AIRTEL ATN

THE DATA LINK COMPANY

MTP - MULTI TEST PLATFORM HARDWARE EQUIPMENT

USER GUIDE

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1. GENERAL

This manual provides an overview of the MTP hardware. It is intended to be used in conjunction with the software application's HELP or User Guide.

This document describes the physical attributes and user considerations of the MTP, Multi Test Platform.

The MTP is used as a platform for applications such as PVDL (Aircraft or Ground Station), MRO and VDB – depending on the customer options.

Detailed operation of those software applications are described in their respective User Manuals.

1.1 BRIEF SPECIFICATIONS

Item	Details
Computer	Dell, Latitude E74xx or equivalent
Mini-VDR	Airtel Mini-VDR PN PVDL-3101
Pelican Equipment Case	Peli 1500
Weight	11.88 kg / 26.20 lbs excluding accessories
Size	470 x 375 x 180 mm / 18.5 x 14.5 x 7 in

Table 1: Equipment Specifications

2. COMPONENT IDENTIFICATION

Component identifiers are used throughout this manual to provide positive identification of all major components including accessories.

The major components of the test set are identified with one or two-digit number per Table 2 below:

Item	Description	Item	Description
1.	Battery 1	23.	Fuse
2.	Battery 2	24.	Stowage space
3.	Top panel latch	25.	Support strut
5.	Input / Output panel	26.	Locking pin
7.	Switch & Indicator Panel	30.	Laptop mounting post
9.	GPS Tray	31.	Headphone Socket
10.	Stylus holder	32.	SYSTEM/VDR POWER Switch
11.	Manual holder	33.	CHAN Busy
12.	MTP Antenna mount	34.	VDR Operate
13.	Antenna stowage	35.	SYSTEM POWER Indicator
14.	BNC terminator and stowage	36.	MASTER POWER Switch
15.	Co-ax BNC holder	37.	Antenna Bonding Strap Attachment Point
16.	Antenna Bonding Strap	38.	MTP 50 Ω Co-axial feed-thru Connector
17.	Case	39.	GPS USB type A Connection Point
18.	Laptop	40.	Audio Speaker
19.	Antenna (mounted)	41.	Spare USB type A Connection Point
20.	LAPTOP Mounting Tray	42.	External DC Charging Point
21.	Mini-VDR	43.	Laptop USB type B Connection Point
22.	Battery Bays / Battery Tabs	44.	USB type A – USB type B connector (not shown)

Table 2: Component Identification

Figure 1: General Assembly

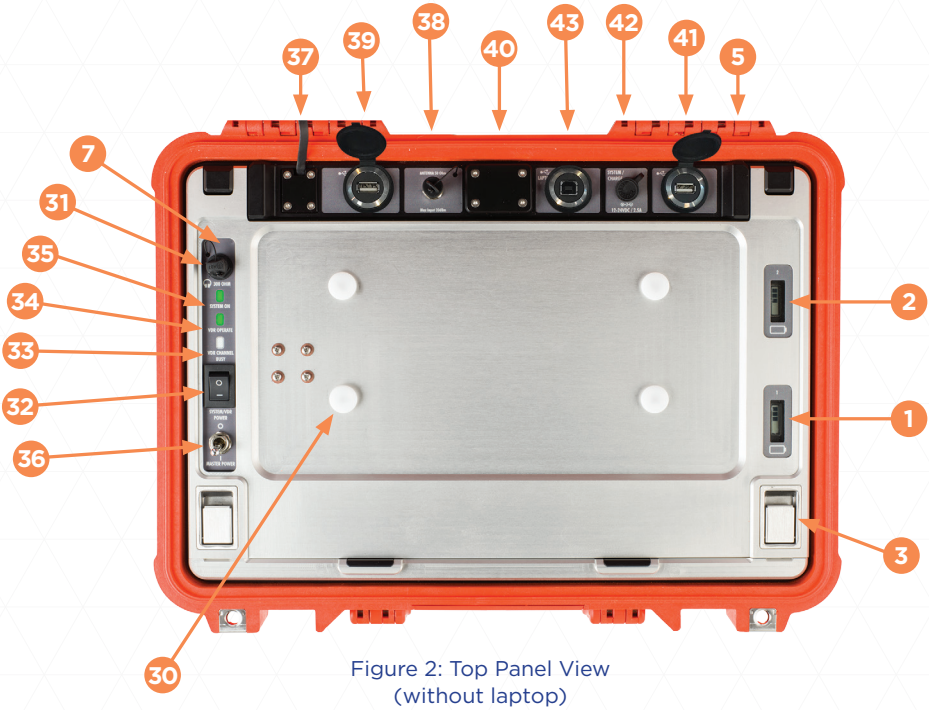

Figure 2: Top Panel View
(without laptop)

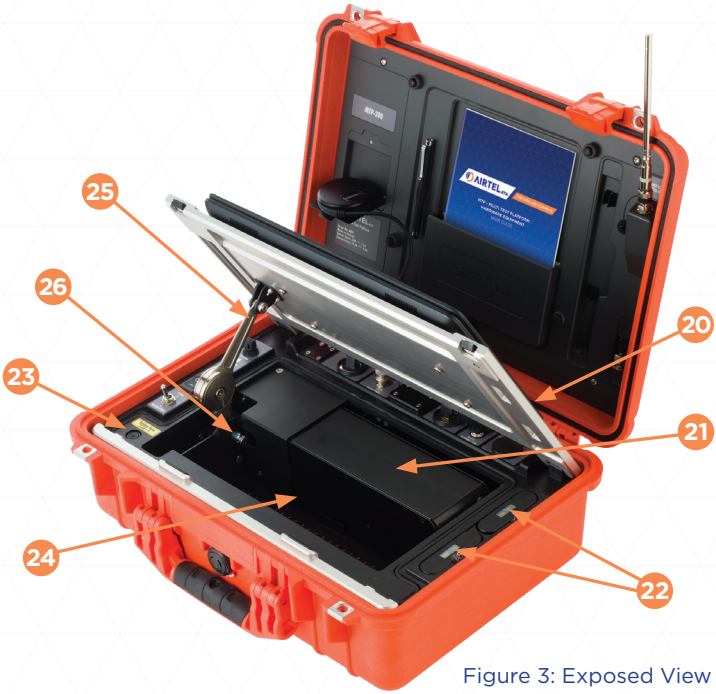

Figure 3: Exposed View

Figure 4: MTP Lid

3. SYSTEM DESCRIPTION

3.1 GENERAL

The Multi Test Platform (MTP) combines the Mini-VDR, LAPTOP, batteries and power supplies, to provide a fully portable testing and monitoring station. It is designed to support multiple independent software applications.

MTP is built into a rugged and environmentally sealed carry case. The case is also fitted with a removable set of trolley wheels and handle for convenience. All major components are situated within the chassis below the hinged LAPTOP mounting tray (item 20).

The LAPTOP mounting tray is locked and released using the latches on either side (item 3)

The MTP system utilizes two battery sources:

a. the LAPTOP's integral Li-Ion battery pack housed within the laptop.

b. the separate system Li-Ion batteries (items 1 and 2) housed within the chassis.

The two battery sources are charged separately in-situ using their respective AC Adapter chargers. The system batteries are easily removed by raising the hinged mounting tray to expose the battery bays (item 22) and pulling on the battery tabs.

The Laptop (item 18) provides the user interface, data storage, programmed functionality and system documentation.

The system electronics, including the Mini-VDR, are powered by the MTP system battery.

Power distribution within the unit is controlled via the power switches on the MTP Switch and Indicator Panel. (item 7)

A passive USB hub allows the LAPTOP to connect to 3 USB devices – the Mini-VDR, the GPS18X receiver, and an externally connected device such as a USB memory stick via the connector (item 41) on Input/Output panel (item 5). The MTP internal USB hub is USB 2.0 compliant and supports Low Power USB devices.

An internal Audio Amplifier and LED Module drives the MTP mini-speaker (item 40), the external headphones and the MTP status indicators located on the Switch and Indicator Panel. Refer section 3.6.

The MTP is supplied with a Garmin GPS18X GPS receiver as standard. The GPS is only required for selected software applications. Its use is described in the relevant software application user guides.

A storage space (item 24) located below the hinged LAPTOP mounting tray provides storage for the GPS receiver, AC adaptors and power leads and other items at the user's discretion.

3.2 SYSTEM SCHEMATIC

The following diagram (Figure 5) gives an overview of the MTP system schematic.

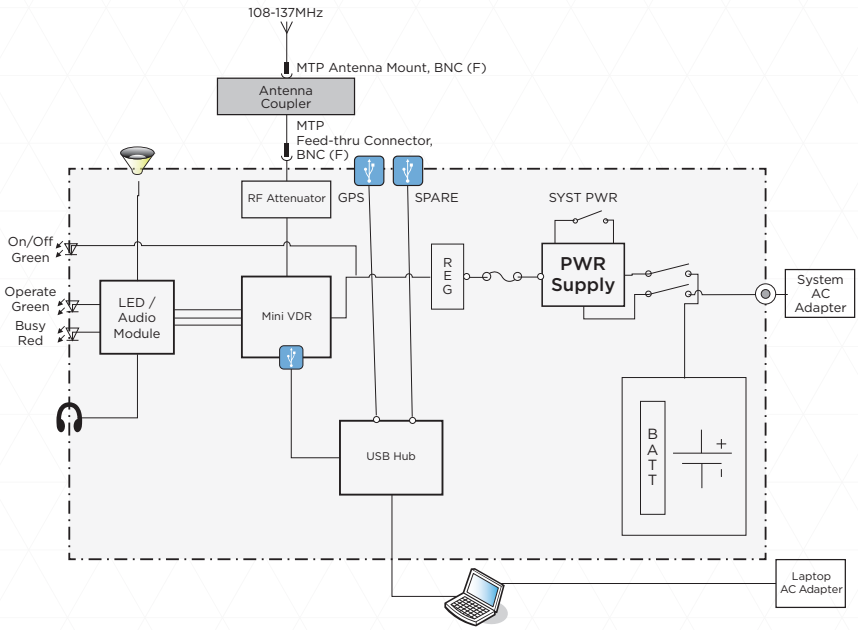

Figure 5: Schematic Diagram

3.3 TECHNICAL SPECIFICATIONS

There are 3 basic models of the MTP configured principally to meet the requirements of particular regulatory and user environments. The key differences between the models are summarised in Table 3:

	MTP-100	MTP-200	MTP-300
Antenna System[1] Feed Power	50µW	50mW	50nW
Antenna System[1] Feed (dBm)	-13dBm	+17dBm	-43dBm
Approximate Transmit Range	> 200 meters	> 500 meters	~ 10 meters
Min. Receivable Input Level[2]	-68dBm	-98dBm	-38dBm

Table 3: Model Parameters

Note 1: Measured at MTP Co-axial Feed-Thru Connector

Note 2: For an uncorrected BER better than 10^{-3}

General Specifications covering all 3 models are:

TRANSMIT:

Frequency Range	108.000 to 117.950 (VDB application)
	118.000 to 136.975 (VHF Data Link)
Channel Spacing	25 kHz
Modulation	AM-MSK (ACARS) D8PSK (VDL2, VDB).
Transmit Duty Cycle	100%.
Frequency Stability	+/- 2ppm.
Emissions & RF Mask	Meets DO-224A and ED-92A.

Table 4: Transmit Specifications

Unmodulated Carrier Output Power measured at the MTP Co-axial Feed-Thru Connector, located on the top panel:			
Model Type	**MTP-100**	**MTP-200**	**MTP-300**
Maximum Power Output, dBm	-13dBm	+17dBm	-43dBm
Maximum Power Output, Watts	50µW	50mW	50nW
Note 1: Unmodulated Carrier Output Power at the MTP Co-axial Feed-Thru Connector, defaults to the maximum value, the power level is configurable in 1dBm steps under software control for specific applications; Refer to Application User Guides for details.			

Table 5: Carrier Output Power

RECEIVE:

Frequency Range	108.000 to 136.975MHz (depending on software application)		
Channel Spacing	25 kHz		
Model Type	**MTP-100**	**MTP-200**	**MTP-300**
Input Signal Range:	-68 to +20dBm	-98 to +10dBm	-38 to +20dBm
Sensitivity:	Uncorrected BER better than 10^{-3} over the input signal range measured at the MTP Co-axial Feed-Thru Connector.		
Resolution:	1dB over the input signal range measured at the MTP Co-axial Feed-Thru Connector. Application dependent.		
Burnout Protection:	No permanent damage with input signal of less than +20dBm		

Table 6: Receive Specifications

Audio	Mini speaker and 300 Ohm PJ-055 headset socket.
GPS	GPS18x USB is supplied for integral or remote mount.

Table 7: Audio/GPS Specifications

ANTENNA:

VHF telescopic – detachable.	Antenna length adjustable 6.5 to 23.5 inches (165 to 600 mm)
Users have the option of supplying their own 50 Ohm VHF antenna to connect to the Co-axial Feed-Thru Connector.	

Table 8: Antenna Specifications

GENERAL:

Environmental	IP67
Temperature Range	-10°C to 50°C (operating) 0°C to 45°C (during battery charge)
Computer - laptop	DELL Latitude 74xx or equivalent
Power Sources	Operates from batteries and/or external power sources. Provides uninterrupted operation when connecting or disconnecting external power.
External Power Sources	AC Adapters for laptop and system batteries.
System Battery	Dual 3.1AH 14.4V Li Ion Battery.
System Operation from Full Charge	8 hours
Laptop Operation from Full Charge	Approx 8 hours
System Battery charge indicator.	Yes
Connectivity Expansion	System USB hub offers an expandable USB 2.0 port.
Dimensions	18.5 x 14 x 7 inches; 470 x 355 x 180 mm, (excluding pull handle and wheels) 18.5 x 14.5 x 9 inches; 470 x 370 x 230 mm, (including pull handle and wheels)
Peli 1500 case	Colours – Orange (standard, see Options below)
Weight	33 pounds (15 kg), including accessories, pull handle and wheels

Table 9: General Specifications

PORTABILITY

Portability.	Detachable pull handle and trolley wheels on the Peli 1500 case.
Airline Transportation.	Peli 1500 case meets airline carry-on dimensions. Laptop easily removed from unit. Laptop and System Li Ion batteries easily removed and stored within the Peli 1500 case when required for transportation. Pull Handle and Trolley Wheels easily removed from unit.
Accessory Storage	Internal accessory storage space for adapters, leads, batteries etc

Table 10: Portability Specifications

OPTIONS

Description	Manufacturer	Manufacturer Part #
Extended Warranty including Calibration	Airtel ATN	
Automobile 24VDC source with adapter lead.	Sordan	
Case Color Options: Yellow, Black, Silver, Desert Tan	Airtel ATN	

Table 11: Optional Extras

USER ORDERABLE REPLACEMENT PARTS

Description	Manufacturer	Manufacturer Part #
USB Type A to USB Type B Double Angled (6 inches)	USBFIREWIRE	RR-AR4BR1-12G
50 Ohm Telescopic Antenna, Swivel base, BNC Plug	Tenma	72-6601
BNC termination plug, 1%, 50 Ohm, 0.5W	Telegartner	J01006A1268
Touchscreen Stylus	Targus	AMM165EU
GPS18X with short USB cable	Airtel ATN	AIRTEL-ATN-106-01
Detachable Pull Handle and Trolley Wheels	Airtel ATN	AIRTEL-ATN-107-01
System Fuse (FUSE, QUICK BLOW, 2.5A)	BUSSMANN BY EATON	BK/S500-2.5-R
System AC Adapter - 24V, 2.5A, 60W	Accutronics	599020
System European AC Power Cord	Accutronics	551007
System North American AC Power Cord	Accutronics	551006
System Batteries	Accutronics	ND2054HD31

Table 12: Replacement Parts

3.4 LAPTOP

The DELL Latitude laptop with an integral Li-Ion battery provides approximately 8 hours operation in the MTP platform (depending on power-save settings).

The MTP laptop is delivered with Microsoft Windows or Linux operating system depending on software applications loaded. Power Management settings have been optimised for normal MTP usage.

In addition, the MTP is delivered with several DELL features disabled to prevent inadvertent loading of 'auto updates' which may introduce incompatible operating system characteristics.

It is important that the laptop processor is never allowed to suspend or hibernate during operation of the MTP software applications as this will interfere with the system's use of the USB input/output and control functions.

3.5 MINI-VDR

The Mini-VDRTM (item 21) gives the MTP its VHF/RF communications capability. It is a compact, portable, low power realisation of an Arinc 750 VDR designed specifically for test and diagnostic applications. The Mini-VDR is controlled across a USB LAPTOP interface using the ADS-ASIP protocol – a modified version of Arinc 750 ASIP – which provides information and control functions with user/keyboard access.

The 12V DC voltage for the Mini-VDR is controlled by the SYSTEM/VDR Power switch (Item 32).

The Mini-VDR is secured under the hinged LAPTOP mounting tray (item 20) and is not normally accessible to the user.

Figure 6: Mini-VDR

3.6 SWITCH AND INDICATOR PANEL

The Switch and Indicator Panel shown in Figure 7 provides control and status display.

1. MASTER POWER switch (item 36)

   Function: This switch acts as an isolation switch. When turned off (O), the internal battery and external charger power sources are completely disconnected from the system electronics. When turned on (I), the MTP system power supply is energised and ready to provide power to operate the system.

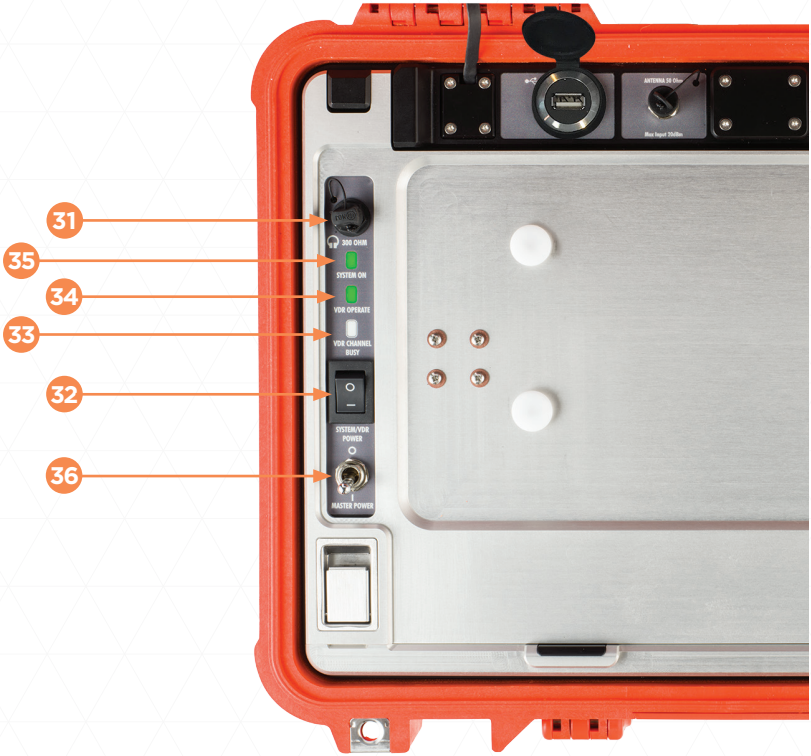

Figure 7: Switch and Indicator Panel

2. SYSTEM/VDR POWER switch (item 32)

   Function: Allows the system power supply to apply power to the MTP system components. A 2.5 ampere fast blow fuse (item 23) protects the output of the system power supply.

3. SYSTEM ON Indicator - Green (item 35)

   Function: Indicates that the system power supply is providing power to the MTP system components.

4. VDR OPERATE Indicator - Green (item 34)

   Function: Indicates that the internal Mini-VDR is operational (powered and software functional).

5. VDR CHAN BUSY Indicator - Red (item 33)

   Function: Indicates that the RF Channel is busy due to existing RF signals on channel or that the MTP is currently transmitting.

> ***Note 1:*** *When the MTP transmits, the CHAN BUSY will come ON and the VDR OPERATE indicator will turn OFF.*

HEADPHONE Connector (300 Ω) (item 31) Provides an audio signal generated from received data signals to assist with awareness of system activity. The same audio signals are delivered to the mini-speaker located on the Input / Output Panel.

3.7 INPUT / OUTPUT PANEL

Figure 8: Input/Output Panel

The MTP Input / Output Panel contains the following:

1. System Charge Input (item 42) - use only the AC Adapter accessory provided
2. Laptop USB type B connection (item 43) – provides interface between the Laptop and the internal USB hub
3. Spare USB type A connection (item 41) – provides a convenient means of connection an external USB device to the Laptop e.g. USB memory stick, printer etc. The MTP internal USB hub is USB 2.0 compliant and supports Low Power USB devices.
4. GPS USB type A connection (item 39) – used to connect the GPS receiver when in use.
5. Ground plane bonding strap connection (item 37) – provides a ground reference attachment for the enclosed antenna ground plane.
6. RF coaxial feed-thru connector (item 38) – provides a means of connecting the enclosed Mini-VDR to the lid-enclosed antenna module.
7. Mini-Speaker (item 40) – provides an audio signal generated from received data signals to assist with awareness of system activity. The same audio signals are available via the MTP headphone output installed on the Switch and Indicator Panel.

CAUTION: Be careful when raising the hinged Laptop Mounting Tray that any connectors plugged into the Input/Output Panel are not damaged or cause interference.

3.8 MTP LID ASSEMBLY

The MTP Lid Assembly accommodates several functional and operational elements:

1. ANTENNA RECEPTACLE / MATCHING MODULE AND GROUND PLANE
The BNC connector on the MTP Antenna Mount (item 12) is the connection point for the MTP telescopic antenna. The lid of the MTP 'Peli-case' also conceals an integral ground plane and antenna matching module which are designed to optimise the efficiency of the MTP as a stable transmit and receive platform and with minimal loading effects from nearby objects.

Figure 9: MTP Lid

2. GPS MOUNTING TRAY (ITEM 9)
The GPS Mounting Tray is designed for the supplied GPS18X receiver. It is released by pulling it away from the concealed magnetic latch to rest in a horizontal position.

3. MANUAL HOLDER (ITEM 11)
The Manual Holder is a convenient place to stow the User Guide.

4. COAXIAL CABLE STOWAGE (ITEM 15)
The 'press-fit' cavity provides a place to stow the antenna co-axial lead when it is not connected on the Input / Output panel.

5. RF BONDING STRAP (ITEM 16)
The RF Bonding Strap connection – provides a ground reference attachment for the enclosed antenna ground plane.

6. 50 OHM TERMINATOR STORAGE (ITEM 14)
Provides a storage place for the 50Ω terminator. The terminator may replace the antenna when in the vicinity of strong RF signals to further attenuate the RF signal levels.

7. STYLUS STORAGE CLIPS (ITEM 10)
A touch-screen stylus is included for the convenience of users.

8. ANTENNA STORAGE CLIPS (ITEM 13)
The antenna is stored here when closing the MTP lid.

4. OPERATION

PRECAUTIONS

1. It is highly recommended to locate the MTP a safe distance away from any live transmitting source such as an aircraft or data link ground station to avoid signal overload of the Mini-VDR. Input levels greater than +20dBm may damage front-end receiver circuits.
   a. MTP-100 minimum distance is 10 Meters or Yards
   b. MTP-200 minimum distance is 6 Meters or Yards
   c. MTP-300 minimum distance is 3 Meters or Yards
2. When received signal levels are unavoidably high, replace the detachable telescopic antenna with the 50Ω terminator stub supplied (stored at item 14) to significantly reduce signal levels.
3. Any direct co-axial connection between the MTP and a unit under test must be done in consultation with the manufacturer to ensure adequate RF signal attenuation is placed ahead of the MTP.

* Unless careful attention is paid to attenuation, damage will occur. *

4.1 INITIAL OPERATION

1. Unpack the batteries from the MTP stowage space and install in accordance with the instructions in section 6.
2. Check state of charge of the MTP battery (or batteries) by observing their inbuilt LCD Charge indicators.
3. Turn ON the Laptop and check its battery's charge state.
4. If necessary, charge the batteries prior to use as described in section 6.

4.2 NORMAL OPERATION

Note 1: *The system may be operated from its internal batteries or while system or laptop batteries are being charged.*

1. Open the case and ensure the laptop USB cable is securely plugged into the USB receptacle (item 43)
2. Remove the telescopic antenna from its stowage clips and install it to the MTP Antenna Mount (item 12).
3. Withdraw the antenna cable/BNC connector from its holder (item 15) and connect it to the MTP Co-axial Feed-thru receptacle (item 38) on the MTP Input/Output panel.
4. Extend the antenna to its full length.

5. Turn the LAPTOP ON and allow it to boot normally.
6. Turn the MTP system ON by switching the MASTER POWER switch to ON; then switch the SYSTEM/VDR POWER switch to ON.
7. Observe that the green SYSTEM ON indicator (item 35) illuminates.
8. Observe that both the red VDR Chan Busy (item 33) and green VDR Operate (item 34) indicators illuminate temporarily before stabilising with the VDR Operate indicator on steadily and the VDR Chan Busy indicator flickering occasionally in the presence of signal or noise.

> ***Note 1:*** *The MTP VHF receiver adjusts to the background level of RF noise for any given test environment. This will be noticed at initial power on or whenever the antenna is adjusted or plugged in or out. In some instances, initial adjustment may take approximately 30 seconds or so. During this adjustment period, the Chan Busy indicator will be ON and noise will be heard in the loudspeaker/headphone.*
>
> ***Note 2:*** *Speaker/headphone volume adjustment is only available through the software application running on the LAPTOP.*

9. Launch the installed software application, ensure your software application has established USB connectivity with the radio (refer to your software user guide for details) and Load/Re-load radio as necessary.

4.3 SHUTTING DOWN

1. Shut down the software application and the laptop normally.
2. Turn the SYSTEM/VDR POWER and MASTER POWER switches OFF.
3. Disconnect the telescopic antenna and return it to its stowage location.
4. The antenna co-axial cable and LAPTOP USB cable may stay connected when the lid is closed. It is not necessary to disconnect them. However, it is essential to take care not to crimp the co-axial cable during lid closure.

4.4 BATTERY CHARGING

1. The Laptop may be charged without removing it from the MTP assembly by simply connecting the DELL AC Adaptor supplied as an accessory.
2. The internal MTP battery/batteries are charged by connecting the ADAPTER TECH AC Adaptor to the DC Charge Input (item 42) on the MTP Input/Output Panel. The MASTER POWER switch (item 36) must be switched ON. The SYSTEM/VDR POWER switch (item 32) can be either switched ON or OFF. The battery state of charge is displayed by the LCD indicator on each individual battery. When a battery is charging, the LCD indicator flashes. A battery is fully charged when all 5 bars are on and steady.

Note 1: *Battery manufacturer recommends battery charge only in an ambient temperature range of 0 – 45 deg C.*

4.5 MAINTENANCE

It is recommended that the MTP should be returned to the manufacturer for a maintenance check (or re-calibration) every five years. This will involve a check and adjustment of tuned circuits required to ensure that performance is in accordance with manufacturer specifications.

In the case of critical applications where the MTP is used to monitor and record RF signal levels to a degree of accuracy it is recommended that a maintenance check is conducted every two years.

5. REMOVAL / INSTALLATION OF LAPTOP

The LAPTOP can be removed from the MTP assembly for independent use or battery removal.

Removal and re-installation is achieved as follows:

5.1 REMOVAL

1. Disconnect the USB connector.
2. Unlatch the hinged LAPTOP mounting tray and raise it to its 'open' position.
3. Slide the LAPTOP forward until its fixed attachment panel disengages from the retaining posts (Item 30) on the mounting tray.
4. Lift the LAPTOP away from the mounting tray.

Note 1: *The LAPTOP mounting tray has* ***two open positions****. The extended (wider) open position is obtained by pulling on the locking pin located on the tray support strut. The tray may be lowered again by pulling on the pin to release the lock.*

5.2 INSTALLATION

1. Raise the LAPTOP mounting tray to its 'open' position.
2. Hold the LAPTOP over the mounting tray's retaining posts so that the posts align immediately below the cut outs in the LAPTOP fixed attachment panel.
3. Lower the LAPTOP onto its attachment panel and slide it backwards so that the retaining posts lock the LAPTOP securely in position.
4. Re-connect the USB connector.

6. REMOVAL / INSTALLATION OF BATTERIES

6.1 LAPTOP (WITH REMOVABLE BATTERIES) BATTERY REMOVAL / INSTALLATION

1. To un-install the laptop battery, it is necessary to remove the LAPTOP as described in section 5.1
2. Once the laptop is removed, its battery release slider lock is found on the underside of the laptop.
3. To install the battery, slide the battery into position and press inwards to engage the laptop's battery locking mechanism.

6.2 MTP SYSTEM BATTERY REMOVAL / INSTALLATION

1. The system batteries are easily removed by raising the hinged mounting tray to its fully extended position (Refer section 5.1) to expose the battery bays (Item 22) and pulling on the battery tabs.
2. Installation of the batteries is the reverse of paragraph 1 above. Either battery can be installed into either slot.
3. When installing each operating battery, locate the guide arrangement on the side of the battery and drop the battery into its slot.
4. Ensure the battery is fully pushed down onto its receptacle and that the pull tabs are pushed back out of the way so as not to conceal the LCD charge indicators.

6.3 MTP BATTERIES – GENERAL HANDLING & CARE

1. Each of the batteries used in the MTP assembly has a capacity of less than 100Wh. This means that for shipping purposes they do not have to be declared as 'Dangerous Goods'. However, they must still be handled and disposed of appropriately in order to be compliant with the various regulations.
2. The international IATA regulations and requirements governing shipping (flight and other modes) must be met. This requires that batteries must be disconnected (removed) and stowed safely e.g. in the stowage space (item 24).
3. Local and national disposal regulations must be observed.
4. Temperature Considerations:

Storage Temp	Not to exceed 60°C (140°F)
Charge Temp Range	0 – 45°C (32 - 113°F)

5. Batteries being stored for several months should be charged to approximately 50% capacity.
6. Batteries should be transported in a state of approximately 50% charge.
7. Battery life is approximately 2 to 3 years. A battery reaching end of life will exhibit loss of operating time or increase in charging time.

7. REMOVAL / INSTALLATION OF TROLLEY WHEELS ATTACHMENT

The trolley wheels are provided as a basic part of the MTP assembly but may be removed if not required.

7.1 REMOVAL

1. Lay the MTP case upside down to view the Trolley Wheel assembly.
2. Loosen all 4 captive thumbscrews and withdraw the entire Trolley Wheel assembly.

7.2 INSTALLATION

1. Lay the MTP case flat for easy access.
2. Present the Trolley Wheel mounting plate to the case and align the thumbscrews with the embedded attachment blocks. The captive thumbscrews are 'floating' to account for any dimensional tolerances.
3. Gently insert one of the screws into its attachment block and make several turns but do not completely tighten - allowing for subsequent minor positional alignment.
4. Repeat with each of the other 3 thumbscrews.
5. When all 4 thumbscrews have taken up several threads, tighten all screws to secure assembly.

8. TROUBLESHOOTING GUIDE

The following guide may help to isolate the cause of some problems.

	Symptom	Suggestion
1	Laptop will not turn ON	• Plug in to external mains power using DELL AC Adaptor and try again after 10 minutes.
2	System will not turn ON	• Ensure MASTER POWER and SYSTEM/VDR POWER switches are ON. • Check fuse • Check battery state of charge • Check that AC adaptor can charge MTP internal batteries
3	Speaker makes continuous crackling noise when system is turned ON	• Disconnect antenna to see if received RF signals are source of the noise • Plug headphones into headphone socket to see if noise is still present
4	RED LED on continuously	• Re-check after 30-45 seconds to see if receiver AGC has eliminated noisy pickup • Disconnect antenna to see if continuous received RF signals or noise are saturating the channel • Using your software application, tune the radio to different frequencies to see if noise is channel dependent.
5	RED / GRN LEDs do not illuminate when SYSTEM/VDR POWER switch is turned on	• Faulty unit. Requires repair.
6	SYSTEM ON illuminates but other LEDs do not.	• Faulty unit. Requires repair.
7	No sound in speaker	• Check that headphones are unplugged • Check that RF data is still being received • Check that antenna and antenna lead are correctly plugged in • Check that software application volume level is turned up • If problem persists – faulty unit. Requires repair.
8	No sound in headphones	• Check that headphones are OK • Faulty unit. Requires repair.
9	Laptop / software will not talk to Mini-VDR	• Check LAPTOP USB connecting lead • Re-check after 30-45 seconds to allow time for USB drivers to load.
10	Radio activity can be heard but no data being received	• Reload radio • Alternatively, consult software application User Guide for further advice.
11	Unable to receive even though close to aircraft	• Strong signal may be overloading receiver input • Remove antenna and plug in 50Ω terminator stub • Move further away from aircraft.

Table 13: Troubleshooting Guide

9. PACKING / UNPACKING AND TRANSPORTATION

IMPORTANT SAFETY NOTE

To comply with transport safety regulations, both the laptop if it has a removable battery and MTP system batteries should be un-installed prior to shipping or carriage on aircraft. Refer to section 6.

Once removed, the batteries can be safely stowed in the MTP lower storage space using standard bubble wrap or similar, to provide padding.

9.1 UNPACKING - CHECKLIST

When unpacking the delivered MTP carton, check that, in addition to the main MTP assembly, the following items are present in the accessories box:

Item	Present Y/N
• DELL Laptop Li-Ion Removable Rechargeable battery	
• AC Adaptor for Laptop with both EU and USA mains leads	
• MTP Li-Ion System Batteries (Inspired Energy) – Qty 2	
• ADAPTER TECH AC Adaptor for MTP with both EU and USA mains leads	
• Garmin GPS18X GPS Receiver	
• 24VDC Auto lead Set – Cigarette Lighter Connector (Supplied as an option only)	

Table 14: Main Accessories Checklist

Verify that the following items are installed in the main MTP lid:

Item	Present Y/N
• 50Ω BNC Terminator	
• Telescopic Antenna	
• Touchscreen Stylus	

Table 15: Lid Accessories Checklist

Verify that the USB cable is connecting the Laptop to the USB type B connector (item 43) on the Input/Output panel.

APPENDIX A: COMPLIANCE

A.1 MTP-100

The MTP-100 has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications made to the equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note 1: *To comply with RF safety requirements a distance of at least 20 cm between the antenna and personnel shall be maintained and fully supported by the operating and installation configurations of the transmitter and its antenna(s).*

Note 2: *To comply with the limits for a Class B device, pursuant to part 15 of the FCC Rules, the user is restricted to operate the MTP-100 only on the following frequencies:*

- *131.450 to 131.825 MHz*
- *136.850 MHz*
- *136.900 to 136.975 MHz*

APPENDIX B: GLOSSARY OF TERMS

The following terms appear in this document -

Acronym	Meaning	Context
MRO	Maintenance & Repair Organisation	Data Link Test Software Application
MTP	Multi Test Platform	Hardware Platform
PVDL	Portable VDL	VDL2 Test Software Application
VDB	VHF Data Broadcast	GNSS GBAS/LAAS Test Software Application
VDR	VHF Data Radio	Aviation Data Communications

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