the device manual for this information.

Radio Channels

When configuring a radio system the Channel parameter should be selected using the following table as a guide.

For devices with a base frequency of 868 MHz

The 868Mhz type has 36 available channels and each channel has limitations on duty cycle and output power. The duty cycle limitations are specified as a percentage and indicate how much transmission can take place every hour. For example if a TDM is communicating with a TSC with an update of 3 readings per second then because the response from the TSC takes 100mS then each second the TSC is transmitting for 300mS.
In a 10% band the rule is that each hour the total transmission time must not exceed 10% of an hour or 360 seconds. In this case the TDM and TSC would only be allowed to communicate for 20 minutes in each hour. This is because 20 minutes X 60 seconds = 1200 seconds which actually contain 300mS each of transmission time. Thus 1200 X 300mS = 360 seconds.

The telemetry range does not currently enforce this restriction and therefore the end user should only use the < 100% bands for evaluation purposes.

Because of the duty cycle restrictions it is good general practice to configure and test a system on a 100% duty cycle channels then move to the reduced duty cycle channels when the system is operational.

Also note that in the 100% duty cycle band the maximum transmitter power is 30% or 5 mW.

The default channel is **29**.

Channel Number	Frequency	Maximum TX Power (100% = 20mW 30%= 5mW)	Duty Cycle
0	868.00	100	<1%
1	868.05	100	
2	868.10	100	
3	868.15	100	
4	868.20	100	
5	868.25	100	
6	868.30	100	
7	868.35	100	
8	868.40	100	
9	868.45	100	
10	868.50	100	
11	868.55	100	
12	868.70	100	<0.1%
13	868.75	100	
14	868.80	100	
15	868.85	100	
16	868.90	100	
17	868.95	100	
18	869.00	100	
19	869.05	100	
20	869.10	100	
21	869.15	100	
22	869.20	100	
23	869.40	100	<10%
24	869.45	100	
25	869.50	100	
26	869.55	100	
27	869.60	100	
28	869.65	100	
29	869.70	30	100%
30	869.75	30	
31	869.80	30	
32	869.85	30	
33	869.90	30	
34	869.95	30	
35	870.00	30	

For devices with a base frequency of 915 MHz

The 915MHz type has user settable channels that cover the whole available frequency range in 131 channels. There are no duty cycle limitations or power output limitations.
The default channel is **0**.

Channel Number	Frequency
0	902
1	902.2
2	902.4
3	902.6
4	902.8
5	903
6	903.2
7	903.4
8	903.6
9	903.8
10	904
11	904.2
12	904.4
13	904.6
14	904.8
15	905
16	905.2
17	905.4
18	905.6
19	905.8
20	906
21	906.2
22	906.4
23	906.6
24	906.8
25	907
26	907.2
27	907.4
28	907.6
29	907.8
30	908
31	908.2
32	908.4
33	908.6
34	908.8
35	909
36	909.2
37	909.4
38	909.6
39	909.8
40	910
41	910.2
42	910.4
43	910.6

Channel Number	Frequency
44	910.8
45	911
46	911.2
47	911.4
48	911.6
49	911.8
50	912
51	912.2
52	912.4
53	912.6
54	912.8
55	913
56	913.2
57	913.4
58	913.6
59	913.8
60	914
61	914.2
62	914.4
63	914.6
64	914.8
65	915
66	915.2
67	915.4
68	915.6
69	915.8
70	916
71	916.2
72	916.4
73	916.6
74	916.8
75	917
76	917.2
77	917.4
78	917.6
79	917.8
80	918
81	918.2
82	918.4
83	918.6
84	918.8
85	919
86	919.2
87	919.4

Channel Number	Frequency
88	919.6
89	919.8
90	920
91	920.2
92	920.4
93	920.6
94	920.8
95	921
96	921.2
97	921.4
98	921.6
99	921.8
100	922
101	922.2
102	922.4
103	922.6
104	922.8
105	923
106	923.2
107	923.4
108	923.6
109	923.8
110	924
111	924.2
112	924.4
113	924.6
114	924.8
115	925
116	925.2
117	925.4
118	925.6
119	925.8
120	926
121	926.2
122	926.4
123	926.6
124	926.8
125	927
126	927.2
127	927.4
128	927.6
129	927.8
130	928

Normal and 1:1 Modes

The TDM has two modes of operation:
Normal mode where more than one ID is entered into the address book.
1:1 mode when only one ID is entered in the address book
and

1:1 mode has some special features to simplify the operation of the TDM when communicating with a single remote device.

In 1:1 mode the following functions are different from normal mode:

- On power up the TDM will attempt to wake the remote device. If this fails the operator can retry by clicking the WAKE key.
- On power down the TDM will attempt to send the remote device to sleep.
- There is no access to the Address Book for selecting and reading additional devices.

Throughout the rest of this document there are references to 1:1 mode where operation is different from normal mode which the manual describes.

NOTE: If the device has more that one entry in the Address Book and does not operate in 1:1 mode then to revert to 1:1 mode delete all entries in the Address Book except one. To delete an entry set the ID to 000000.

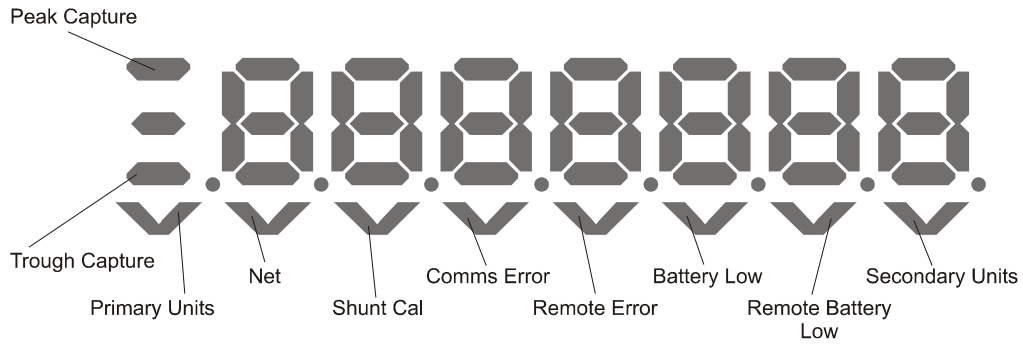
Keypad

The TDM keypad buttons are normally activated on release. For example to enter Address Book Mode just press and release the Address Book key. Some functions require 2 keys to be held then released. I.e. Shunt Cal mode and Remote Error Flag retrieval.

Powering On / Off

Power On/Off is achieved by holding down the Power key (Trough / ✕). Hold for 5 seconds to power off and 2 seconds to power on.
The TDM will remember which mode it was in when last switched off and will return to either Reading Mode or Address Select Mode.
In 1:1 mode the remote device will be woken on power up and sent to sleep on power down.
The TDM will also power down automatically after a period with no key presses. This period defaults to three minutes but can be changed in **System Configuration**.
NOTE: The TDM will not auto power down during calibration.

LCD



Note: Each time the TDM requests a reading from the remote device the currently selected units indicator will flash. This gives a visual indication of the speed of display updates.

Reading Mode

In reading mode the TDM will interrogate the remote device for its value and status. The rate at which the display is updated (the remote device interrogated) can be set by pressing the RATE key combination. The rate will be displayed briefly on the display: Fast 3 per second; Medium 1 per second; Slow 1 every 3 seconds. The update rate is remembered between power cycles. This update rate can be overridden in the **System Configuration**.

The following keys are available:

Function	Key Combination	Description
Address Book		Enter Address Select Mode. Not available in 1:1 mode.
Hold		Freeze the current value arriving from the remote device. The display will flash when in this mode. Press Hold again to return to normal readings.
Gross / Net		Toggle between Gross and Net readings. When switching from Gross to Net the display will be zeroed (Tared).
Units		Switch between the primary units of the remote device and the secondary units. The gain and Offset used to create the secondary units from the primary units can be set in Calibration Mode. The resolution settings which determine the decimal places displayed and the actual resolution of the displayed value are entered in the address book for each device.
Peak		Toggle Peak capture.
Trough		Toggle Trough capture. Press and hold for 5 seconds to power off TDM.
PT Reset	Peak and Trough	Reset the Peak or Trough capture.
Rate	Gross / Net and Units	Cycle between fast, slow and medium display update rates.
Error?	Hold and Units	Request the error status from the remote device. See Error Flag Mode.
Shunt Cal	Address Book and Hold	Toggle Shunt Cal output. If the remote device supports it, turn on or off its shunt cal output.

Error Flag Mode

ErrorFlag	Accessed by pressing the Hold & Units buttons
nnnnnn	• The remote error flag will be displayed. Refer to the remote device manual for error code descriptions. • Press ✕ to return to reading the device. • Press ✓ to Reset the remote error flag.
Reset ?	• Press ✕ to return to reading mode • Press ✓ to reset the remote error flag then return to reading mode.

Displayed Messages In Reading Mode

If the returned value is greater than the overload level (Set in Calibration Mode) the reading will be replaced by OverLOAd. The reading will return to the numeric value once it has dropped below the overload level again.

If the remote device indicates that the battery is dead i.e. The battery level is below operating specifications the display will read r Batt. This is returned as an error flag and is latched. To reset this error refer to Error Flag Mode.

When some of the function keys are pressed a BuSy message may be displayed while communication takes place with the remote device.

If an error occurs when communicating a function to the remote device the display will read ERROR. Press the ✓ or ✕ keys to clear.

If communication fails then -------- will be displayed.

Address Select Mode

Address Select Mode is not applicable in 1:1 mode but some functions that are available from this mode can also be activated from 1:1 mode. See notes for each function.
In Address Select Mode the TDM will display the list of entered device IDs and the user can scroll between them using the ◀ & ▶ keys. Pressing the ✔ key will switch to Reading Mode communicating with the selected item.

NOTE: After shipping the TDM will display NO ADDR when turned on. This indicates that there are no addresses held in the address book. Enter Address Setup Mode to add some IDs to the address book.

The following table lists the operations available in this mode:

Address Select Mode	
	Accessed by pressing the Address Book Button.
Select	Message.
1 FFFFFF	• Use ◀ & ▶ to select address book item. There are 20 available items. The items will only be displayed if their IDs have been configured to be non zero. The item number is displayed on the left. • They will appear as 1-9, A,b,c,d,E,F,g,H,I,j,k. A special item named ALL is present for waking or sleeping all devices on the current System ID and Channel. • Press ✔ to start reading selected item. • Press ✕ to read last item.

Other modes are also available once in Address Select Mode. These are selected by holding the appropriate key or key combination for 10 seconds. These functions would not usually be explained to an end user not qualified to use them.

- Sleep & Wake
- Address Book Setup
- System Configuration Mode
- Calibration Mode

Editing Numeric Data

In many of the modes numeric data can be edited. To do this simply move the cursor, which is the flashing character, to the digit that requires changing using the ◀ & ▶ and either increment or decrement the value of the digit using the ▲ & ▼ keys.
Polarity and decimal points are set using the special character key combination which is simultaneously pressing the Address Book and Hold keys. Pressing once will place a decimal point to the left of the current digit, a second press will move the decimal point to the right. Subsequent presses will give negative number with no decimal point, negative number with decimal point to the left, negative number with decimal point to the right followed by positive number with no decimal point.

Sleep & Wake

Ensure that the current address book item displayed is the required device or the ALL item. If the ALL item is selected then the wake or sleep command will be transmitted to all devices sharing the TDM Channel and System ID.

Press **Sleep** to be prompted SLEEP? Press ✕ to cancel or ✓ to send the sleep command.
Pressing the **Wake** button will transmit wake commands to the devices for the duration set in the System Configuration. If a single device is being woken and the TDM has detected that it has woken then the duration of transmission may be cut short. If the wake command is sent when ALL selected then the full duration will transmitted.
NOTE: the remote device must have been already configured to wake at intervals to 'sniff' for the wake command using the **RadioInt** parameter.

Address Setup Mode

	Accessed by holding down Address Book key for 10 seconds. In 1:1 mode this is available in reading mode. If additional remote IDs are entered into the address book then the TDM will revert to Normal mode. **NOTE:** This function is unavailable in 1:1 mode while the TDM is attempting to wake a remote device after power up. I.e. If the remote device is unavailable. While the remote device is being woken BUSY will be displayed on the LCD. Either wait until the wake period has elapsed or press the ✕ key to cancel waking. Once normal communications is being attempted and ------ is displayed the Address Book button can be held down to access **Address Setup Mode**.
1 FFFFFF	• The item number will be flashing (numbered from 1-9 then A-K). • Use ◄ & ► to select address book item. • Press ✕ to return to Address Select Mode. • Press ✓ to edit selected item.
Set ID	The ID should match the 6 character ID of the remote device. • Press ✓ to set ID. • Press ✕ to return to Address Select Mode.
FFFFFF	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Set Resolution	**Primary Units Resolution** The resolution setting serves two purposes. It sets the number of decimal places to display and also the resolution of the displayed value. I.e. setting a resolution of 000.005 would display the reading with 3 decimal places and the reading would only change in blocks of .005 units. • Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✓ when finished to return to selecting item to edit. This resolution setting is used to display readings when using the primary units.

Set ALT Resol	**Alternate Units Resolution** The resolution setting serves two purposes. It sets the number of decimal places to display and also the resolution of the displayed value. I.e. setting a resolution of 000.005 would display the reading with 3 decimal places and the reading would only change in blocks of .005 units. • Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished to return to selecting item to edit. This resolution setting is used to display readings when using the alternate units. If alternate units are not used then this should be set the same as the primary resolution above.

System Configuration

Canceling part way through this mode will not save any changes made!

	Accessed by holding bottom 2 keys (Peak & Trough) in Address Select mode for 10 seconds. In 1:1 mode this is available in reading mode.
Config	Message.
Set Channel	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit Channel. This sets the frequency of operation. See Channel Configuration section. Range dependant on base frequency.
0029	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Set SysID	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit System ID. The System ID is used to encrypt data transmissions and should be changed so all devices required to communicate share the same System ID. Range 0-255.
0000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Set Power	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit TX Power level. Power can vary from 10 to 100%
030	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Set Wake	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit Wake transmission duration in seconds. When the WAKE button is pressed, wake commands are transmitted in very quick succession for this time period. This period should be set slightly longer than the RadioInt setting on the remote device that is being woken.
012	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.

Overide update	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit the update rate in milliseconds. When non zero this update rate will be used to request remote device readings and cannot be altered by the usual key pad Rate selection. The range is 300 to 6000 milliseconds. (3 per second to 1 every 6 seconds)
0300	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Auto turn off	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit the period in minutes, that when elapsed with no key presses, will cause the TDM to automatically turn off. Entering zero will stop the TDM from automatically turning off. (0 – 10 minutes)
0003	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
INHIBIT FUNCTION	• Press ✕ to cancel changes and return to Address Select Mode • Press ✓ to edit the Inhibit Function value. The value of this setting determines which functions are inhibited. Add the value of individual functions to inhibit multiple functions: **1** = **Hold**. Disabled the Hold function available from the keypad. **2** = **Gross/Net**. Disabled the Gross/Net function available from the keypad. **4** = **Alt Units**. Disabled the Alt Units function available from the keypad. **8** = **Peak/Trough**. Disabled the Peak/Trough function available from the keypad. **16** = **Shunt Cal**. Disabled the Shunt Cal function available from the keypad. 32 = Reserved 64 = Reserved **128** = **Leading Zeros**. Applies leading zero suppression to displayed values in reading mode. For example, to disable Hold, Gross/Net and Peak/Trough use a value of 11. **NOTE: Before disabling any of the keypad functions ensure that the remote device is in the correct mode. Otherwise the mode cannot be changed. I.e. before disabling Peak/Trough ensure that the remote device is not in Peak Mode as you will then be unable to exit from this mode.**
0000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Press ✓ when finished.
Apply Changes	• Press ✓ to apply changes and return to Address Select Mode • Press ✕ to discard changes and return to Address Select Mode

Calibration Mode

Calibration mode allows setting of an overload value, alternate units for the gain and offset of the secondary unit display and optionally one of three calibration methods:

- **NoAuto** – Manual mode. You can adjust the values of the gain and offset manually. This is the gain and offset applied to the mV/V to convert to the required engineering units.
- **Table** – Using information in the loadcell manufacturers table you can enter a mV/V and associated engineering unit value for a low and a high level.
- **Auto** – Allows you to apply a low and high weight to the device and enter the engineering unit display value required at each of these points.

	Accessed by holding down Shunt Cal keys (Address Book & Hold) in Address Select Mode for 10 seconds. In 1:1 mode this is available in reading mode.
Busy	Remote device is being interrogated
Set Overload	• Press ✕ to skip to next item. • Press ✓ to enter Overload value. The overload value is used to change the display to Overload whenever the reading from a remote device exceeds it.
0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the Address Book & Hold keys together to cycle through the decimal point options. • Press ✓ when finished.
Set Alt Units	• Press ✕ to skip to next item. • Press ✓ to enter Alt Units values. This allows changing the Gain and Offset applied to the primary units to create the secondary units. By default these are set to a gain of 1 and an offset of zero so the alternate units displayed will be the same as the calibrated units. The gain and offset are applied to the calibrated engineering unit value NOT mV/V.
Set Alt Gain	Press ✓
0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the Address Book & Hold keys together to cycle through the decimal point options. • Press ✓ when finished.
Set Alt Offset	Press ✓

0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✓ when finished.
Select Cal type	Press ✓
NoAuto ?	• Press ✗ to skip to Table ? item. • Press ✓ to calibrate in manual mode.
Set Gain	Press ✓ to view or change the Gain.
0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✓ when finished.
Set Offset	Press ✓ to view or change the Offset.
0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✓ when finished.
Calibrated	Press ✓ to return to Address Select Mode.
Table ?	• Press ✗ to skip to Auto ? item. • Press ✓ to calibrate in table mode. In this mode the mV/V can be entered against the required display value.
Enter Input Lo	Press ✓ to enter the mV low input value.
0.000000	• Use ◄ & ► to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✓ when finished.

Enter Display Lo	Press ✔ to enter the required gross value at this input.
0.000000	• Use ◀ ▲ & ▶ ▼ to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished.
Enter Input Hi	Press ✔ to enter the mV high input value.
0.000000	• Use ◀ ▲ & ▶ ▼ to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished.
Enter Display Hi	Press ✔ to enter the required gross value at this input.
0.000000	• Use ◀ ▲ & ▶ ▼ to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished.
Calibrated	Press ✔ to return to Address Select Mode.
Auto ?	• Press ✖ to avoid calibration. • Press ✔ to calibrate in Auto mode.
Apply Lo Load	Apply low load to device then press ✔
Enter Display Lo	Press ✔
0.000000	• Enter gross value required at this load. • Use ◀ ▲ & ▶ ▼ to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished.
Apply Hi Load	Apply high load to device then press ✔

Enter Display Hi	Press ✔
0.000000	• Enter gross value required at this load. • Use ◀ & ▶ to select digit. • Use ▲ & ▼ to change digit. • Use the **Address Book** & **Hold** keys together to cycle through the decimal point options. • Press ✔ when finished.
Calibrated	Press ✔ to return to Address Select Mode.

Factory Setting Reset

The device can be reset to factory settings using a special key combination. This will reset all system settings to factory defaults and remove all entries from the Address Book.
Hold in the **Address Book**, **Gross/Net**, **Units** and **Trough** buttons for approximately 10 seconds until the device powers down.

Specification

Supply Voltage:	
Nominal Voltage	3V dc 2 X AA Cells
Current Consumption:	
Off / Standby:	32uA
Idle Mode:	5mA
Receive Mode:	32mA
TX Mode:	39mA
Radio:	
868MHz:	36 channels covering 868 to 870 MHz
915MHz	131 channels covering 902 to 928 MHz
Range	Up to 200M @ 20mW
Power	20mW (5mW in 100% duty cycle 868MHz band)
Licence Requirements	Licence Free
Antenna	Internal
Communications:	
Transmission Protocol	Proprietary encrypted ASCIIXP

Unit Inserts

The TDM is supplied with a card containing legends of common engineering units. To insert a legend into the front panel of the TDM it is necessary to remove the case. Unscrew the battery compartment then remove the 2 screws under the compartment and the 2 screws at the top rear of the case.
The case rear can now be removed.
Cut the required legends to the indicated outline then slide them into the slots provided behind the rear panel.
Re-assemble the case ensuring that the case gasket has not been dislodged and that the gaskets behind the 4 self tapping case screws are refitted.

Identification

The TDM displays base frequency and firmware versions on powerup.

TYPE 868	This shows the base frequency and will display either 868 or 915.
UER 1.2	This shows the firmware version.

Warranty

All Wireless Telemetry products from Procter & Chester (Measurements) Ltd., ('PCM') are warranted against defective material and workmanship for a period of (1) one year from the date of dispatch.

If the 'PCM' product you purchase appears to have a defect in material or workmanship or fails during normal use within the period, please contact your Distributor, who will assist you in resolving the problem. If it is necessary to return the product to 'PCM' please include a note stating name, company, address, phone number and a detailed description of the problem. Also, please indicate if it is a warranty repair.
The sender is responsible for shipping charges, freight insurance and proper packaging to prevent breakage in transit.

'PCM' warranty does not apply to defects resulting from action of the buyer such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorised modification.

No other warranties are expressed or implied. 'PCM' specifically disclaims any implied warranties of merchantability or fitness for a specific purpose. The remedies outlined above are the buyer's only remedies. 'PCM' will not be liable for direct, indirect, special, incidental or consequential damages whether based on the contract, tort or other legal theory.

Any corrective maintenance required after the warranty period should be performed by 'PCM' approved personnel only.

In the interests of continued product development, Procter & Chester (Measurements) Ltd reserves the right to alter product specifications without prior notice.