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MPTOUCH™

OPERATIONS & TECHNICAL MANUAL

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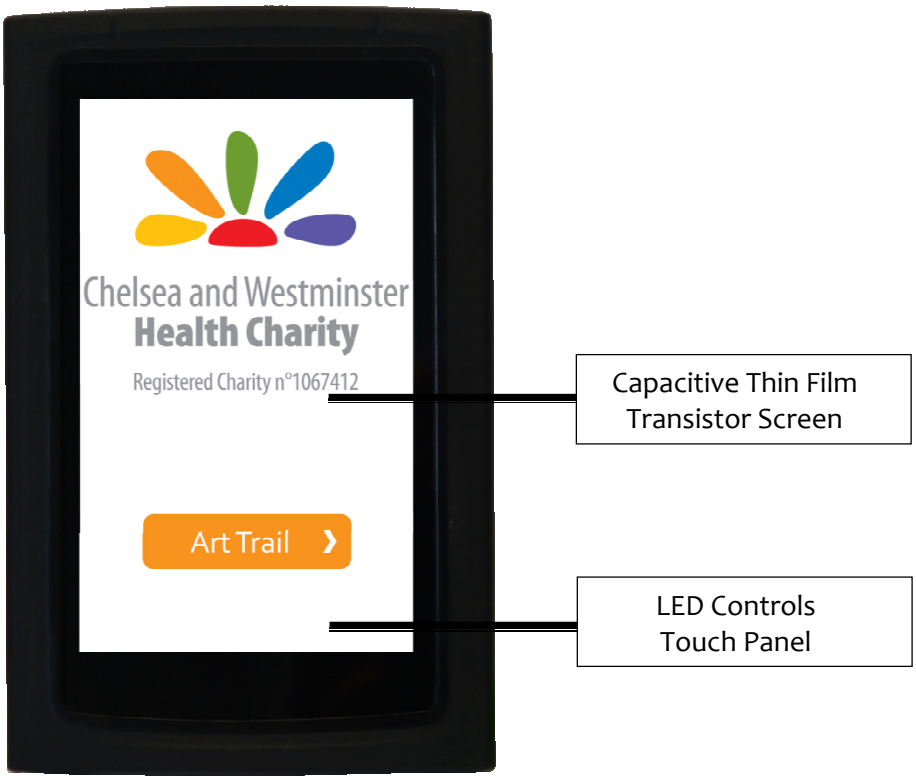
1. INTRODUCTION

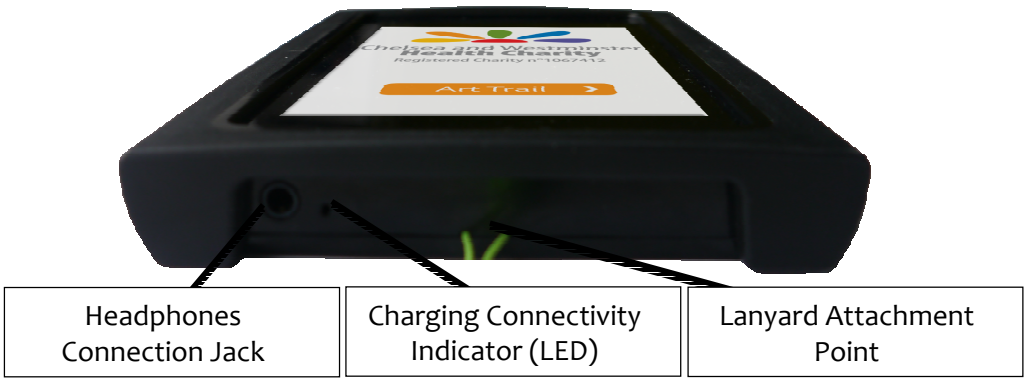
This document describes the MPtouch™, a 5-inch Android 4 multimedia tour player by imagineear.

The MPtouch™ is a hybrid audioguide-smartphone-tablet, purposefully designed for rigorous, repeat rental use, and has been built to offer visitors the best multimedia experience possible.

In this manual, we will address the player's functionality, operational use, how to create/load content and suggestions for best practice.

2. HARDWARE OVERVIEW





3. FUNCTIONALITY OVERVIEW

- The MPtouch™ is a genuine Android 4 tablet. When controls are unlocked, all common functions of a normal tablet are available to you (ie – Wi-Fi, Google Play Store, Gmail, Skype, etc.), however, the player can be locked to disable visitors from tampering with controls and other areas within the player.
- The player can be controlled via on-screen display (OSD) virtual keys that are linked to the screen orientation of the device, as well as via LED keys that are fixed to the touch panel at the base of the screen in portrait mode. Controls include: Back, Home, Menu, Vol+ and Vol-.
- For the purpose of quick and easy mass deployment to visitor groups, the player includes a suite of on-board system apps that are tailored to onsite use, and simplify mechanical player adjustments. This offers a hassle-free player with a long lifespan at low re-occurring costs.
- The device is open, rooted and fully accessible during content creation, and can be easily configured to work through repetitive consumer cycles by visitors during your operation without having to worry about making the player vulnerable by having to open it up fully to visitors.
- It charges in a dedicated, small, 10-unit charger that can be easily expanded in capacity. The rack allows for multiple, parallel and transparent data access to the devices via a USB 2.0 high speed interface that can be daisy-chained. The player can also be charged via any standard commercial USB 2.0 compliant charger.
- Standard components that are subject to wear-out over time like lanyards and batteries are easy to replace locally, reducing cost of ownership and downtime.

4. QUICK-START

4.1 UNPACKING

When you receive your MPtouch™ players, they will often be shipped in custom-made foam inserts for easy packaging and protection during transportation. We recommend safeguarding this packaging material for later use.

The devices also come with a plastic screen protector. For best touch screen performance, it is best to peel these off before starting to distributing players on site. These protectors can be locally disposed of.

4.2 CHARGING

The first thing to do once you have your MPtouch™ players is to charge them.

Insert each one gently into the charging rack, or, using a standard mini-USB cable, connect the player to a PC or USB charger (capable of > 700mA).

When charging, the front LED will light up red. It will switch to green when the player is ready. There is an intermediate state where it flashes between red and green. If a player is at this stage, it is safe to use for at least one *normal* visit or roughly 3 hours.

4.3 TURNING THE PLAYER ON

Once fully charged, remove the MPtouch™ devices from the charging racks and gently press the on switch (located at the head of the player, see 2. *Hardware Overview*) for about 2 seconds. It will either perform a normal boot (if turning back on having been shut down) or a fast boot (if turning back on having been put to sleep).

'Fast boot' will be the default start up during a normal day of repetitive, visitor-after-visitor use. 'Normal boot' is more likely to happen after transportation or a manual reset. In rare cases where the MPtouch™ may not respond when holding down the on switch, insert a paper clip into the little reset hole at the head of the player until you hear/feel a little click. The MPtouch™ will then perform a standard reset/boot.

5. Onsite Daily Use

5.1 Starting up your players

By default, the MPtouch™ is configured to run its tour content app called **tourBuilder** (see *7. Creating Content*). Using the system control app, manageear (see *8. Manageear*), all other apps, the Android operating system and both the virtual and LED keys are disabled. Users can only access content presented in or linked through tourBuilder.

Upon start-up of tourBuilder, a splash screen will be displayed. On the top left corner of this screen is the imagineear logo, and on the top right corner is the version number of tourBuilder. Below, in the white plane, all available tours / folders uploaded to your device are listed, in descending alphanumeric order.

5.2 Selecting a Tour

To select a tour, simply tap on one of the titles in the white plane and that tour will start. Only 8 tours / content folders are visible at a time. Swipe up to get to tours lower down in the list.

5.3 Returning to base

Inside any tour, from the numeric T9 keypad, enter the code **9999** and press GO (or tap on the screen, where 9999 appears). The player will terminate the current tour, display the battery status for 2 seconds and then return to the splash screen. The player is now ready for another visitor or another tour. This *jump* command (9999) can also be programmed visually (see *7.9 T99 Parallel Choices*).

6. Power Management

6.1 During the day

At the start of the visitor day, most sites will remove the players from their charging racks and place them at the distribution desk.

When an MPtouch™ comes out of a rack, it is in sleep mode. For power preservation, it is best to leave it in this mode and revive it only when needed.

A short press of the on switch revives the MPtouch™. Within seconds, the splash screen is presented. Once you have selected a tour you can then hand over the player to the visitor.

When the visitor is finished, you should return the device to its base, by pressing 9999 (see 5.3 *Returning to base*). Staff should put the MPtouch™ back to sleep mode until it is needed again.

Sleep mode is entered by tapping on the version number at the top right corner of the splash screen. The MPtouch™ can retain its battery charge for an entire month when in sleep mode. In cases where the MPtouch™ is in constant use, its battery will last 8 hours before needing a recharge.

After 30 seconds of non-use, the device's display dims to a lower brightness. In this mode, it can run for about 16 hours.

6.2 During the night

The devices need to be recharged overnight. Ensure that power to the racks does not get turned off during closed-hours).

The device requires 8 hours of charging to go from completely flat to fully charged. For safety/overheating concerns, the current drawn does not exceed 750mA per device. This is an external limit imposed by the rack slot. Additionally, for heat and power management, the MPtouch™ turns to sleep mode when inserted into the charging rack. It is assumed that the device does not need to perform when charging. In the infrequent case that it does need to operate (when eg attached to a computer or USB charger when used as an alarm beacon – *see 13. Setting up an MPtouch as a Beacon*), a simple short press on the on switch revives the display and touch panel.

6.3 Optimal battery usage

The best battery performance is achieved when the in-charge/out-of-charge ratio is 1:1 – ie charged at night and used/drained during the day. At that ratio, the battery can sustain at least 750 charge cycles before it starts to deteriorate. We recommend changing the battery once it has undergone more than 750 charge cycles.

6.4 Periods of non-use

In the (seasonal) event of no/low visitor attendance, the charge ratio may be thrown out of balance. This can contribute to a quicker deterioration of the battery. It is always best practice to ensure all players are being used equally, and we recommend adopting a rotation strategy.

Put a bookmark on the last device used for the day so as to know where to continue the next day.

In cases where the MPtouch™ will be out of active use for a week or more, switch off the devices completely and turn the charging racks off. In this case, the MPtouch™ should be switched off by pressing and holding down on the on button for 10 seconds. It will then ask if you would like to shut it down. Tap on 'ok'.

6.5 TRANSPORTING

To transport the MPtouch™ devices, re-insert them into the foam packaging that they originally came in. Double-check that the devices are switched off as outlined in the paragraph above.
NB: ***By international fire safety regulations it is illegal to (air) transport a device in active or sleep mode***.

7. CREATING CONTENT

7.1 PHILOSOPHY BEHIND THE CONCEPT

The MPtouch™ (as well as its sister technology platform, the mediaPacker™) does not require any software for programming content.

Our on-board content scheduler is called tourBuilder - an app that allows you to compose and present your story in a very straightforward, intuitive way. It can be compared to a book that has an index, chapters, pages, paragraphs and words. It is with the creator to supply the multimedia blocks and construct a multimedia experience out of them.

Consider these separate multimedia blocks like LEGO blocks. Their behaviour and inter linking is set by naming the blocks of content using a predefined protocol. By naming the multimedia blocks, their behaviour is set.

The easiest example is to name an MP3 file 0010.mp3. When the number 10 is entered on the keypad, it will trigger this audio file and play it. We have provided a wide range of various LEGO-type blocks that allow for unlimited creative building. That's it. Happy building!

7.2 OPTIONS AVAILABLE TO YOU THROUGH TOURBUILDER

7.2.1 Creating/adding a new tour

Attach the MPtouch™ to a computer. Its flash memory will present itself as a standard removable media drive. Open it on the computer. It will contain, at minimum, the folders:

- APK
- imagineear
- LOG
- mpTouch

Of the four, the folder ***MPtouch*** is what is relevant for content building purposes.

If you double click on this folder, you will find 2 folders that are to be left untouched: ***Library*** and ***Settings***. All other folders, when added to the ***MPtouch*** folder will appear as options on the tourBuilder splash screen.

The first step in creating a tour is therefore as simple as creating a new folder in the MPtouch folder. Any UTF8 character is allowed in the folder name.

Renaming/deleting a tour is done by renaming/deleting the corresponding folder.

7.2.2 Types of display

There are two main types of display on the MPtouch™:

- Classic display (with keypad)

- Full screen display (in either portrait or landscape orientation)

7.2.3 Blocks inside a tour

By simply numerically naming your content blocks following the file naming protocol, the entire tour experience is determined. This is the most important step in making your tour functional. All is based upon the 4 digits a visitor can enter to access a particular block. From there, the creator can determine what happens next.

At first attempt, tourBuilder's scheduler will try to match the 4 digit links to content blocks found inside the current folder. When not found, it will query the **/mptouch/library/** folder. In that general folder, shared assets that apply to all folders (like a general introduction video/picture/sponsor message) can be added. This can help in avoiding having to create multiple duplicates.

Available content blocks are:

- **Audio (.mp3)**

  Name the audio file using the number you wish to be entered into the keypad to get to the commentary as a 4 digit number with leading zeros. For example, the audio file for stop 1 is to be named 0001.mp3 and the audio file for stop 951 is to be named 0951.mp3.

  Where the correct number is entered into the player, the corresponding audio track will start playing. The user does not need to enter any leading zeros.

- **Format for audio files:**

  Any .mp3 type, exported at any rate between 8 - 320kbps, CBR/VBR.

- **Audio + Image (.mp3 + .jpg)**

  Where you wish to have a background image during playback, name the image file identically to the audio file.

  - Format for image files:

    480 x 360 px for Classic display (with permanent keypad underneath)
    480 x 800 px for Portrait display (using key command _P, *see* *7.2.7 Choreography of content*)
    800 x 480 px for Landscape display (using key command _F, *see* *7.2.7 Choreography of content*)

    NB: Images that are smaller or larger will be auto-scaled or stretched.

- **Image (.jpg)**

  For Classic display, a graphical interface such as a logo or image with custom text can be added above the keypad. This image file will display until a number is entered.

- **Video (.mp4)**

Same 4 digits naming protocol applies to video files. There are several playable formats (ie - .wmv/.avi/.flv/.mp4/.mpg/.mpeg). The possibilities are determined by the embedded native Android 4.0 media player, and are found online here:
http://developer.android.com/guide/appendix/media-formats.html

- Format for video files:

  For guaranteed stable performance, videos can be encoded in .mp4/H.264 or FLV (its own container/codec) with:
  Frame size: 800x480 (15:9)
  Frames per second: 25
  Bitrate: 1500 kbps
  Audio: 128 kbps, .mp3/.aac

  Subtitles can be supplied in the open SRT format. Simply give it the same filename as the video.

➢ **Text (.txt)**

For scrollable text, add and save the text in a (Ansi/UTF-8) .txt compatible file and name using the file naming protocol. When displayed on the device, zooming in and out is possible.

➢ **Text + Image (.txt + .jpg)**

It is possible to add a background image file to be displayed with the text. The default colour for text is black, but can be changed to any RGB colour using a settings file. (*See 8.1 Settings*)

➢ **FM**

Provide a file named **<4-digits>_<4-digits>.FM** to trigger FM reception. An .FM file is created by changing the filename extension of a .txt file to .FM.

The first 4 digits represent the number to enter on the keypad. The last 4 digits represent the FM channel in MHz and range from 0870 to 1080 (87.00 to 108.00 MHz in 100 KHz steps)

- Examples:

  To trigger the FM preset channel 104.5 MHz when entering 1000 on the keypad, supply the name 1000_1045.FM
  To trigger the FM preset channel 88.6 MHz when entering 45 on the keypad, supply the name 0045_0886.FM

  After exiting the FM reception, tourBuilder will execute block 3335 when present.

➢ **3rd party / external apps**

One can start a pre-programmed external app (eg Chess, Solitaire or Angry Birds) by entering 3333 into the keypad.

After exiting this 3rd party app, tourBuilder will execute block 3334 when present.

To avoid getting stuck in the 3rd party app, ensure navigation is not dependent on the virtual/LED keys.

- **background.jpg**

  In normal cases, the window above the keypad in Classic display will show 'ENTER A NUMBER' to visually prompt a user to do so.

  Where so desired, this window can be customised using an image file. Name your image file *background.jpg* and ensure it is 480x360 px.

7.2.4 Linking blocks

So far, the above blocks have all been single / standalone blocks: a visitor enters a number, media is brought up, and at the end the player prompts for a new entry. However, it is often desired to link to and from other blocks of content, without having to go via the keypad. This linking can be done by simply changing the filename from a single to a double set of 4 digits, with an underscore between the two. The inclusion of this 2nd set of 4 digits tells the player what to bring up next.

For example: the content block named 0004_1400 gets started by entering 0004 and ends by linking to block 1400.

There are two types of linking:

- **Manual linking**

  This is the default setting for linked blocks of content. When the current linked piece of content ends, the next block is loaded but doesn't start playing until a user presses play.

- **Automatic linking**

  By adding an **_A** command to the end of the filename, the next piece of content will automatically play when the current piece ends. This is often used to create mini slideshows of audio/image combinations, and is done by chopping up the main audio track and complementing each segment with an image, in the fashion:

  (Enter 1 on keypad and press play)
  Segment 1: 0001_1000_A.mp3 →
  Segment 2: 1000_1001_A.mp3 →
  Segment 2: 1001_1002_A.mp3 →
  Segment 4: 1002.mp3
  (Back to keypad)

7.2.5 Menus/Choices between blocks

The above building blocks and methods of linking content together lack one essential tool required for a full interactive experience – the ability to present options and allow your visitor to make a selection.

To enable this interactivity, the following functions are available:

- **Play/FF** (single choice, compatible with the mediaPacker™)

  Supply a .jpg of 480x360 px, visually presenting a choice for the user to press the PLAY key or the FF key.

  Name the .jpg ***XXXX_YYYY_ZZZZ*** where
  XXXX is the 4 entry digits. The device will link to:
  YYYY upon pressing the FF key and
  ZZZZ upon pressing the PLAY key

  Example: 0001_1000_2000.jpg
  Press **FF** and it will link to 1000
  Press **PLAY** and it will link to 2000

  To add an audio message or soundtrack to accompany this image file, add an mp3 with the same name. It will sound once without media controls.

- **T9 (9 parallel choices)**

  Supply a .jpg of 480x360, visually presenting up to 9 choices in a 3 x 3 graphical matrix grid.

  Name the jpg ***XXXX_<T9>_ZZZZ*** where XXXX are the 4 entry digits and <T9> is a ***SINGLE*** digit between 1 and 9. The device will link to ZZZZ upon pressing the corresponding (1~9) key on either the 3 x 3 grid in the top screen or on the T9 keypad below.

  One can supply up to 9 different .jpgs at the same time, allowing up to 9 different links to jump to in parallel at a single press.

  The MPtouch™ will only display the lowest numbered jpg so any subsequent jpg can be simple txt files renamed as jpg (to save memory space).

  In case an audio message is desired during displaying this choice, add an mp3 with the same name (the lowest numbered one). It will sound once without media controls.

- **T99 (92 parallel choices)**

  This block is the most often used block as it offers virtually unlimited options. Compose a 480x800 jpg on where you graphically present up to 92 (8x12) choices. The MPtouch™ will display the jpg full screen and wait for touch input.

  Depending on the pressed grid coordinate, up to 92 different links can be activated. Its format is **XXXX_<T99>_ZZZZ** where XXXX are the 4 entry digits and <T99> is a **DOUBLE** digit number between 01 and 92. Padding 01 to 09 with a pre-leading zero is mandatory. The MPtouch™ will only display the lowest numbered jpg so any subsequent jpg can be simple txt files renamed as jpg (to save memory space). It is best practice to always start with XXXX_00_ZZZZ being the actual jpg to display.

  In case an audio message is desired during displaying this choice, add an mp3 with the same name (the lowest numbered one = 00). It will sound once without media controls.

- **T99 best practices**

- Always start with XXXX_00_ZZZZ being the actual jpg to display. The list of links can get comprehensively long (up to 92 entries per screen are possible) and an overview/base point from a creative point of view becomes helpful.
- If a grid coordinate does not require a link to a next block, it does not have to be programmed.
- We have 3 PNG transparent 480x800 grids available (with red, black, white grid numbers). These can be overlaid onto the jpg in order to quickly determinate/design which graphical link corresponds to which T99 name to create
- The core is a 480x800 jpg that is always displayed in portrait. If a landscape experience is required, you have to create this "illusion" by rotating the jpg. So you start designing in 800x480 and when done, you rotate it to 480x800 CCW in your graphical editing program and supply it to the device. Users will simply rotate the device themselves (and think it is landscape).
- In order to assist in creating a lot of almost similar file names and prevent inevitable typos, we have created a little aiding app on the MPtouch™. See below.

➢ **T99 aid**

This app runs on the MPtouch™. Provide all raw originally named jpg pictures to /temp/ on its flash memory and start it on the MPtouch™. It allows you to quickly create all the correctly named T99 screens and link screens by selecting the raw jpg and for each link, provide its 4-entry digits, 4-link digits and ranges of grid coordinates. It will then process them to copy/paste ready file names in \temp\output\

➢ **T999 (368 parallel choices)**

It is planned to enlarge the T99 screen by introducing a panorama jpg that can be horizontally panned 360 degrees by swiping left/right (and it loops indefinitely, like a flattened globe). This panorama picture will be 3200 x 480 px in size (4 quadrants N, S, E and W, each at 800 x 480 px) and will offer a staggering number (40x12 px grid) of links.

7.2.6 Input

Alphanumeric data capture. It is planned to add a content block where people can leave alphanumerical answers/inputs. These input arrays will be saved in the same file/format as currently recorded user statistics (*See* *12. Data Logging*).

7.2.7 Choreography of content

One can easily imagine that T99 is a jump-board to virtually anything. It is the main director of content. We have provided for a couple of practical director's instructions for the linked blocks to subsequently behave in a controlled manner when they are activated from T99 screens. These behavioural instructions are added at the end of the T99 file name (or at the end of the block name) and are called ***switches.***

➢ **Available behavioural switches are:**

_A Triggers the next block/link to start **A**utomatically. Irrelevant for T99 (as all T99 links start automatic)

_F Triggers next block/link to display **F**ull Landscape

_P Triggers next block/link to display **P**ortrait

_K Block access to the **K**eypad during the next block

_R Triggers next block/link to **R**eturn at its end to the sending T99 without having to specify the (next) link in that block. Ideal to quickly compose pick lists from a T99

- **Reserved numbers - 0000/3333/6666/9999**

0000 Any content starting with 0000 as the first 4 digits will start automatically when entering the tour.

3333 Triggers the 3rd party app when activated.

3334 Block that will automatically activate upon returning from the 3rd party app.

3335 Block that will automatically activate upon returning from the FM reception.

6666 Triggers the keypad to be the next block.

9999 Exits the current tour and cycles the tourBuilder back to the list of tours to choose from.

- **Priority**

A T9/T99 link can contain switches as well as the linked content block itself. In case a block is started from a T9/99 link, the switches of that T9/99 link ***OVERRIDE*** the ones attached to the block being linked.

NB: The FIRST T99 block name (XXXX_00_YYYY) cannot have any switches.

7.3 EXTERNAL INTERACTIVITY

In addition to allowing internal interactivity between the user and tourBuilder, the MPtouch™ also offers several options to modify its behaviour from externally.

7.3.1 3rd party app and its requisites to function inside tourBuilder

Upon the entry (or link to) of 3333, tourBuilder will super-imposed any other Android app to run. It allows for breaking out of the tourBuilder content structure and temporarily run any other app until its exit/termination. Although this sounds limitless, deployment of this does not always yield proper results. There are 2 directives to keep in mind for successful (repetitive) use of this function.

1. Almost always, the virtual and LED keys are disabled in order to keep the user out of the Android OS. The tourBuilder app can cope with any user request by providing virtual controls on the active screen. Navigation to go forward and back, volume increase/decrease and

others are all **included** into our app. This is not to be taken for granted on 3rd party apps. If eg that app can only be closed by pressing the Android back or home key, jumping from tourBuilder to this app will succeed, only to never be able to get out of it again.

2. Certain 3rd party apps register their state/settings/preferences when they exit, in order to return to that exact same state when called again. This can yield the undesirable effect of the next user being confronted with the results of an earlier session/user.

Requisites:

- The 3rd party app must be installed prior to using it
- A settings file in mpTouch/settings/ must be present, called **app.txt**
- Inside this app.txt, its Android ***package*** name must be listed so tourBuilder knows which app to start. Contact support to retrieve this name.

7.3.2 Sending digital messages (*See 13. Setting up an MPtouch™ as a Beacon*)

Each MPtouch™ comes equipped with a FSK data module for wireless transmission of short burst data messages without the need of a wireless grid.

In short, out of the box, they can talk to each other within a range of 2-25 meters on a one-to-one basis, anywhere on the planet (and beyond). This module can be used to cause the following behaviour:

- **Alarm**

  One MPtouch™ is configured as an alarm beacon. It will send out the code ALARM *x*-times a second to any other MPtouch™ in its vicinity. Any MPtouch™ coming inside the range of the MPtouch™ that is transmitting this alarm message picks up these repetitive messages until reset by a member of staff.

  The range of the alarm zone can be set by increasing/decreasing the transmission rate and the power settings of the transmitting device (*See 12. Setting up an MPtouch™ as a Beacon*).

- **Trigger**

  In this case an MPtouch™ is configured to repetitively send the name of a fixed content block. Any MPtouch™ coming inside its range will activate this (internal) content block.

  This function is often used to give automatic room or object introductions.

- **Sync**

  In this case an MPtouch™ is configured to also send additional timing information to a fixed content block. Any MPtouch™ coming inside its range will ***play along*** this (internal) content block from the last timing signal received. This function is often used to synchronize to video soundtracks.

8. MANAGEEAR

Manageear is the system utility app of the MPtouch™. It allows for quick configuration of the relevant settings for preparing your players for onsite deployment. Most of its settings can also, in parallel, be set via .txt files in the mpTouch/settings/ folder. This is done in order to roll out a lot of similarly configured MPtouch™ devices at the same time, versus manually running manageear on each device. Some of these setting changes are instant, others require a reboot. It is best practice to always perform a reboot by standard after each manageear update. This assures all changes are reflected correctly.

8.1 HOW TO START MANAGEEAR FROM A LOCKED MPTOUCH™

By default, the virtual and LED keys of Android are locked, preventing visitors from leaving tourBuilder easily.

To quit tourBuilder, cycle to the splash screen and press and hold the imagineear logo on the top left corner of the screen. Repeat this twice (each press-and-hold responds with a buzz). This closes tourBuilder, allowing access to the Android desktop. Tap on the manageear icon. When not present on the desktop, go to Apps and select it from there.

8.2 SETTINGS

The following settings can be changed:

- **Virtual keys**: Turned on or off.
- **LED keys:** Turned on or off.
- **Rotate**: When set to ON, the Android orientation sensor is enabled, allowing 3rd party apps to use this sensor to adapt the display orientation. When set to OFF, 2 things happen:
  1. The device boots in the orientation set under Home Screen.
  2. In tourBuilder, the rotate icon will no longer be shown.
- **Logging**: When set to ON, tourBuilder will capture user statistics in chronological user unique TXT files in the /LOG/ folder.
- **Autostart tourBuilder**: When set to ON, upon boot, tourBuilder will run automatically.
- **Alarm**: When set to ON, the FSK module data transceiver is enabled to pass on external commands.

- **Home Screen**: With Rotate set to OFF, the display orientation can be fixed to Landscape or Portrait.

8.3 MODIFYING SEVERAL TABLETS

Each of the settings outlined above can also be accomplished with a text editor. Simply supply the word ON or OFF in the following txt files in mpTouch/settings/ = Virtual/LED/Rotate/Logging/Autostart/Alarm_on.TXT

Home.txt is supplied with the word LANDSCAPE or PORTRAIT. By using mass copy routines, all tablets can quickly be configured without manually going via manageear.

It remains necessary to reboot the players to ensure settings have been applied correctly.

8.4 APK (FOLDER)

Installing/upgrading several apps in one go on a large number of devices in the standard, manual way, can be time consuming. For a hassle free solution, place any install-apk of any standard app in the /apk/ folder on the MPtouch™ and select **Install APKs** in manageear. This will install and/or upgrade all of them in a single go. At the end of the install process, the device will automatically reboot and the newly installed/upgraded apps can be found in the apps section on the player. The original apks are left untouched in the /apk/ folder. They are archived here and can be re-used or re-installed if required.

8.5 IMAGINEEAR (FOLDER)

The /imagineear/ folder on the flash memory serves the same purpose as the /apk/ folder. Any (updated) install apk from imagineear can be placed there and will be processed in a similar manner by tapping **Install APKs** in manageear. The separation of folders is done simply to reflect a separation between external apps and apps produced by imagineear. The /imagineear/ folder also holds version records of earlier versions for reference purposes.

8.6 OTHER FUNCTIONS DEFINED IN /MPTOUCH/SETTINGS/ NOT INCLUDED IN MANAGEEAR

- Create **controls.txt** with the word OFF inside and the standard 2 second control pop-up at every start of a dynamic media block is suppressed.
- Create **battery.txt** and its number will override the current battery counter. This can be useful for maintenance purposes when swapping batteries with a known charge history.
- Create **brightness.txt** with 2 numbers (1-100) separated by a comma and the first number is the default brightness percentage at boot and the second the standby brightness percentage (after 30 seconds of non-use). Standard values are 50,15 (%).
- Create **font.txt** with 3 x 3 numbers (0-255) without commas to construct the font colour used when displaying Text files in tourBuilder. 3 numbers for Red, Green and Blue in serial manner. So White requires the number array **255**255**255**, Red requires **255**000**000**, Green requires **000**255**000** etc etc.

3. BATTERY

The battery app of imagineear is always active and best not to uninstall. Its main function is to monitor rack insertions in order to increment the battery counter indicating how often a particular battery has been used so far. With virtual keys enabled, it can be seen in the system tray bottom right corner (little i logo). Press it and it will pop up a message displaying the current counter and the current battery voltage. Further functions are explained in more detail below

9.1 MONITORING

As touched upon, it increases the current battery counter value each time a player is inserted into a rack. A **copy** of the most current value can be found in the /LOG/battery.txt file. Altering this value there has no effect.

When the battery is very low in value, it can happen that it boots the MPtouch™ when being inserted into a rack to charge. This would bypass the system code that puts the device into sleep mode upon a rack insertion (that code simply has not started yet at that moment). The battery app performs a double check to assure the device ultimately does enter sleep mode. Otherwise an active screen and touch panel could overheat the device when left for extensive periods inside a rack slot.

The current value is constantly passed on to tourBuilder.

9.2 DATE/TIME

The default method of Android to set its date/time/time-zone is via Wi-Fi where it polls atomic-based clock servers on the internet. However, it is imaginable that large numbers of MPtouch™ players do not have permanent Wi-Fi/internet access. The battery app detects the presence of a file DATE.TXT in the root of the flash memory, reads the date-modified attributes of it, sets the MPtouch™ clock accordingly and then deletes this file. This allows mass copy software to create this file, in order to date/time synchronize a large number of MPtouch™ devices at the same time.

Reptor, imagineear's mass copy software (see 11. Using Reptor) creates this file on each device at the end of every up/download action and upon removal from the rack (do not wait too long with removing the devices in order to prevent a time offset), the battery app syncs the date/time.

9.3 RESETTING BATTERY COUNTER VALUE

The battery app receives the command from the manageear app to reset the battery counter in case a new battery is inserted. It is recommended to change a battery after 750 standard charge cycles for stable performance. At that time, the counter stored inside the MPtouch™ needs to be reset in order to reflect the new battery pack.

9.4 TRANSFERRING BATTERY COUNTER VALUE

For maintenance purposes, it may be desirable to swap over sets of batteries with a certain charge history from one MPtouch™ batch of devices to another batch. In that case you'd need the battery counter value to travel with each battery. Step 1 would be to record its individual value (either manually noted from the tourBuilder app or digitally noted from the value inside /LOG/battery.txt). You perform this action on each MPtouch™ where you take out this battery.

Step 2 is to reset the battery counter on that MPtouch™ (see above). Step 3, after inserting the battery into another MPtouch™, is to transfer this recorded value to that MPtouch™. Create a battery.TXT in /mptouch/settings/ with this number and the battery app will use this value to override its internally stored value and by that, adapt the value belonging to this inserted battery.

4. UPDATING APPS

Updating (imagineear or 3rd party) apps can be done in several (parallel) ways:

- Obtain the latest APK copies from your support person. Load these anywhere onto the MPtouch™ and run them locally via the File Manager app found under Apps = browse to them and tap them. Or:
- Place them into the /apk/ and/or /imagineear/ folder and execute **Install APKs** from the manageear app. This will install all of them at the same time. Or:
- Go to the Google Play store and download and subscribe the latest versions (just search for **imagineear** to locate them). With a valid Google account and wifi on, automatic notifications will be send to the MPtouch™ an update is available (and depending on your chosen settings in your Google account, whether it also automatically updates)

5. UPDATING FIRMWARE

New versions of the firmware will be made available in the form of a single file called **UPDATE.ZIP**. Obtain a copy via your support person and load this file to the root of the flash memory of the MPtouch™ (or use Reptor to mass transfer it to multiple devices in parallel). Unplug the MPtouch™, go to SETTINGS, BACKUP&RESTORE and select RECOVERY. The MPtouch™ will reboot and process the new firmware. A subsequent reboot at the end of this process will finish upgrading the firmware.

6. DATA LOGGING

All visitor steps from entering a tour to its end/exit are (anonymously) recorded on the MPtouch™ for later retrieval and analysis. Each "visitor" is recorded in an individual, UTC time-stamped (and named), TXT file in the /LOG/ folder and this user file lists all user steps taken in chronological and time-stamped order when they happen. These files can be individually accessed and/or mass downloaded to a computer via Reptor. From there, we have instructions available to upload these to a database analysis suite on-line, called the ArtTool. With ArtTool, one can generate a set of default reports. Custom reports are programmable upon request. Ask your imagineear representative for more details.

12.1 ENABLING DATA LOGGING

In order for logging of user files to start, use manageear and set Logging to ON. Reboot the device.

12.2 LOG FOLDER

Every start of a tour activates a new user file. Its name indicates the (UTC) time this user starts a tour and the top line lists the folder chosen. From that point onwards, every content block that is scheduled/accessed is listed, pre-leading the time it got started. A user file stops the moment the tour is exited (via 9999) or the MPtouch™ is inserted into the rack without a *proper* tour ending. All user files generated on a particular MPtouch™ are located in the /LOG/ folder.

12.3 ANALYSIS STEPS

For convenience, Reptor software allows for mass downloading of this LOG files. Once all files from all devices are downloaded, Reptor also has a function to pack them all into a single ZIP archive and will prompt the location where this ZIP archive can be found locally. The ZIP archive is to be uploaded to the on-line ArtTool data analysis suite where it can be processed to user reports. Contact your imagineear representative for more details about this.

7. SETTING UP AN MPTOUCH™ AS A BEACON

As mentioned, each MPtouch™ has a FSK data module, allowing it to send and receive short burst data messages to any other MPtouch™. By default, each MPtouch™ can be set to ***receive*** these messages by turning Alarm ON in manageear. So how to **SEND** messages to an MPtouch™ and what message to send?

13.1 OVERVIEW OF GENERAL PREPARATIONS

- At the location where one wishes to send messages to any MPtouch™ in that area, one picks any MPtouch™ to act as a sender.
- In manageear, set 'Autostart tourBuilder' to OFF. It is also best to enable virtual/LED keys in order to control the device.
- Go to settings, manage apps, uninstall imagineear.battery. A ***sending*** device requires permanent power and the battery app will put an MPtouch™ to sleep mode when connecting it to a USB charger. This is inconvenient.
- Go to Apps, start FSK SENDER. Go to Settings.

13.2 SETTING THE BEACON'S MESSAGE

- In case of sending an ALARM message, tick on Message to transmit. Change the *Default message* to **ALARM** (all capitals).
- In case of sending a TRIGGER message, change the *Default message* to **TRIGGER(XXXX)** where XXXX are the 4 digits of the content block to start automatically on each MPtouch™ when it is in range of the beacon.
- In case of video-sync, contact your imagineear representative.

13.3 ACTIVATING THE BEACON'S MESSAGE

- Escape settings via the back key to return to the main FSK sending program. Tick Start. The MPtouch™ will now send the message twice a second until stopped.
- By default, the power settings are at maximum (+5dBm) and transmission is on Channel 2401 (2.401 Ghz) at 1000bps. This will normally yield a range of 5-10 meters depending on radio propagation factors on location.
- One can increase the range by decreasing the Send interval to 333/250 (3 to 4 times per second). One can decrease the range by decreasing the Power.
- Best settings are to be determined on location and can be changed under settings of the FSK Sender App.

13.4 THINGS TO CONSIDER

- In case the MPtouch™ is used as an Alarm beacon, do not forget to secure its own safety and operations. It can be stolen too.

- We advise to provide a permanent power point close to where the beacon is to operate and encapsulate it in a key box with staff access only. Inside this key box, the MPtouch™ can be safely attached via a USB charger to this power point
- We also advise to pad the back of the MPtouch™ with Velcro so it can be easily attached and detached after initial programming and repetitive check intervals by staff to confirm it is still functional.
- Its transmission direction is (when held in front of you, screen facing forward) out of its back, in the direction of your line of sight. It is best to be positioned vertically (hence the Velcro) with its transmission direction pointing towards people trying to leave the premise with the device.
- To aid in staff checking regularly whether it is still operational, the FSK Sender app by default beeps when it is transmitting. This sound can be raised/lowered when the LED keys are activated (via manageear)

8. Using Reptor

14.1 Purpose of Reptor

Reptor is a windows (only) program that is designed to push or pull data to as many devices as possible at the same time, as quickly as possible. All imagineear family products are supported. It is supplied free of charge under fair use policy.

14.2 Requisites of Reptor

- It runs on Windows 7 and/or Windows 8 (run as Administrator)
- Windows considers it quite a nasty program as it can decimate hundreds of "drives" in a single click. By default, windows does not allow it to run in order to protect users against mayhem.
- To lift these restrictions, a pc account has to
  - Have (local) **administrator** privileges
  - **User account control** is to be set to OFF
- By default, the program does not require installation and can be run from any folder. For windows 8, it is best placed inside the **Program Files** folder.
- By default, the program only allows 5 parallel devices at the same time. To lift this restriction, obtain a registration code that is unique to each computer. This registration code is to be send digitally to imagineear. imagineear will create a counter code that is to be entered into the program. After a restart, Reptor is now fully operational.
- We normally recommend a Teamviewer session to remote install and configure this program together with the local system administrator.

14.3 Using Reptor

- Determine what needs doing. Uploading content from a master set located on the computer, whether or not to download LOG files from the devices and whether to do it all at once or in chunks (for computers will less RAM memory).
- Select the appropriate actions to perform by ticking the right boxes. Often these actions apply to all connected devices so tick **Show All labels**. Labels on each batch of devices can be set/altered and used later to discriminate between batches of devices in order to send different master sets to different devices. This however is out of scope for this manual.
- Attach the devices one by one, either via the local USB ports or via the racks. Wait for them to settle under **My computer**. We advise to turn on the computer's sound and wait for the standard USB recognition sound coming from the computer before one attaches another device. Once all devices at attached and recognized, press **Scan devices**. This will present a list of devices currently attached and found by the computer. Make sure it matches the number of devices physically attached to it.
- Pressing **Save to devices** then perform the selected action. Progress indicators show the state of execution of the action. When done, an overlay message will pop up and the computer will send a reminder audio message every 5 seconds.

- Remove the devices and press **Scan devices** until it no longer shows any. This also stops the repetitive audio message.
- Insert a new batch of devices and repeat the above.
- For further assistance and troubleshooting, contact your imagineear representative.

14.4 Alternative to Reptor (PC/MAC)

Reptor is a mere aiding tool to process a lot of devices at the same time. It is not of mandatory nature. One can always copy/paste/delete/overwrite each device via the standard removable media interface embedded into every PC as well as Mac. Due to an ever increasing number of anti-virus suites like McAfee, Kaspersky, Norton that can block undesired programs, it has become increasingly complex to determine why Reptor sometimes does not run on a particularly configured computer. We often cannot offer any other solution but to disable these instead of adapting to each and every computer configuration.

9. CHARGING RACKS

15.1 ON/OFF SWITCH

On the front of each smartCharger is a combination of on/off switch on top of a fuse holder. Prior to powering any rack, make sure the switch is set to off and the rack does not hold any devices. Insert the power cord on the left hand side. Then switch on the rack. The light should illuminate. If it does not, check the fuse (below). When it does, insert players one by one and visually check they make proper contact. Determine for each device it is making proper contact (= depending on the battery, it will show red or green). When the devices are new, it may be a bit tough to insert them deep enough. This effect will wear out after a few insertions.

15.2 FUSE

In case the switch does not illuminate when flipped to the ON position, check the fuse holder below it. It is a so-called bayonet open/close model. In order to open the compartment, push and rotate CCW. Then release. The fuse-holder pops to the front and can be taken out to inspect the fuse. The fuse is of type **5x20** and rated **1Amp, slow burn**. Normally, when a fuse is blown, it can be visually seen. Replace it. In order to close it again (and make proper contact), push it in and turn CW. Often the fuse itself is not damaged but the compartment merely opened.

15.3 LINKING THE RACKS HORIZONTALLY

One can daisy-chain the racks horizontally by inserting the next rack to the right of the chain and clicking the power plug of the rack on the left into the power socket of the rack on the right. We recommend not to go beyond 10 racks per horizontal row due to increasing chances the chain gets mechanically interrupted. Each rack consumes a peak wattage of 35 Watts so local electricians can calculate overall power requirements. To facilitate/improve mechanical stability of a horizontal row, each rack comes with a little metal "lock" that can be inserted at the left/right top at the front. It keeps 2 racks together from moving horizontally apart.

15.4 STACKING THEM VERTICALLY (FEET/HOLES)

At the top of each rack are 4 plastic covers. When removed, they reveal an opening for the rack feet of a rack that can be placed on top of it. The feet of that rack will fit inside these holes. Just like LEGO.

15.5 DESK DESIGN

Here are some design considerations for a desk to hold a multitude of racks:

- Do not go beyond 10 racks per horizontal row in case the racks cannot be mechanically secured
- Each rack is of footprint 150.00 (deep) x 153.00 mm (wide) x 295.00 mm (height, including feet in their minimum position - they are adjustable in height-)
- At the ***right*** end of a row, add 30mm for the power plug that comes out of the utmost right slotted rack
- At the ***left*** end of a row, add 70mm to allow inserting a straight IEC C13 power connector

- Do not forget each row requires 1x IEC C13 power cord to connect (and therefore mains socket and/or distribution boxes). http://en.wikipedia.org/wiki/IEC_60320 shows the type used.
- Make sure the racks can rest against a vertical FLAT back plate. Staff will push the device into the racks and this effect will cause rack sliding issues when not compensated by a proper back plate
- Make shelves no deeper than 20 cm deep. That way, the lanyards at the front will not clutter in front of the racks (and hang freely). For lanyards to not touch the floor and ergonomic considerations, it is also advisable to start the bottom shelve at 550 mm height.
- Do not stack higher than 3 racks vertically due to increasing mechanical imbalance. Our advice is to match 1 horizontal row by a (wooden) shelve and to make it a tight fit (295.00mm exactly). That way the only shelve that requires proper vertical support to withstand the total weight is the bottom shelve.
- The racks cool themselves by natural air convention. At the bottom of each rack (front and back) there are air inlets and air outlets at the top. Make sure there is enough natural air flow for the desk. Do not seal/make air obstructing shutters on both vertical sides to allow for an open air flow.

15.6 USB CONNECTIONS

Each rack comes equipped with a standard mini-USB and USB-A connector. It allows for daisy-chaining of data to a computer and each subsequent rack. If you start by inserting a USB-A (big) connector into a USB port of the computer, cascading racks can't go wrong with a standard mini-USB to USB-A cable.

There are several rules to respect:

1. USB 2.0 does not allow more than 128 USB devices per USB host controller. Nowadays laptops are often used for connecting to a chain of racks and these normally have only 1 host controller (with 2 to 3 USB ports). Each rack consists of 2 HUBs (which are also recognised as a valid USB device).

2. USB 2.0 host controllers cannot communicate with devices more than 5 hubs away. Windows will pop up a message in case too many racks are cascaded, so no more than 4 racks per computer USB port can be controlled.

3. In reality, a laptop with 3 USB ports can control 3 parallel chains of daisy-chained racks (4,4,2 racks or 4,3,3), yielding a total parallel capacity of 100 devices at the same time.

4. The more devices, the longer it takes before a computer will be able to detect all of them at the same time. For every device, it has to load and settle a digital driver. As the data transfer to the devices is extremely quick (6Mbyte per device), in reality a single setup of 3-4 racks is found adequate as an uploading subset for all the devices in all the racks. The devices are simply batch processed in turn through this subset of connected racks.

5. HEADSETS

imagineear's behind the neck headset has been optimized for mass use. It has no moving parts, is extremely flexible and one size fits all. Defective parts are easy to exchange without the need to send the entire headset back.

16.1 WEARING THEM

The only large obstacle found on location, is that it is sometimes unclear to especially the elder generation on how to exactly wear them. Several suggestions are often used, ranging from dress dolls, videos or a simple instruction from staff to compare them to wearing reading glasses on a necklace.

16.2 STOCKING THEM

Mobile garment racks are favourite where they are hung on horizontal pegs.

16.3 REPLACING THE WIRE

Often when defective, it is the wire that is the cause. Therefore we have made it easily detachable with standard 2.5mm to 3.5mm connectors. Spare wires are economically available. Any other 2.5mm to 3.5mm stereo wire can be used.

Specifications for imagineear wires are:

- Fitted with a straight plug.
- The wire is treated with a solvent to make it smooth/slippery.
- The round cylinder shape near the contacts has been optimized for optimal grip into the device and speaker compartment.

16.4 REPLACING AND CLEANING THE FOAMS

- For hygienic purposes, it is best to replace the foams as and when needed. By twisting the speaker inside the ear shell, the foam can be removed and replaced.
- We supply headsets with a spare set of foams, which means when washing them, headsets can still be used.
- Washing is best done in a washing machine with a temperature below 30°C. To avoid staining, ensure no other colour sensitive garments are added to the wash. We recommend using special washing bags.

16.5 SUPPORT

Additional spare wires and spare foams are available upon request.