NOTES

Castle Group Ltd

KA018

Weatherproof Case

Operating Manual

Thank you for buying a Castle product, I am sure you will find both the goods and the service to be of the highest quality but if not, then please feel free to write to me personally and I will ensure that your needs are dealt with immediately.

This manual is designed to show you the operation of the goods you have purchased. If you would like to become a competent person in the eyes of the law, then you may like to know more about our Competent persons training courses, which cover a wide variety of noise assessment tasks.

It is my intention for Castle Group Ltd to provide a complete range of Noise and Vibration products and Services of the highest standard. If you would like to know more about any of our other products and services then please visit our web site at www.castlegroup.co.uk or telephone on +44(0)1723 584250.

Simon Bull

Sales and Marketing Director

NOTES

NOTES

PRECAUTIONS

- Only operate the case as described in this manual.
- This manual assumes that the manuals for each individual instrument and accessories have been read. Read this manual in full before using your equipment.
- The charge in the batteries supplied with your KA018 can cause severe injury even death if misused. Take extreme care not to short the battery terminals with any conductive objects. During operation, always ensure the Air Tight Valve on the Front of your KA018 Case is not tightly fastened.
- Leave your KA018 kit to temperature adjust for at least 2 Hours when transferring use from a cold environment to warmer.
- Turn OFF the Isolation Switch to prevent discharge of the batteries in the KA018 if it is not in use.
- Do not let any conductive objects, such as wire or metal scraps get into the unit.
- Care should be taken when closing the case lid to ensure that no cables are trapped as this will damage the cables.
- Do not try to disassemble the control box, wiring or attempt any repairs as this may cause injury and will invalidate your warranty. Take a note of the condition of the case and contact your authorised Castle service station if a problem arises.
- Do not use any solvents or cleaning agents on the case. Use only a soft dry cloth or a soft cloth lightly moistened with water when necessary.
- To ensure continued precision performance of your instrument have it checked and serviced at regular intervals. It is recommended that the case be sent when instruments are returned for calibration.
- As this kit is heavy, please take care whilst lifting and transporting.

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

Operating Voltages And Current Consumption

GA131 Sound Level Meter
Voltage = 9V
Current = 180mA

KA018 Control Box
Current = 20mA

GA505 Printer
Voltage = 6.5V
Current = 250mA

GA504 DAT
Voltage = 6.5V
Current = 200mA
Standby Current = 1mA

Battery Life

Approximately 150 Hours Continuous With Full Charge

Approximate Weights

12V 17Ah Battery = 6.1 Kg

KA018 Empty Case = 5.0 Kg

KA018 Combined Overall = 19.5 Kg

AC output

0.953V rms at full scale deflection on each range into loads > 10K Ohms.

Output is short circuit protected and is not affected by Weightings.

Ambient Operating Conditions

Temperature -10ºC to +50ºC
Relative Humidity 30 to 90%

Spare Parts & Accessories Codes

GA505.....Thermal Printer

GA504.....DAT Recorder

ZL2093-03 ..... Microphone Extension Cable - 3 metres

ZL2093-10 ..... Microphone Extension Cable - 10 metres

ZL2093-20 ..... Microphone Extension Cable - 20 metres

ZL2093-30 ..... Microphone Extension Cable - 30 metres

MC1TP1 .....Microphone Clip with Tripod Adapter

MW400 ..... Short Term Weatherproof Windshield Assembly

MW401 .....Long Term Weatherproof Windshield Assembly with De–Humidifier

CPGA503.....Thermal Paper for GA505

REMBUTT2 ..... Remote Button for GA504

KA018BATT ..... Spare Battery for KA018 Case

PC007.....dBDataPRO PC Software

ZL1102-02 .....KA018 PC Link Cable

ZL1063-01 .....KA018 AC Output Cable

PSU3..... KA018 12V DC Power Supply

ZL1096-01 .....KA018 External Power Cable

PSU4..... KA018 Battery Charger

INTRODUCTION

The KA018 Weatherproof Case is part of Castle's Pro-DX meter accessories and has been designed to allow outdoor and long term logging capabilities with optional sound recording to a Digital Audio Tape (DAT) recorder.

This manual contains complete operating instructions for the above named instrument, read it carefully and you will quickly become familiar with your instrument. If you have problems with the operation of the instrument please call Castle Group Ltd on either:-

+44 (0)1723 584250	Telephone
+44 (0)1723 583728	Fax
techsupport@castlegroup.co.uk	Email
www.castlegroup.co.uk	Web site

KA018 PART CONTENTS

Your KA018 is supplied as standard with the following parts :-

- KA018 Case With Integrated Control Box
- 2 * 12V 17AH Batteries*
- External 12V DC Power Supply
- External Power Connection Lead
- Battery Charger*

Although other accessories may be present in your KA018, these are ordered independently.

* Noisy Neighbour kits are supplied without batteries and charger.

GETTING STARTED

Firstly your KA018 case is shipped with your batteries disconnected.

Before operation using the batteries you must first re-connect them. To do this simply lift out the foam using the handles provided and plug the battery connectors into the mating connectors in the cable cut out. The connectors are keyed so you cannot plug them the wrong way around. (Note that shipped batteries may require charging before use)

Secondly, the Battery Isolation Switch is OFF when shipped, this will need switching ON before the batteries can be used as a power source. Please see page 4 for further information.

As the DAT is an additional option, this manual refers to setting up the case with the DAT recorder. Since this manual covers the operating instructions for the full capabilities of the case the shaded areas of the title serves to inform the user which functions are being described on your case.

As an example the title below informs you that this function and its associated text is only applicable to the DAT.

Example Title	DAT

Warranty and After Sales Service

Castle Group Ltd design and manufacture precision instruments, which if treated with reasonable care and attention should provide many years of trouble free service.

In the event of a fault occurring, during the warranty period, the instrument should be returned to Castle Group Ltd, in its original packaging, or to an authorised agent. Please enclose a clear description of the fault or symptom.

Details of the warranty cover are available from Castle Group Ltd or an authorised agent.

All instruments are designed to meet rigid British and International Standards. An annual calibration is recommended to ensure that these high standards are maintained. This is particularly important for cases in which instrument readings are to be used in litigation or compliance work.

For warranty and service return to:

The Service Department
Castle Group Ltd
Salter Road
Cayton Low Road Industrial Estate
Scarborough
North Yorkshire
YO11 3UZ

Telephone +44 (0)1723 584250
Fax +44 (0)1723 583728
Web: www.castlegroup.co.uk

Any misuse or unauthorised repairs will invalidate the warranty.

Damage caused by faulty or leaking batteries is not covered by the warranty.

ADDITIONAL OPTIONS — ALL

dBDataPRO Software & KA018 PC Link Cable
This cable plugs into the socket labelled 'I/O' on the KA018 case allowing you to upload saved data to your PC using the required software 'dBDataPRO'. This allows you to easily view log information either graphically or as text, save the data in your preferred format and also print on your PC printer.

KA018 AC Output Cable
This cable plugs into the socket labelled 'I/O' on the KA018 case allowing you to measure the AC signal level on test equipment.

See 'Spare Parts & Accessory Codes' on page 20 for order code details.

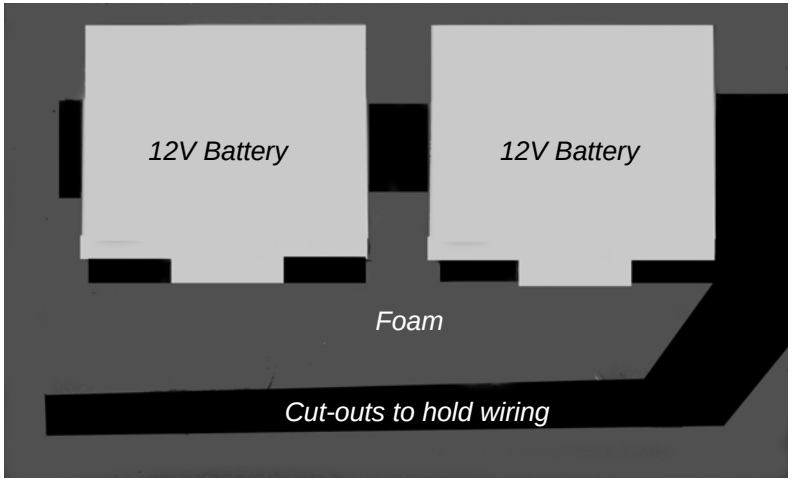
TROUBLE SHOOTING — ALL

Not Printing
Ensure the printer is ONLINE indicated by a solid GREEN LED on the top face of the printer. The solid RED LED indicates the printer is OFFLINE. Press the ONLINE / OFFLINE key to toggle between ONLINE or OFFLINE.

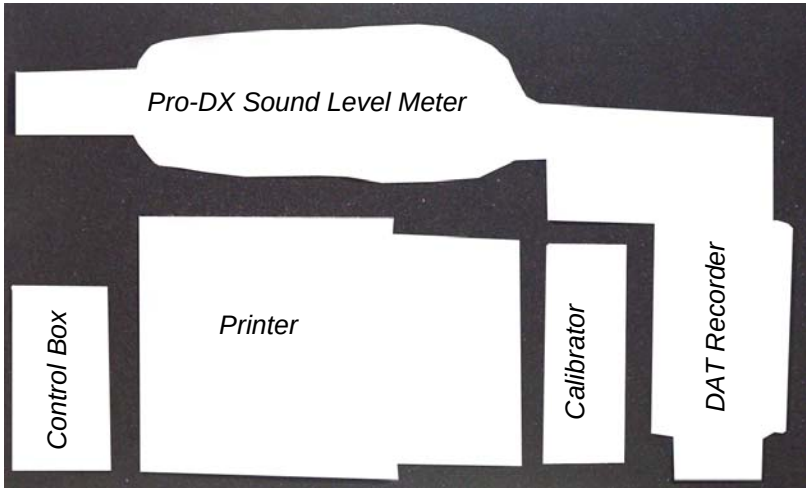
Ensure the Printer Power Switch is in the ON position. This is a slide switch located on the left side of the printer.

CASE LAYOUT — ALL

Lower Section
The batteries sit in the foam cut outs as shown below, cut outs are also provided to hold the battery connections and internal wiring.

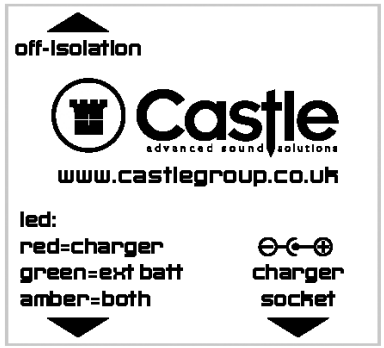


Upper Section
The instruments and control box are situated in the upper section as indicated below.



Control Box

The control box sits inside the case and houses the electronics. The control box should not be opened by anyone other than an approved Castle service engineer. The isolation switch should be ON (indicating BLUE) when the case is in use and switched off when the case is not in use, for safe storage and to prevent battery discharge.



The LED on the control box will illuminate RED when the Charger is plugged in.

The LED will illuminate GREEN when an external Battery Pack or external Power Supply is plugged into the case.

If the LED illuminates AMBER then both the Charger and External Power are being used.

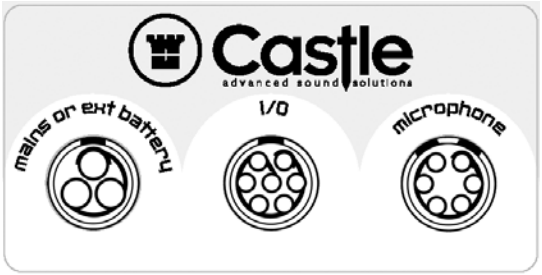
CAUTION: Never use the ISOLATION switch to Turn OFF the instruments, always shut down as outlined in the instruments operating manual. Doing so may result in data loss or corruption.

Case Sockets

DO NOT TWIST PLUGS TO CONNECT OR DISCONNECT FROM THE KA018

No turning is required to fit or remove a plug, simply push to fit or pull to remove.

Please note that each socket is keyed, to fit a plug line up the **RED** identification mark on both the socket and plug.



Plugs will only fit into the correct sockets. Plugs should not be forced or damage to the connector pins may occur.

This section is a guide highlighting the procedure required to make recordings. It is required that you read this manual fully and refer to other manuals as required.

Ensure that the 12V batteries are connected or alternatively if you wish to power the KA018 kit from the mains plug the power lead into the socket labelled '**mains or ext battery**'.

Plug your microphone into the microphone extension lead and attach the microphone to the MW400 as described on page 14. Now attach the microphone extension lead into the socket labelled '**microphone**' on the KA018 case.

Plug the DAT Remote Switch into the socket labelled '**I/O**' on the KA018 case.

Switch the control box Battery Isolation Switch to ON (indicating Blue) if you are powering your kit via the mains this switch position is overridden.

Power on the Pro DX Sound Level Meter and proceed to calibrate the instrument as described on page 7.

Set the Clock as described on page 8 and then record a Reference Tone on the tape as described on page 9.

Set the range on your Pro DX Sound Level Meter to the initial recommended range of 15 – 90dB as described on page 10.

Set the weightings on your Pro DX Sound Level Meter to the recommended settings as described on page 11.

Activate the DAT option on the Pro DX Meter and select the sound level to automatically start recording on the DAT machine. This procedure is described on page 12. An initial recommended level for automatic recording is 85dB.

Close your KA018 case lid and ensure that the air valve near the case handle is not fully tightened.

Finally position the KA018 kit / cables and microphone in a safe and secure manner such as to minimise any possible hazard and leave to record.

ATTACHING THE MICROPHONE TO THE MW401 | WINDSHIELD

Step 3
Carefully push the pre-amplifier through the MW401 pre-amplifier clamp until the de-humidifier and 10mm of the pre-amplifier are visible. Now tighten the clamp into place using the allen key provided with your kit.

Step 4
Attach the microphone capsule over the de-humidifier unit and then place the MW401 rain guard over the pre-amplifier assembly. Fasten using the supplied allen key.

Step 5
Attach the windshield holder over the assembly and fasten using the allen key, now place the windshield into position. Finally pull the extension cable through the slot in the stem and screw the tripod adaptor into place.

BATTERIES | ALL

The KA018 uses two sealed 12V, 17 Ampere Hour, rechargeable lead acid batteries. Only use the batteries supplied by Castle and always ensure if replaced that they are inserted with the terminals to the top. For safety precautions never operate the KA018 kit upside down.

For safe charging of the batteries the following points must be adhered to:

- Only charge indoors
- Never close the KA018 case lid whilst charging
- Use only the supplied charging unit

To charge the case batteries, firstly ensure the above criteria are met. Ensure the Battery Disconnect Switch is ON (indicating Blue) and insert the charging plug into the control box socket labelled "Charge". Charging both batteries completely, if depleted may take approximately 14 Hours. When your charger unit illuminates Green then charging is complete. (Refer to the charger manual for more detail if required).

The KA018 kit can only be powered from the external battery pack or external power supply connector whilst the batteries are being charged.

To reduce the weight of the KA018 the kit may be powered using one battery only, however this may cause an unbalance when carrying the case. The operational time will also reduce by approximately one half.

Operational life of the batteries, on continuous use, will be approximately 6 days.

BATTERY REMOVAL | ALL

This time will vary depending on whether the case printer and DAT are used during operation, and also on the initial battery charge. Extensive use of either the printer or DAT machine will reduce the time the KA018 Kit will operate for, however the batteries may be removed and replaced whilst the KA018 is running and is recommended for long running applications.

To replace the batteries, perform the following procedure:

- Unplug and remove the left side battery
- Replace and connect the charged left side battery
- Unplug and remove the right side battery
- Replace and connect the charged right side battery

External Battery Pack & Power Supply | All

The KA018 kit may be powered from either the supplied Castle 12V DC Power Supply or from an optional external Castle Battery Pack.

To use any external power source simply plug it into the 'Mains / Ext Batt' Connector on the KA018 case and remove when finished. This procedure will not interrupt your instruments operation if your batteries are charged and connected correctly.

The position of the battery isolation switch will not hinder operation with either the external 12V DC Power Supply or the optional External Batteries, however the isolation switch will need to be ON for un-interruptible operation between Internal Batteries and External Supply.

For safety reasons only use the supplied Castle DC Power Supply and optional Castle Battery Pack.

Printing | Printer

The power switch on the printer can be left on at all times and the printer's internal battery can be removed when used in a KA018.

With the GA505 printer plugged into the KA018, power is automatically provided to the printer when data is sent from the instrument. This means that if the batteries are not installed in the printer or if they are flat, printing will still be possilbe.

The supplied GA505 printer will operate using the power supplied from your KA018 kit as with your Pro DX Sound Level Meter. The printer is only powered when print information is sent to the printer. When the print job is finished the printer will power down again.

To ensure printing runs smoothly ensure that the power supply and 9 pin D connector are plugged into the printer.

Printing is achieved via your Pro DX Sound Level Meter, refer to your operating manual if required.

Attaching The Microphone to the MW401 | Windshield

The MW401 is an optional longer term weather proof windshield assembly with a de-humidifier unit that can be used for periods of time greater than 7 days. The unit is assembled using the additional microphone pre-amplifier that has been supplied with your MW401 kit. Use the diagrams below to aid assembly of the unit. Please remove your microphone capsule prior to assembly.

Standard Pre-Amplifier

Additional Long Term Pre-Amplifier

De-Humidifier Unit

Step 1
Attach the long term pre-amplifier unit to the microphone extension cable.

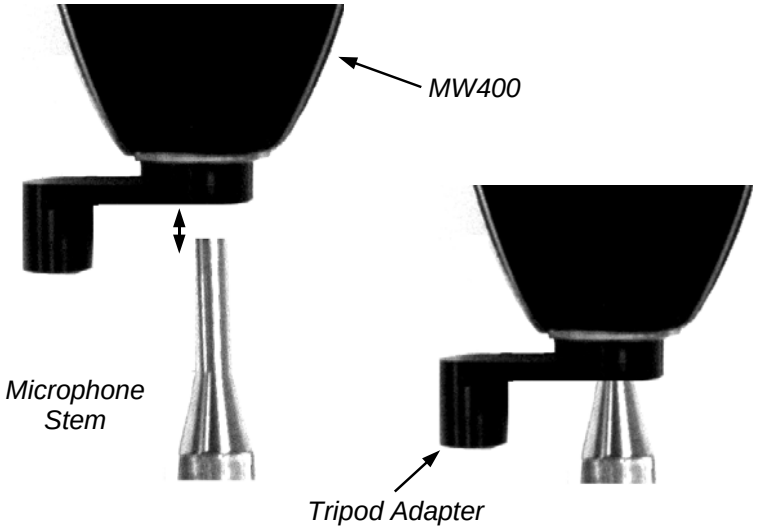
Step 2
Insert the pre-amplifier through the MW401 stem and attach the de-humidifer unit to the top of the pre-amplifier. Do not attach the microphone capsule at this stage.

ATTACHING THE MICROPHONE TO THE MW400 | WINDSHIELD

The MW400 is an optional short term weather proof windshield assembly that can be used (depending upon the environment) for up to 7 days continuous outdoor monitoring.

Place the microphone stem, with microphone capsule attached, into the hole at the base of the MW400 Weatherproof Windshield.

Once inserted turn the screw at the base of the MW400 until it tightens against the microphone stem. Be careful not to over tighten as this can cause damage to the microphone stem.



The MW400 should now be attached to a tripod via the tripod adapter.

PRO DX SOUND LEVEL METER CALIBRATION | SOUND METER

It is recommended that your sound level meter is calibrated each time it is used. Follow the instructions below to calibrate your Pro DX sound level meter or refer to the meters operating manual for more in-depth information: -

Firstly ensure that your microphone preamplifier is plugged into your microphone extension cable, then plug the microphone extension cable into the socket labelled 'microphone' on the KA018 case.

TAKE EXTREME CARE WHILST HANDLING YOUR MICROPHONE, IT IS AN EXTREMELY SENSITIVE DEVICE AND VERY COSTLY

Press the **Power** key on you Pro DX meter to turn on your instrument

Once powered up you are presented with an option to calibrate your instrument by selecting YES / NO. Press the Light Blue Arrow key directly beneath YES on the screen.

Carefully and gently push a Castle GA607 calibrator over the microphone. A small amount of resistance should be felt as the o-ring seal on the calibrator forms a seal around the microphone.

Ensure the calibrator is set to 94dB. (Note that the calibrator automatically turns OFF after approximately 1 minute)

Using the Light Blue Arrow keys on the Pro DX Meter, select the correct level for calibration. This figure needs to take into account all the correction factors such as the atmospheric pressure and microphone type in use with the calibrator used. For the example purposes we will assume these have been taken into account and are 94.0dB.

Press the large **OK** button on the Pro DX Meter to start calibration.

Calibration of your Pro DX Meter will take 5 seconds to complete and your instrument should read 94.0dB once completed.

If you encounter any problems during calibration, ensure that the microphone is inserted into the calibrator cavity correctly and also that the calibrator is switched on.

DAT General Information — DAT

The GA504 DAT Recorder can be used in conjunction with the KA018 to record noise either continuously, manually using the remote DAT switch, or automatically by setting the Pro DX Sound Level Meter to start and stop recording at user specified sound pressure levels.

The DAT powers down automatically after approximately 2 minutes if not being used to save battery life. The DAT will power ON automatically if a recording is made either via your Pro DX Meter or from pressing the Remote DAT Switch. When ON the DAT is powered from the KA018 batteries. Internal DAT batteries are not required.

The DAT Recorder is supplied with it's own manual and it is recommended that you are familiar with it's operation prior to setting up with a KA018.

It is strongly recommended that you set the correct time and date in the DAT machine before proceeding with any recordings.

Setting The DAT Clock — DAT

The DAT machine returns to its default settings when powered down and therefore it is recommended that the DAT Clock is set each time your KA018 kit is used. This will stamp the correct Date and Time for any recordings on the tape.

Follow the instructions below to set the time and date, or refer to the DAT operating manual for more in-depth information.

1 Press the **CLOCK / SET** button on the DAT for more than 4 seconds.

2 Press the **+** or **–** buttons to set the current year. Press the **CLOCK / SET** button when the correct year is selected.

3 Repeat step **2** to set the current **Month**, **Date**, **Day**, **Hour**, **Minute and Seconds**. The display will then stop flashing and the clock will begin to operate.

To Exit the Clock Setting Mode press the **STOP** button.

To view the clock as either 12 Hours or 24 Hours press and hold the **+** button for longer than 2 seconds.

DAT Remote Switch — DAT

The supplied Remote Switch allows manual control over the DAT recording.

For operation of the DAT Remote Switch connect to the 'I/O' socket on the KA018 case.

Press the switch once to start the DAT machine recording. The integral button LED will illuminate Red when recording.

Press the switch once to stop the DAT machine recording. The integral button LED will cease to illuminate indicating the DAT is not recording.

The Remote Switch will still operate even if the Pro DX Meter has been set for automatic recording as described in the previous section. However the Remote Switch will not interfere with recording if the recording was activated automatically via your Pro DX Meter. Likewise the Remote Switch will not interfere with a recording if started automatically via your Pro DX Sound Level Meter.

Trouble Shooting — DAT

If the DAT starts recording when the KA018 kit is first powered then check that the Pro DX Sound Level Meter is securely connected via the 9 pin D-Plug.

PRO DX SETUP FOR DAT RECORDING | DAT

The Pro DX Sound Level Meter can be set so that once a certain sound level has been reached the DAT machine will start recording.

Once the sound level falls below this level the DAT machine will then stop recording.

To set this level and to enable the DAT option press the **menu** key on your Pro DX Meter until the Main Menu is displayed.

Select option 2 'General Setup' by pressing key **2.**

Select option 4 'DAT Recorder' by pressing key **4**.

Select option 1 'DAT activated' by pressing key **1**.

Press the Light Blue Arrow key directly underneath TOGGLE displayed on the screen. This will toggle the DAT to be either ON or OFF. (Note YES = ON). Press the **OK** button to confirm the selection.

Select option 2 'DAT threshold' by pressing key **2**.

Type in a number between 30 and 140 (Note that this figure needs to be less than or equal to the top of the range you have selected. As an example if you have selected the 15 to 90dB range then do not set this value to greater than 90dB. Press the **OK** button once your threshold is entered.

Repeat press the Light Blue Arrow key directly underneath BACK that is displayed on the screen to return to sound level meter operation.

The Pro DX Meter is now setup to automatically start the DAT recording at your selected threshold level when you start the Pro DX to record. To perform this task press the Start / Stop key which is located to the left of the OK button. To stop the Pro DX Meter recording simply press the Start / Stop key again. Note that REC is displayed on the screen whilst the Pro DX Meter is recording.

The DAT records for a minimum of 5 seconds even if the sound level has dropped below the set threshold level. This delay is reset each time the sound level reaches the threshold level. The purpose is to alleviate a recording that continually starts and stops if the noise source is fluctuating around the set threshold level.

DAT REFERENCE TONE | DAT

To ensure validity of the recorded data it is necessary to record a reference tone on the tape each time your KA018 kit is used.

Follow the procedure below to perform this task:

Firstly ensure that your microphone preamplifier is plugged into your microphone extension cable, then plug the microphone extension cable into the socket labelled 'microphone' on the KA018 case.

TAKE EXTREME CARE WHILST HANDLING YOUR MICROPHONE, IT IS AN EXTREMELY SENSITIVE DEVICE AND VERY COSTLY

Ensure that your Pro DX Meter and the DAT are ON. (If the DAT machine is currently OFF it can be powered by pressing the **STOP** key)

If you have not yet set the DAT clock, do so now as indicated on page 8 of this manual.

Ensure the range 45 – 120 is selected on your Pro DX Meter, this is achieved by pressing the Light Blue Arrow key directly underneath RANGE on the screen until the desired range is selected. (If RANGE is not visible then repeat press **menu** until it is)

Confirm that the 3.5mm jack plug is connected to the DAT Line Input socket and then press the **REC / ID WRITE** key on the DAT machine.

Carefully and gently push a Castle GA607 calibrator over the microphone. A small amount of resistance should be felt as the o-ring seal on the calibrator forms a seal around the microphone.

Ensure the calibrator is set to 94dB. (Note that the calibrator automatically turns OFF after approximately 1 minute)

Set the **REC MODE** to manual on the DAT machine and then adjust the dial on the DAT machine labelled **REC LEVEL** until the both the left and right channels read –24dB (minus 24dB) on the bar graph. i.e. until the bar graph display is located directly above the number 24.

Switch the calibrator to 94dB again to reset its timer to give another minutes operation. Press **PAUSE** on the DAT machine twice to start recording the reference tone for future playback and analysis purposes.

DAT Reference Tone Continued | DAT

Ensure at least 30 seconds of the reference tone is recorded.

Press the STOP key on the DAT machine to end recording the reference tone.

The reference tone has now been recorded onto the tape for future playback.

Never adjust the REC LEVEL of the DAT machine once it has been set for any individual recording.

Playback of your recording can be heard via the Phones / Line Out jack socket. Connect either headphones or preferably amplified speakers. Adjust the volume as required.

Pro DX Range Setup | Sound Meter

The levels that you are to be recording are unknown at this time, however it is recommended that initially you set your Pro DX Meter to its most sensitive range that measures from 15dB to 90dB. To achieve this repeat press the Light Blue Arrow key directly beneath RANGE on the display. (If RANGE is not visible then repeat press the **menu** key until it is)

If you are using a DAT machine to record your audio levels then please be aware of the following: -

The reference tone is recorded whilst your Pro DX Meter was on the 45 – 120dB range therefore once you have changed range to 15 to 90dB your recordings will be +30dB higher than your reference level.

Example 45 – 15 = +30dB

NOTE: As the recorded level changes depending on the range selected, it is not recommended to change range whilst recording.

Refer to the Pro DX Manual for more in-depth information on range selection.

Pro DX Weightings Setup | Sound Meter

A microphone hears all frequencies equally whereas a human ear hears some frequencies better than others. The Pro DX Sound Level Meter has the ability to mimic the human ear via its electronics. This is referred to as 'A Weighting'.

The Pro DX Meter also has the capability to slow down the effects of fast rising and falling sounds for instance a loud clap. This is effect is referred to as 'Slow Weighting'.

It is recommended that the Pro DX Sound Level Meter is used with these settings. The procedure below describes how to change the settings for the Pro DX Meter, refer to the operating manual for the Pro DX Meter for more in-depth information.

A Weighting

Change Channel A (CHA) to display **dBA** by repeat pressing the Light Blue Arrow key directly underneath FWGT displayed on the screen. (If FWGT is not visible then repeat press the **menu** key until it is).

Slow Weighting

Change Channel A (CHA) to display **Slow** by repeat pressing the Light Blue Arrow key directly underneath TWGT displayed on the screen. To view the TWGT option you will first need to press the Light Blue Arrow key directly beneath the right arrow displayed on the screen. (If the right arrow is not visible then repeat press the **menu** key until it is).

The weightings on your Pro DX Meter have now been set.

NOTE:
Audio signals recorded by a DAT machine (if used) are recorded with no weighting effects.