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## REMOTE DISPLAY TL-6860 USER MANUAL



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**Record of revision**

<b>Revision</b>	<b>Revision Date</b>	<b>Description</b>	<b>ECO#</b>	<b>Insertion date</b>	<b>By</b>
PrA	13.04.2013	Initial version			Hovorka

-  **WARNING:** This product is not TSO approved as a flight instrument, therefore, the manufacturer will not be held responsible for any damage caused by its use.
  
-  **WARNING:** The altitude calculated by the INTEGRA is geometric height above mean sea level and could vary significantly from altitude displayed by pressure altimeters in aircraft.
  
-  **CAUTION:** The 3D Terrain Map supplied with INTEGRA relies on GPS data, this system is subject to changes which could affect the accuracy and performance of the INTEGRA's 3D Terrain map. The electronic chart is an aid to navigation and is designed to facilitate the use of authorized government charts, not replace them. Land and water data is provided only as a general reference to your surroundings. The positional accuracy of the land and water data is not of a precision suitable for use in navigation and it should not be used for navigation. Only official government charts and notices contain all information needed for safe navigation – and, as always, the user is responsible for their prudent use.
  
-  **CAUTION:** The Terrain feature is for supplemental awareness only. The pilot/crew is responsible for all terrain and obstacle avoidance using information not provided by the INTEGRA 3DTerrain feature.
  
-  **CAUTION:** Although the INTEGRA series are precision electronic Navigation AIDs (NAVAID), any NAVAID can be misused or misinterpreted and therefore become unsafe.
  
-  **CAUTION:** Use the INTEGRA at your own risk. To reduce the risk of unsafe operation, carefully review and understand all aspects of this Owner's Manual and the Flight Manual Supplement, and thoroughly practice basic operation prior to actual use. When in actual use, carefully compare indications from the INTEGRA to all available navigation sources, including the information from other NAVAIDS, visual sightings, charts, etc. For safety, always resolve any discrepancies before continuing navigation.
  
-  **CAUTION:** The INTEGRA -series does not contain any user-serviceable parts. Repairs should only be made by an authorized TL-elektronik service center. Unauthorized repairs or modifications could void your warranty and authority to operate this device under FCC Part 15 regulations.

- i NOTE:** It is the pilot's responsibility for initial missed approach guidance in accordance with published procedure. The unit may not provide correct guidance until established on a defined leg.
- i NOTE:** This device complies with Part 15 of the FCC limits for Class B digital devices. 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. Furthermore, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference, the user is encouraged to try to correct the interference by relocating the equipment or connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified avionics technician for additional help if these remedies do not correct the problem. Operation of this device is subject to the following conditions:

- (1) This device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation..
- (2) The INTEGRA display lenses are coated with a special antireflective coating which is very sensitive to skin oils, waxes and abrasive cleaners. It is very important to clean the screen using an eyeglass lens cleaner which is specified as safe for anti-reflective coatings and a clean, lint-free cloth.

To obtain accessories for your INTEGRA, please contact your TL-elektronic dealer. Help us better support you by completing our on-line registration form today! Registration ensures that you will be notified of product updates and new products and provides lost or stolen unit tracking. Please, have the serial number of your unit handy, connect to our web site ([www.tl-elektronic.com](http://www.tl-elektronic.com)) and look for our Product Registration link on the home page TL elektronik is fully committed to your satisfaction as a customer. If you have any questions regarding the INTEGRA, please contact our customer service department.

## Accessories and Packing List

The INTEGRA represents TL electronics' continued commitment to providing you with the most advanced technology available today — in an accurate, easy-to-use design suitable for all of your flying needs. Unless otherwise specified within this manual, the term “INTEGRA” applies to the TL-6524, TL-6724, TL-6624, TL-6824, TL-6560, TL-6760, TL-6660 and TL-6860.

Before installing and getting started with your new system, please ensure that your package includes the following items. If any parts are missing or are damaged, please contact your TL-elektronic dealer.

### Standard Package:

- INTEGRA Unit
- Installation Rack
- Accessories
- User and Configuration manual
- CD with software and Installation Manual
- Warranty Card

### Optional Accessories:

- Internal back-up Battery

Your aviation maintenance specialist should perform the installation and configuration of your new INTEGRA unit. The INTEGRA should be secured in the installation rack with the proper wiring connections. Be ready to answer any questions that your maintenance specialist could have about the installation such as location of antennas or any connections to other equipment in the panel.



## Limited warranty

The TL elektronik company warrants this product to be free from defects in materials and manufacture for three years from the date of purchase. TL elektronik will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labour. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL TL ELEKTRONIC BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.


To obtain warranty service, call the TL elektronik Customer Service (+420 49 548 23 92) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package and sent freight prepaid and insured to a TL elektronik warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. TL elektronik retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

## General description

**Thank you for purchasing the TL-elektronik INTEGRA. This section provides some important cautionary information and general usage instructions for this manual.**


### Before You Fly

We strongly recommended that you read this entire guide before attempting to use the INTEGRA in an actual flying situation. Additionally, we encourage you to spend time on the ground familiarizing yourself with the operation of the product. While first learning to use the instrument in the air, we recommend you have a backup pilot with you in the aircraft. Finally, we encourage you to keep this manual in the aircraft with you at all times. This document is designed to give you quick access to information that might be needed in flight.

 **CAUTION:** In a flying situation, it is the pilot's responsibility to use the product and the guide prudently.

### OEM Installations

If your INTEGRA is installed by an OEM aircraft producer, you may find that you are unable to access some menus and settings. Some TL-elektronik distributors customize various areas of the INTEGRA firmware to maintain a consistent pilot experience and minimize INTEGRA information issues across a large number of installations. Currently, OEMs can customize access levels to the following settings on TL-elektronik systems: EMS SENSOR setup menu, fuel calibration, trim calibration, flaps calibration, GPS/NAV setup menu, screen configurations, data logging, and checklists/data panels. OEM distributors have the option of customizing some or all of these areas. Please contact your aircraft's manufacturer if you have any questions about how your unit has been customized.

 **WARNING:** TL-elektronik Avionics' products incorporate a variety of precise, calibrated electronics. Except for replacing the optional internal backup battery in INTEGRA -based products per the installation guide, our products do not contain any field/user-serviceable parts. Units that have been found to have been taken apart may not be eligible for repair under warranty. Additionally, once a TL-elektronik unit is opened up, it will require calibration and verification at our factory before it can be considered airworthy.

**⚡ WARNING:** The INTEGRA is permanently supplied by the aircraft's power supply. Therefore, it is necessary to install a fuse to act as protection against a power surge. This will protect against the risk of fire and resulting damage to the INTEGRA and/or aircraft.

### About this Guide

This guide serves two purposes. The first is to help you configure and get acquainted with the INTEGRA's many functions. The second is to give you quick access to vital information. For detailed technical and installation information, please refer to the INTEGRA Installation Manual. In the electronic (.PDF) version of this manual, page and section references in the **Table of Contents** and elsewhere act as hyperlinks taking you to the relevant location in the manual. The latest version of this manual may be downloaded from our website at [www.tl-elektronic.com](http://www.tl-elektronic.com).

### Integra iFamily® Connection

#### The TL elektronik iFamily® BUS

If you have multiple TL elektronik products in your aircraft, they can be networked together via the TL elektronik **iFamily®** BUS. Units networked via **iFamily®** have the ability to share information with each other. Any product's data can then be viewed on any other screen in the **iFamily®** network. For example, an EFIS has the ability to display engine monitor information if it is connected to an EMS TL-6724. The **iFamily®** systems allows you to connect autopilot servos and remote compass.

**ⓘ NOTE:** That the failure of a unit in an iFamily® network may cause the loss of some or all data shared between units. In the example below, if the connected EMS TL-6724 were to fail, the EFIS/EMS would no longer be able to behave as an engine monitor.

### Compatibility of Integra Glass Cockpits

New Integra Glass Cockpits with 9" displays have same software architecture as Integra Glass Cockpits with 7" displays. This means that functionality is identical for both mentioned product lines. The product lines are fully compatible with each other. Practically this means that for example EFIS TL-6524 can be connected to TL-6760 via **iFamily®** BUS. Also HW solution for connection is identical for both product lines; the connectors are identical; so for example you can easily replace your TL-6624 with TL-6660 without any modification of harness.

Here is table describing part numbers for Integra Glass Cockpits:

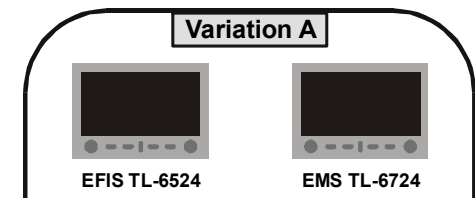
Functionality	Part Number for Integra with 7" display	Part Number for Integra with 9" display
EFIS & EMS	TL-6624	TL-6660
EFIS	TL-6524	TL-6560
EMS	TL-6724	TL-6760
Remote Display	TL-6824	TL-6860

### Explanation of Possible Connections

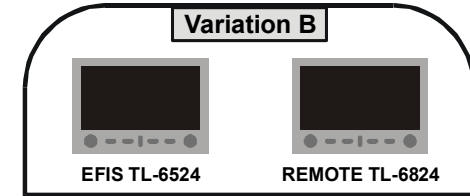
**i NOTE:** This section does not contain all possible connections. Introduction of new Integra Glass Cockpits with 9" displays to market bring many new possible connections.

Here are a few Instrument connection possibilities:

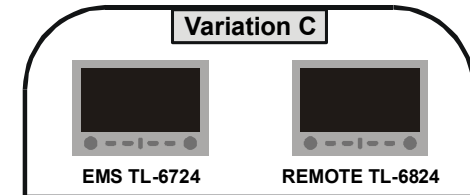
If you connect TL-6524 with TL-6724 you will be able to share the screen data between the two instruments



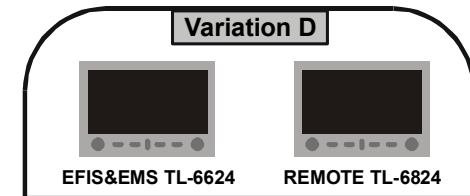
If you connect TL-6524 with TL-6824 you will be able to read the same data on TL-6824 as you have on TL-6524



If you connect TL-6724 with TL-6824 you will be able to read the same data on TL-6824 as you have on TL-6724



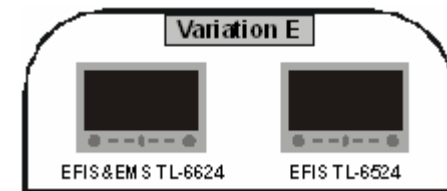
If you connect TL-6624 with TL-6824 you will be able to read the same data on TL-6824 as you have on TL-6624



### Back up System Recommendation

We recommend this configuration for safe panel system redundancy: **TL 6524 and 6624**

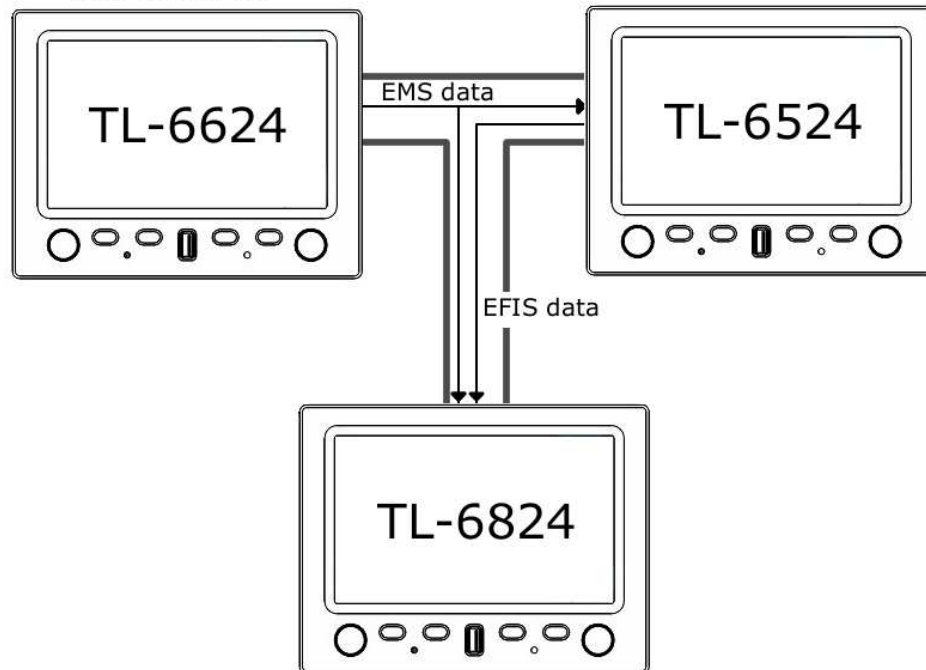
In the case of instrument failure flight information will be available on the second instrument



### Explanation of Priority setting for Data Sharing

The priority for Data Sharing is set in Setup Mode, separately for EMS data (in EMS Setup Mode) and for EFIS data (in EFIS Setup Mode). Although Setup Mode is subject of Configuration Manual, we explain priority setting of Data Sharing here to make you understand whole Data Sharing function at once.

EFIS Data Sharing:  
Low Priority set  
EMS Data Sharing:  
Low  
or  
High Priority set



Data Sharing “Priority” means importance of specific data (EFIS or EMS data), which the Integra is sending to bus.

For example:

The picture on right side shows three Integra units connected by bus. Arrows linking the units express actual flow of information. Connection of TL-6624 and TL-6524 creates EFIS data redundancy, because both units have internal sensors for measuring EFIS data. The both units sends EFIS data to the bus, because their EFIS Data Sharing is On (EFIS Data Sharing is not set to Off). EFIS data from TL-6524 takes priority over EFIS data from TL-6624 on the bus, because TL-6524 is set to higher EFIS Data Priority than TL-6624. Therefore TL-6824 receives EFIS data from TL-6524. But TL-6624 and TL-6524 displays their own EFIS data. Own data of the Integra always takes priority over data from the bus.





Because TL-6524 has no inputs for measurement of EMS data, the only way to display EMS data on the unit is to receive EMS data from TL-6624 via the bus. Therefore priority for TL-6624 EMS Data Sharing could be set to Low or High. There is no difference because this unit is only EMS data source.

TL-6824 hasn't got Data Sharing Setting. It only receives data available on the bus according to priority setting of data sources previously described. The only way to disable receiving and displaying data in standard screen is to unplug the bus from TL-6824.

**NOTE:** Explanation of priority setting is also applicable for Integra units with 9” displays, please see section Compatibility of Integra Glass Cockpits on page 11.

### The INTEGRA Glass Cockpit Instrument System

Before operation the INTEGRA, please check to see if there are any parts missing or damaged. If you have not received all the necessary components or if there are damaged components please contact TL-elektronic or your TL elektronik. dealer immediately. The INTEGRA requires a Remote Compass and GPS Receiver to provide a full range of functions.

-  **WARNING:** Obstacle clearance is not assured in 3D Terrain or Highway in the Sky (HITS) approach mode
-  **CAUTION:** If any display unit in the chain is inoperable, the display units will not be able to share information. The pilot must account for this down-graded mode of operation and expect data will not transfer between displays.
-  **NOTE:** It is highly desirable to provide each display unit with its own connection to each source of data if possible. This increases the redundancy of the system, and reduces the amount of lost function in the event a display unit becomes inoperative.
-  **NOTE:** Most, but **not all** data contained within this manual is accurate. Some differences may be observed when comparing the information in this manual to other instrument generation models.

### Before You Fly

We strongly recommended that you read this entire guide before attempting to use the INTEGRA in an actual in-flight situation. Additionally, we encourage you to spend time on the ground familiarizing yourself with the operation of the product. While first learning to use the instrument in the air, we recommend you have a backup pilot with you in the aircraft. Finally, we encourage you to keep this manual in the aircraft with you at all times. This document is designed to give you quick access to information that might be needed in flight.

-  **NOTE:** While in-flight, it is the pilot's responsibility to use this product and this guide prudently.

### Capabilities

The INTEGRA's robust design enables the use of a wide range of engines and sensors. You may configure the INTEGRA system to meet your monitoring requirements. The INTEGRA visual and audio warning systems give you immediate notification of any potential problem that might otherwise go unnoticed. The accurate and reliable solid-state sensors of the INTEGRA provide essential information with a user-friendly interface.

### Power

The INTEGRA requires between 10 and 30 volts DC for operation and should be connected to an external backup power supply with keep-alive voltage. The INTEGRA can be turned on during engine start.

The INTEGRA can be ordered with an optional internal Li-poly backup battery which allows the instrument to continue to operate in the event of an external power failure. This lithium-polymer battery is rechargeable and its charge is maintained by the INTEGRA.

If the always-on circuit is connected, the INTEGRA continues to charge its internal battery even if the instrument is turned off. This ensures a full charge for your internal emergency battery.

Under normal conditions, the internal battery should have a voltage between 11.1 and 12.6 volts. A new fully charged internal battery is rated for a minimum 30 minute of normal operation with the INTEGRA. If the INTEGRA has switched to its internal back up battery due to external power loss, it is advisable that you land your aircraft as soon as possible.

**i NOTE:** Battery life is dependent on for example, the brightness of the display and number of sensors which are battery-powered etc.



### Theory of Operation

The primary flight instruments on your EFIS display are generated using a group of calibrated sensors. All of them are solid state – that is, there are no moving parts. These sensors include accelerometers, which measure forces in three directions; rotational rate sensors, which sense rotation of all three axis; pressure transducers for measuring air data; and magnetometers on all three axis for measuring magnetic heading.

**i** **NOTE:** This product is intended for experimental and Light Sport Aircraft categories and is not approved for installation in Certified Aircraft.

## BASIC OPERATION

### Operation terminology

Term “select” in the context of Integra operation in this manual means this sequence of operation steps:

1. Highlight described menu option by rotating the knob.
2. Press the knob.

### Turning the INTEGRA ON

Press the right-hand knob to turn the Integra on and wait until the green backlight goes out.

**i** **NOTE:** The other knob and buttons are disabled when the INTEGRA is Shut Down.

### Turning the INTEGRA OFF

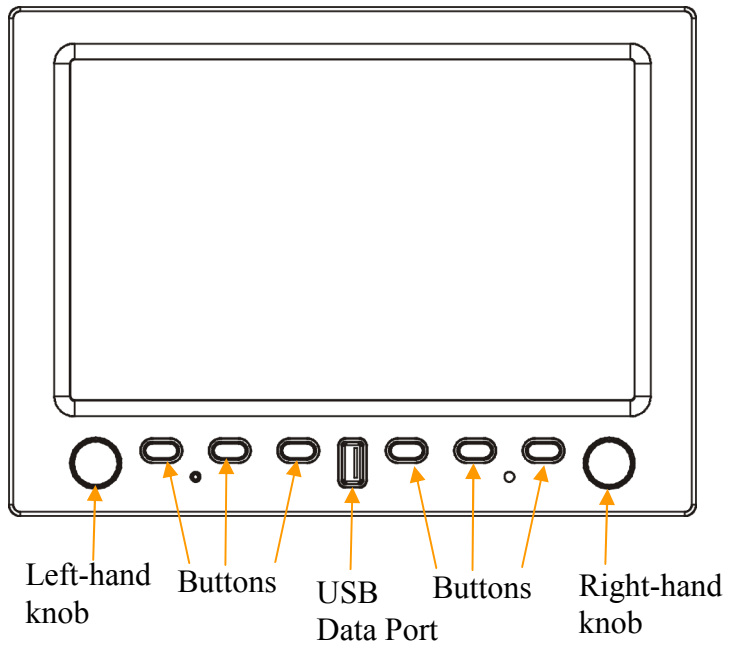
To turn off the INTEGRA and place it in Shut down Mode

3. Press the right-hand knob.
4. Select **Power Off**

**i** **NOTE:** All settings and calibrations will be stored when the INTEGRA is Powered Off.

### The INTEGRA Control Panel

The picture below shows Integra Control Panel. Integra Control Panel includes 2 knobs, 6 buttons and USB Data Port.



### Knobs

Control of all menus is really easy and simple. The two knobs have two interfaces - **press** and **rotate**. These provide particular menu options on different pages, and are used to

- scroll through menus
- adjust instrument parameters and settings

### Buttons and Labels

The **Button** and **Knob Labels** will appear as white on black writing in the default mode.

The **Labels** will be highlighted once the control panel is engaged by pressing a button or turning a knob.

The **Prompt Labels** turn red to match any urgent notice appearing on the screen.

### Data Port

The INTEGRA allows the pilot to enter checklists, flight plans, general information and update firmware through the USB port. This data must be verified for accuracy by the pilot prior to flight.

#### Access to Data Port function

If you want to work with data from an external source, plug a flash disk/memory stick into the USB port. Allow 10 seconds for the Integra to read the disk. Press the right-hand knob to enter the menu and select Enter Setup. When prompt “Are you sure you want to enter to setup?” appears, press button “Yes”.

Now the Integra is in Setup Mode. Button label “Data Port” is displayed. Press that button. Menu Data Port will appear containing the following:

- **Menu DATA PORT**
  - *Import Checklist*
  - *Import Configuration*
  - *Export Configuration*
  - *Export Flight Data*
  - *Export Service Log*
  - *Update Firmware*

**i** **NOTE:** If you can't see “Data Port” button label in Setup Mode, check correct flash disk connection.

Import Checklist	You can create your checklist on your computer and you can transfer this data into the Integra.
Import Configuration	You can create your configuration on your computer and you can copy these settings to the Integra.
Export Configuration	You can export your configuration from the Integra to your flash disk.
Export Flight Data	You can export your flight data from the Integra to your flash disk.
Export Service Log	You can export your service log from the Integra to your flash disk.
Update Firmware	You can update the firmware of Integra.

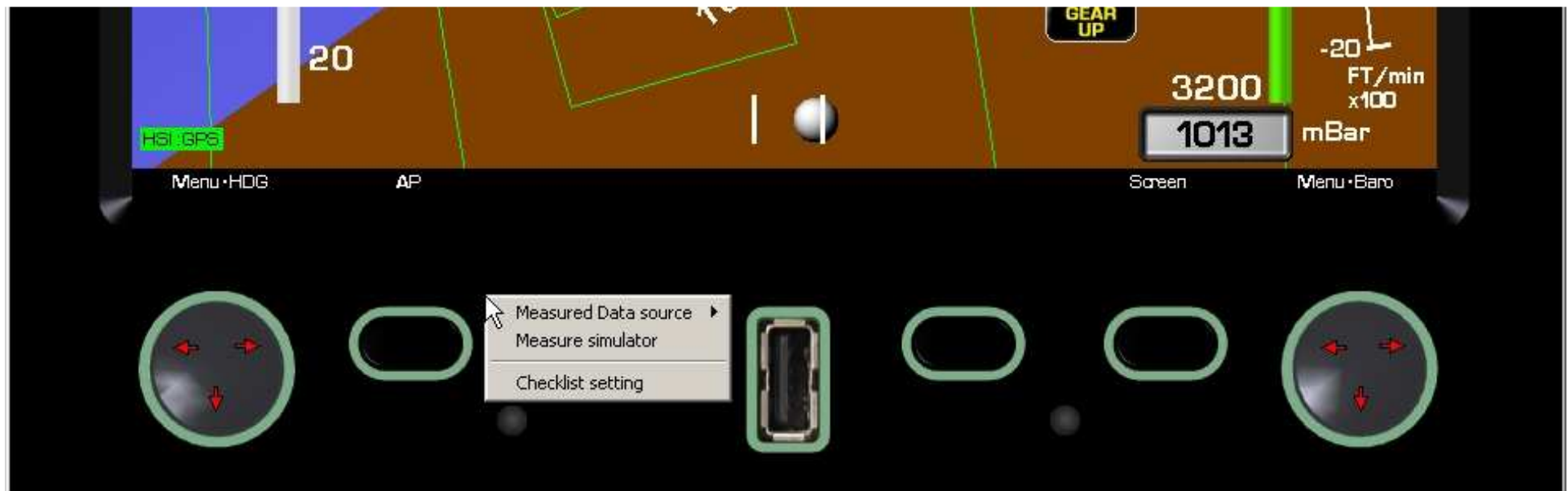
### Import Checklist

### The first step: Integra Demo PC application

#### To create or edit checklist:

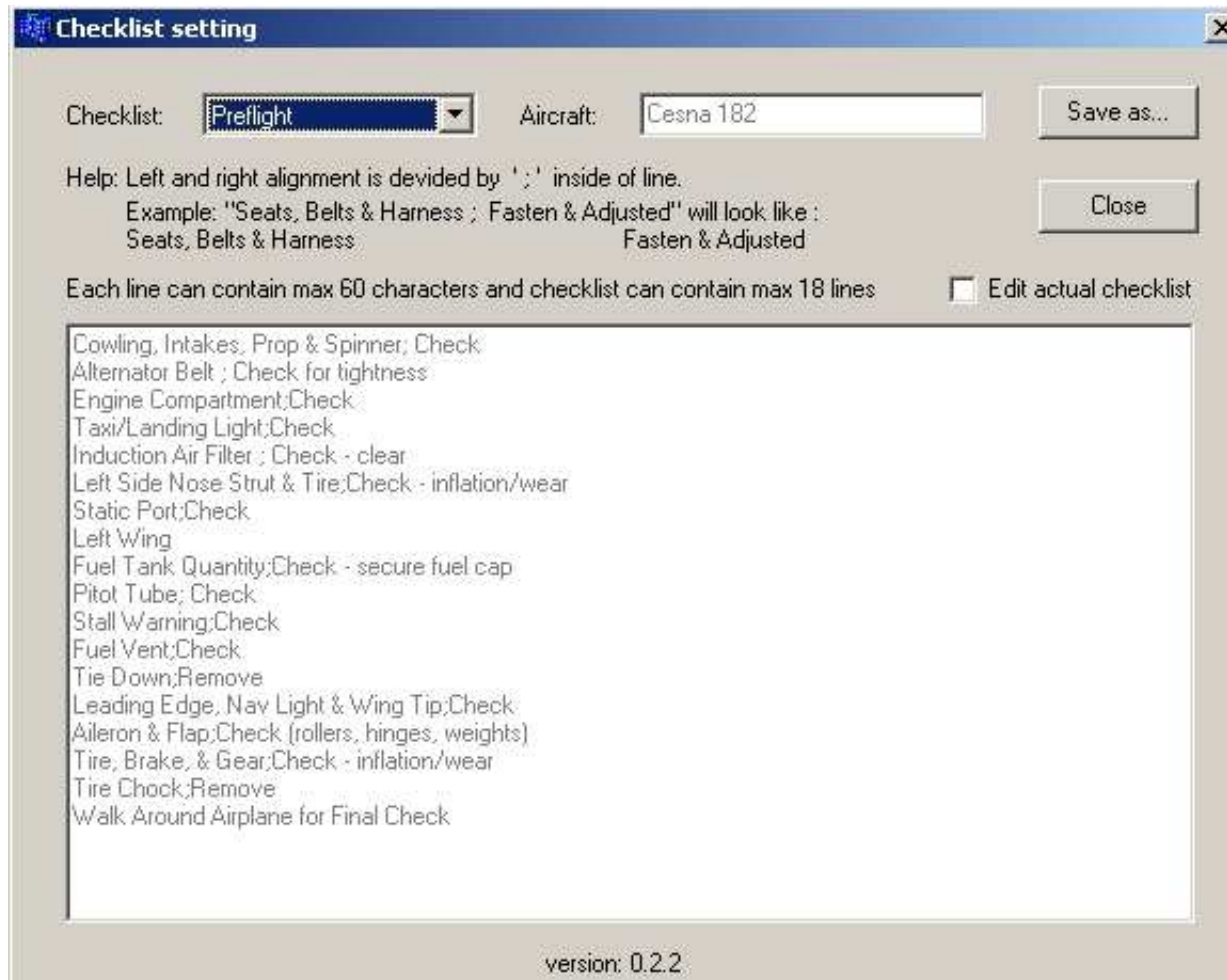
Installed Integra Demo PC application is required. You can obtain Integra Demo from TL-elektronic web site. (Products->LSA->category EFIS&EMS Integra->TL-6x24\*->Downloads-> Demo PC application.)

- 1) Connect USB flash drive to your personal computer. Run Integra Demo, press right mouse button over Integra buttons area. The context menu will appear:



\*Demo PC application is same for all versions of the Integra

- 2) Select Checklist setting from context menu. The Checklist setting window will appear:



- 3) From drop-down list “Checklist” choose desired checklist for editing. Select check box “Edit actual checklist” to edit chosen checklist. Now text of appropriate checklist changed from gray to black and you can edit it. After you’ll be satisfied with content of all checklists, select button “Save as...” to save complete set of checklists at once. In “Save as” window choose root directory of your USB flash drive.

#### **The second step: Uploading checklists to the Integra**

- 4) Plug a USB flash drive into the USB port of the Integra. Allow 10 seconds for the Integra to read the drive. Press the right-hand knob to enter the menu and select Enter Setup. When prompt “Are you sure you want to enter to setup?” appears, press button “Yes”. Now the Integra is in Setup Mode. Button label “Data Port” is displayed. Press that button. In menu Data Port select Import Checklist.






### Update Firmware

#### The first step: PC operation

- 1) Create the “tle” directory and then create the “update” directory inside the “tle” on your USB flash drive. So the path will be: X:\tle\update
- 2) Copy the file “fwu.tls” to the “update” directory (on your USB flash drive).

#### The second step: Uploading firmware to the Integra

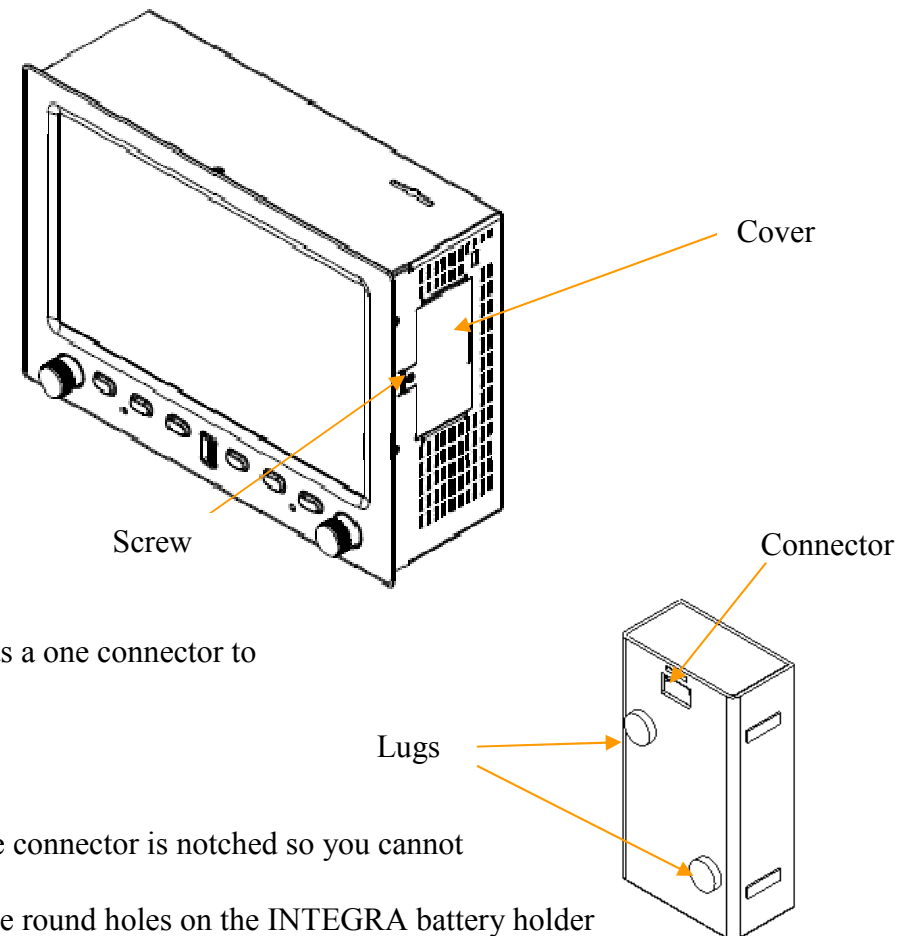
- 3) Plug USB flash drive into the USB port of the Integra. Allow 10 seconds for the Integra to read the drive. Press the right-hand knob to enter the menu and select Enter Setup. When prompt “Are you sure you want to enter to setup?” appears, press button “Yes”. Now the Integra is in Setup Mode. Button label “Data Port” is displayed. Press that button. In menu Data Port select Update Firmware.
- 4) Integra will display: "Are you sure you want to update firmware?" Press “yes”. There will be another warning message: "During operation do not power off instrument!!!" Press “OK”. The display shows you “Firmware update – Please wait while download is finished” while the firmware is loading. Do not touch any button or knob while the firmware is loading. The time for loading the firmware differs with every next firmware. The firmware loading time varies from each software upgrade package.

-  **CAUTION:** Ensure sustaining voltage during updating - if during updating fails the electric power supply, the Integra can be damaged.
-  **CAUTION:** Keep the USB flash drive connected with the Integra during updating.
-  **CAUTION:** This data port is intended only to be used with USB flash drive. Do not try to connect it to another USB device.

### Battery Installation

**⚡ WARNING:** Before installing battery turn off INTEGRA.

- Remove INTEGRA from mounting rack.
- Unscrew the battery cover located on the right side of the unit.
- After screw out carefully take off a sheet metal cover.
- The cable is attached to a holder of the battery with the baling wire – this wire must be removed.



- The battery is intended to be used only with the INTEGRA. The Battery has a one connector to link it to INTEGRA and two lugs which nicely lock it to the battery holder.
- Connect the cables located in the battery holder to the Back-up battery. The connector is notched so you cannot connect this cable incorrectly to the battery.
- Put the battery in to the INTEGRA battery holder so that the lugs fit into the round holes on the INTEGRA battery holder and **the connector must be on the top. You should obey this to prevent damage of the battery cable caused by sharp edges of the battery holder..**



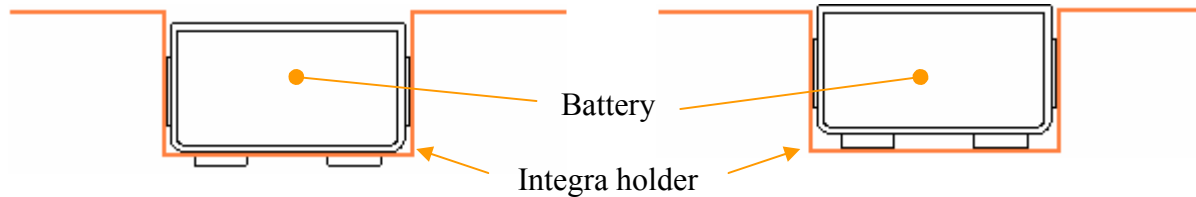
Cable for connecting INTEGRA with battery

**Before screwing the cover on make sure that the battery is not protruding and is properly placed in the INTEGRA battery holder. Then screw battery cover back on to INTEGRA.**

**⚡ WARNING:** To not apply pressure to the battery while re-installing the cover.

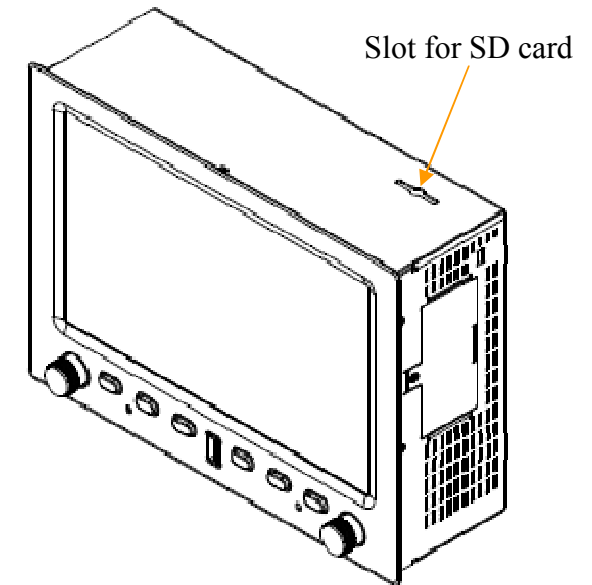
Correct battery installation in Integra

Incorrect battery installation in Integra



### SD card Installation

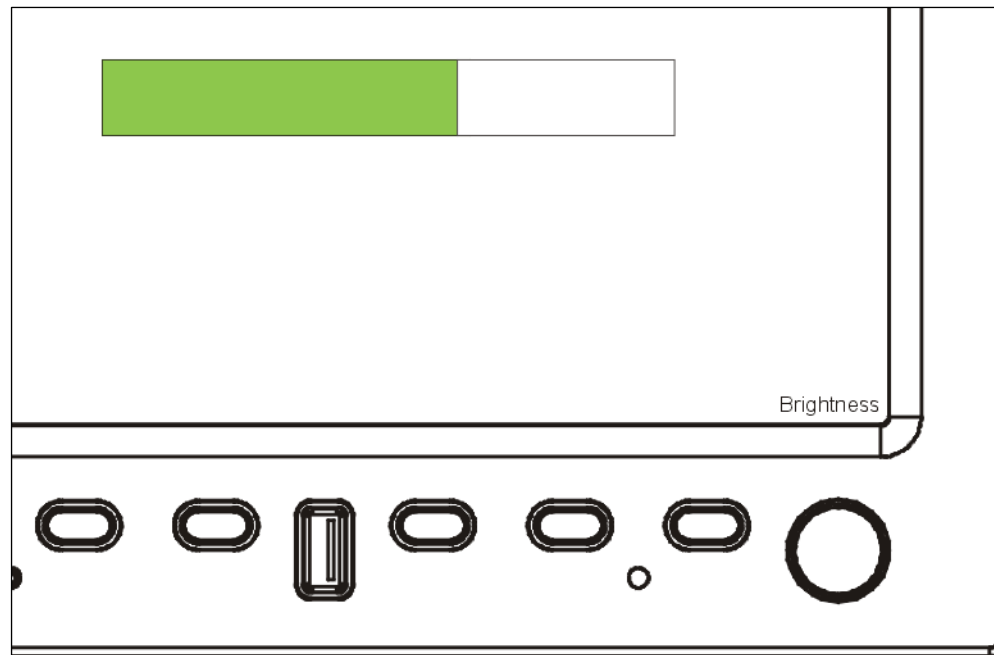
- Turn off INTEGRA.
- Remove INTEGRA from mounting rack.
- The slot for the SD card is situated on the top right side of INTEGRA.
- Now insert SD card into the slot so that the front SD card label is facing you.
- Carefully press the card down until you feel it click.
- The SD is now installed in the INTEGRA.
  
- If you want to remove the SD card, first carefully press down and the card will eject. You can then safely remove the card from the INTEGRA.



### Brightness

This controls the brightness of the LCD.

Press the right-hand knob and select Brightness. Rotate the knob to choose the level of brightness.



The green strip specifies level of brightness

- i NOTE:** This function is available only if DIMMER SOURCE CONTROL is set to MANUAL (Press the right-hand knob, select Enter Setup. When prompt “Are you sure you want to enter to setup?” appears, press button “Yes”. Now the Integra is in Setup Mode. Press the right-hand knob, select Other Setting & Calibration. New menu will appear. There select Backlight Control, then select Dimmer Source Control. Finally select Manual. Now manual setting of display brightness is enabled.

**Information about Battery**

**The INTEGRA utilizes a Lithium Polymer battery with the following characteristics:**

<b>Storage Temperature</b>	-20° C to 60° C (-4° F to 140° F)
<b>Recharge Life</b>	300 - 400 cycles

A Lithium Polymer battery operates without a memory effect, meaning it can be recharged before it is completely discharged without affecting the energy capacity.

- ⚠ CAUTION:** Keep the Battery Pack connector away from metallic objects.  
Any tampering of the cell within the INTEGRA Battery Pack is strictly forbidden in any circumstances.  
Do not immerse in water.  
Do not place near a heat source.  
Never heat the battery nor throw into a fire.  
Do not expose the battery pack to temperatures in excess of 60°C (140°F).

- ⚠ CAUTION:** The Integra Battery Pack is intended for use only with Integra Products.

**Disposal Procedures:**

For Ecological and Environmental reasons it is advisable to consult with local authorities for disposal regulations.

Integra Remote Display is designed for displaying all values measured by Integra EFIS&EMS, EFIS, EMS-see section Compatibility of Integra Glass Cockpits on page 11. (Wiring possibility with other Integra are display above). Integra Remote Display can provide information to the co-pilot or to inform other crew members. The low-profile of Integra Remote Display allows it to be installed into seat backs and by giving passengers flight information and the ability to watch films or listen to music stored on a flash drive, it enriches their flight experience.

- i NOTE:** Integra Remote Display is an auxiliary slaved system.
- i NOTE:** Integra Remote Display is intended to serve as a second screen displaying information it receives from another INTEGRA EFIS and/or EMS instrument.

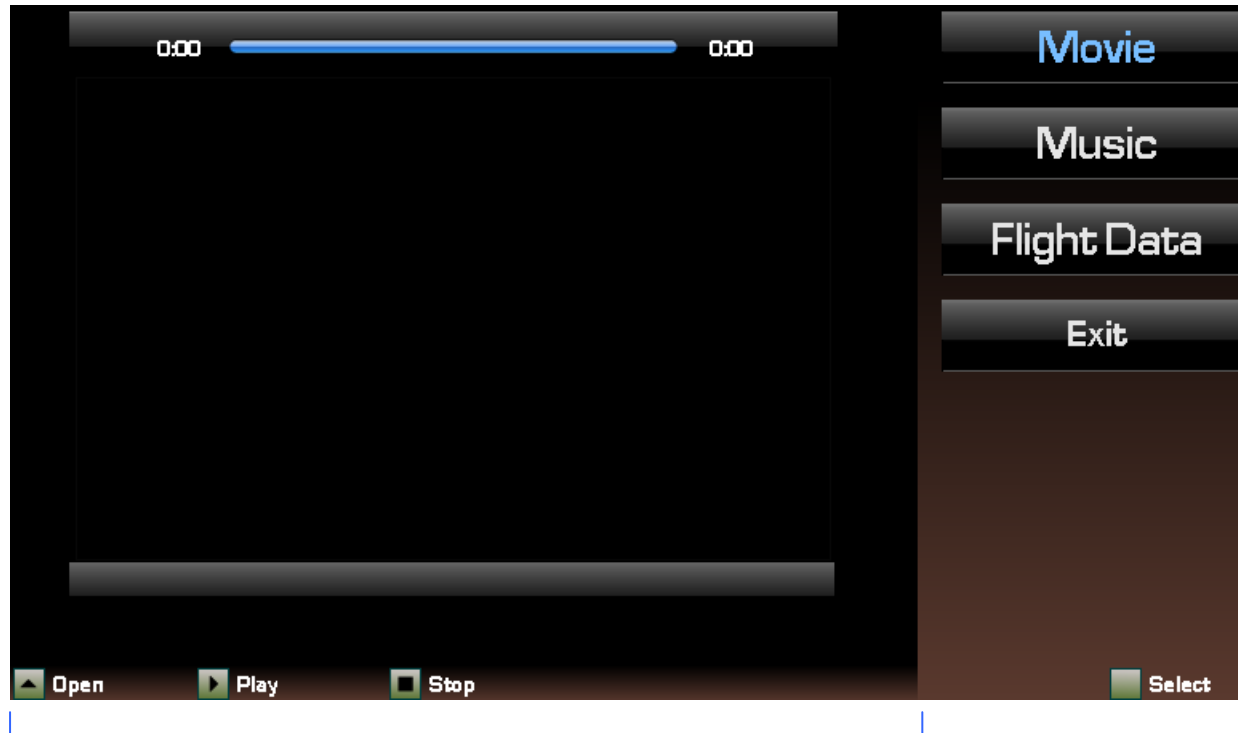
The operation of Integra Remote Display is identical to the operation of the INTEGRA device it is paired with; please consult the USER, CONFIGURATION and INSTALLATION manual of the connected instrument for details on the correct operation of Integra Remote Display.

**Menu Entertainment**



Menu Entertainment serves for access to multimedia functions of the Integra. You can listen to your favourite music or watch movies. These multimedia possibilities of the Integra enrich passengers' experience from flight.

The Integra is displaying Entertainment Screen:



**Part for displaying chosen option**

**menu**

### Handling the menu

Rotate the right-hand knob for scrolling through menu. Select desired function by pressing the right-hand knob.

**i NOTE:** If you want to open multimedia file on plugged SD card, you won't be able to have connected USB flash drive. That's because the Integra will check primarily for connected USB flash drive. Then if USB flash drive isn't found, the Integra will check for SD card. And if SD card is not either plugged, then the Integra will load files from internal memory.

### Option Movie

Probably you want to watch some movie on your USB flash drive or SD card. To do this, follow these instructions:

Press the left-hand knob labeled "Open". Window will appear for selecting video file. There you can scroll through currently viewed directory by rotating the left-hand knob. Names of displayed subdirectories are closed in square brackets [ ]. Playable files are displayed with postfix ".3gp".

If you want to move down to some subdirectory, choose desired subdirectory and press the left-hand knob.

If you want to move up to the parent directory, choose item [..] and press the left-hand knob.

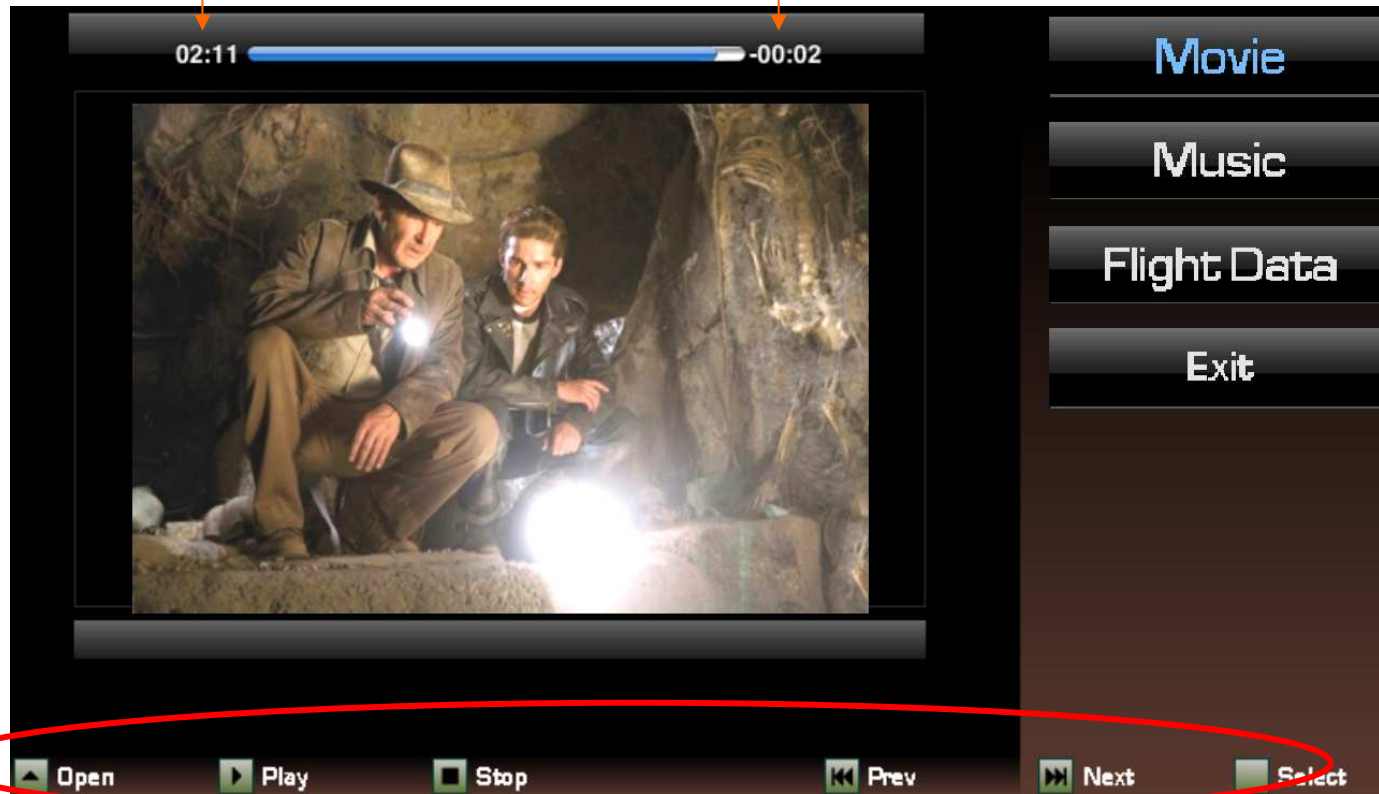
For replaying desired video file, just choose appropriate item and press the left-hand knob. The Integra should be replaying your video now.

For maximizing video presentation to full screen press button labeled "Maximize". For returning to previous screen, press any button.

**i NOTE:** The Integra only supports .3gp video format. Other files-video of different format or any other data aren't displayed in Select video file window.

elapsed time of video

remaining time of video



**buttons' labels**

Opens window for selecting desired video file or folder

Plays currently stopped video

Stops currently played video

Plays previous track

Plays next track

**Option Music**

**i** **NOTE:** The Integra only supports MP3 audio files.

The screenshot shows a music player interface with the following elements and annotations:

- Movie** (button)
- Music** (button, highlighted in blue)
- Flight Data** (button)
- Exit** (button)
- Track Name:** "Bye Bye Love" (labeled "name of currently played track")
- Progress Bar:** Shows "0:21" (labeled "elapsed time of track") and "3:29" (labeled "remaining time of track").
- Track List:** "1 of 4" (labeled "number of currently played track in list and total number of tracks in list").
- Icons:** Loop (labeled "loop playing mode") and Shuffle (labeled "shuffle playing mode").
- Bottom Bar (circled in red):**
  - Open:** "Opens window for selecting desired track or folder" (labeled "buttons' labels")
  - Play:** "Plays currently stopped track"
  - Stop:** "Stops currently played track"
  - Prev:** "Plays previous track"
  - Next:** "Plays next track"
  - Select:** (no label)

## Option Flight Data

This option soothes desire for flight info of impatient and curious passengers. It displays Airspeed, Altitude and Time to arrival.



## Option Exit

The option exits Entertainment Screen.

## Abbreviations

<b>ACTV</b> — Active	<b>DME</b> — Distance Measuring Equipment	<b>HFOM</b> — Horizontal Figure of Merit
<b>ALT</b> — Altitude	<b>DTK</b> — Desired Track	<b>hg</b> — Inches of Mercury
<b>APR</b> — Approach	<b>EFF</b> — Efficiency	<b>HPL</b> — Horizontal Protection Level
<b>APT</b> — Airport	<b>ELEV</b> — Elevation	<b>HITS</b> — Highway in the Sky
<b>ARSPC</b> — Airspace	<b>ENDUR</b> —Endurance	<b>HWY</b> — Highway
<b>ARTCC</b> — Air Route Traffic Control Center	<b>ENR</b> — En Route	<b>IAF</b> — Intermediate Approach Fix
<b>ARVL</b> — Arrival	<b>ENT</b> — Enter	<b>ID</b> — Identifier
<b>AUX</b> — Auxiliary	<b>EPU</b> — Estimated Position Uncertainty	<b>ig</b> — Imperial Gallons
<b>AVGAS</b> — Aviation-grade Gasoline	<b>ESA</b> — En Route Safe Altitude	<b>ILS</b> — Instrument Landing System
<b>AVTN</b> — Aviation	<b>ETA</b> — Estimated Time of Arrival	<b>IND</b> — Indicated
<b>BARO</b> — Barometric setting	<b>ETE</b> — Estimated Time En Route	<b>INT</b> — Intersection
<b>BRG</b> — Bearing To	<b>°F</b> — Degrees Fahrenheit	<b>INTEG</b> — Integrity
<b>°C</b> — Degree Celsius	<b>FAF</b> — Final Approach Fix	<b>ITI</b> — Imminent Terrain Impact
<b>C/V</b> — COM/VLOC	<b>FF</b> — Fuel Flow	<b>kg</b> — Kilograms
<b>CAS</b> — Calibrated Airspeed	<b>FIR</b> — Flight Information Region	<b>kHz</b> — Kilohertz
<b>CDI</b> — Course Deviation Indicator	<b>FLTA</b> — Forward Looking Terrain Avoidance	<b>km</b> — Kilometers
<b>CLR</b> — Clear	<b>FOB</b> — Fuel On Board	<b>kph</b> — Kilometers Per Hour
<b>COM</b> — Communications Transceiver	<b>FPL</b> — Flight Plan	<b>kt</b> — Knots
<b>CRSR</b> — Cursor	<b>fpm</b> — Feet Per Minute	<b>L/VNAV</b> — Lateral and vertical navigation
<b>CTA</b> — ICAO Control Area	<b>FREQ</b> — Frequency	guidance, LNAV/VNAV service level
<b>CTAF</b> — Common Traffic Advisory Frequency	<b>FSS</b> — Flight Service Station	<b>LAT/LON</b> —Latitude/Longitude
<b>CTR</b> — Center (see ARTCC)	<b>ft</b> — Feet	<b>lb</b> — Pounds
<b>CUM</b> — Cumulative	<b>G/S</b> — Glideslope	<b>LCL</b> — Local
<b>DB</b> — Database	<b>gl</b> — gallons	<b>LFOB</b> — Left-over Fuel On Board
<b>DEN</b> — Density	<b>GPS</b> — Global Positioning System	<b>LNAV</b> — Lateral Navigation only
<b>DEP</b> — Departure	<b>GS</b> — Ground Speed	<b>LNAV+V</b> — Lateral Navigation with advisory
<b>DEPT</b> — Departure guidance	<b>HAL</b> — Horizontal Alarm Limit	vertical guidance
<b>DIS</b> — Distance	<b>HDG</b> — Heading	<b>LOC</b> — Localizer

**LPV** — Lateral Precision Performance with Vertical Guidance  
**LRES**— Left-over Fuel Reserve Time  
**Lrg**— Large  
**lt**— Liters  
**°M**— Degrees Magnetic  
**m**— Meters  
**MAP**— Missed Approach Point  
**MAHP**— Missed Approach Hold Point  
**MAPR**— Missed Approach guidance  
**mb**— Millibars of Pressure  
**Med**— Medium  
**MGRS**— Military Grid Reference System  
**MHz**— Megahertz  
**mi**— Statute Miles  
**MOA**— Military Operations Area  
**mph**— Statute Miles Per Hour  
**mpm**— Meters Per Minute  
**mps**— Meters Per Second  
**MSA**— Minimum Safe Altitude  
**MSG**— Message  
**MSL**— Mean Sea Level  
**mul**— Multicom  
**NATNL**— National  
**NAV**— Navigation  
**NAVAID**— Navigational Aid  
**NDB**— Non-Directional Radio Beacon  
**NM**— Nautical Miles  
**NRST**— Nearest  
**NUM**— Number

**OBS**— Omnibearing Selector  
**OCN**— Oceanic  
**PDA**— Premature Descent Alert  
**P.POS**— Present Position  
**PROC**— Procedure(s)  
**PROV**— Province  
**PTK**— Parallel Track  
**PWR**— Power  
**RAD**— Radial  
**RAIM**— Receiver Autonomous Integrity Monitoring  
**REF**— Reference  
**REQ**— Required / Requirements  
**RESTRICTD**— Restricted  
**RNG**— Range  
**RTC**— Required Terrain Clearance  
**RX**— Receive  
**SBAS**— Space-Based Augmentation System  
**SID**— Standard Instrument Departure  
**Sml**— Small  
**SPD**— Speed  
**SQ**— Squelch  
**SRFC**— Surface  
**STAR**— Standard Terminal Arrival Route  
**SUA**— Special Use Airspace  
**SUSP**— Waypoint sequencing suspended  
**°T**— Degree True  
**TACAN**— Tactical Air Navigation  
**TAS**— True Airspeed  
**TAT**— Total Air Temperature

**TEMP**— Temperature  
**TER**— Terrain  
**TERM**— Terminal  
**TKE**— Track Angle Error  
**TMA**— ICAO Terminal Control Area  
**TRANS**— Transition  
**TRFC**— Traffic  
**TRK**— Track (also Ground Track) Angle  
**TRSA**— Terminal Radar Service Area  
**TWR**— Tower  
**TX**— Transmit  
**UTC**— Coordinated Universal Time (also GMT or “zulu”)  
**UTM/UPS**— Universal Transverse Mercator / Universal Polar Stereographic grids  
**VAL**— Vertical Alarm Limit  
**VAR**— Variation  
**VER**— Version  
**VFOM**— Vertical Figure of Merit  
**VFR**— Visual Flight Rules  
**VLOC**— VOR/Localizer Receiver  
**VNAV**— Vertical Navigation  
**VOL**— Volume  
**VOR**— VHF Omnidirectional Radio Range  
**VPL**— Vertical Protection Level  
**VS**— Vertical Speed  
**VSR**— Vertical Speed Required  
**WAAS**— Wide Area Augmentation System  
**WPT**— Waypoint  
**WX**— Weather  
**XTK**— Crosstrack Error

## Technical Parameters

### Physical characteristic

Width	240.8 mm	9.480"
Height	178 mm	7.008"
Depth	61.5 mm	2.421"
Panel rectangle hole	233.8x172 mm	9.205"x6.772"
Weight without battery	1093 g	2.41 lb
Weight with battery	1193 g	2.63 lb

### General Specifications

Operating Temperature Range	- 20°C to +60°C
Humidity	95% non-condensing
Altitude Range	10000 meters max (32808 feet max)
Power Range	10.0 to 32.0 Volts
Max. Signalization	30 Volts, 1 Ampere
Power Consumption	1.15 Ampere @ 14VDC 1.83 Ampere when battery is charging
Vibration	5 to 500 Hz
Show Rate (LCD Refresh)	15 fps depends on volume of information displayed

### Long-term Memory and communication

Storing Rate	0.1 to 60 seconds user selectable
Memory Capacity	Scheck®method
Data Saved Endurance	30 years
Rolling Memory life-time	100 000 hours @ 1 second storing rate



## Communication

USB 1.1	12 Mb/s
USB 2.0	480 Mb/s
CAN BUS	1 Mb/s

## Display parameters

Resolution	800x480 pixels
Brightness	800 cd/m <sup>2</sup>

<b>Memory card</b>	Integra support SD and SDHC memory card
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# REMOTE DISPLAY TL-6860 USER MANUAL



Part Number

**TLX-6860X-DU-001-PrA**

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