BECKER
AVIONIC SYSTEMS

OPERATING INSTRUCTIONS
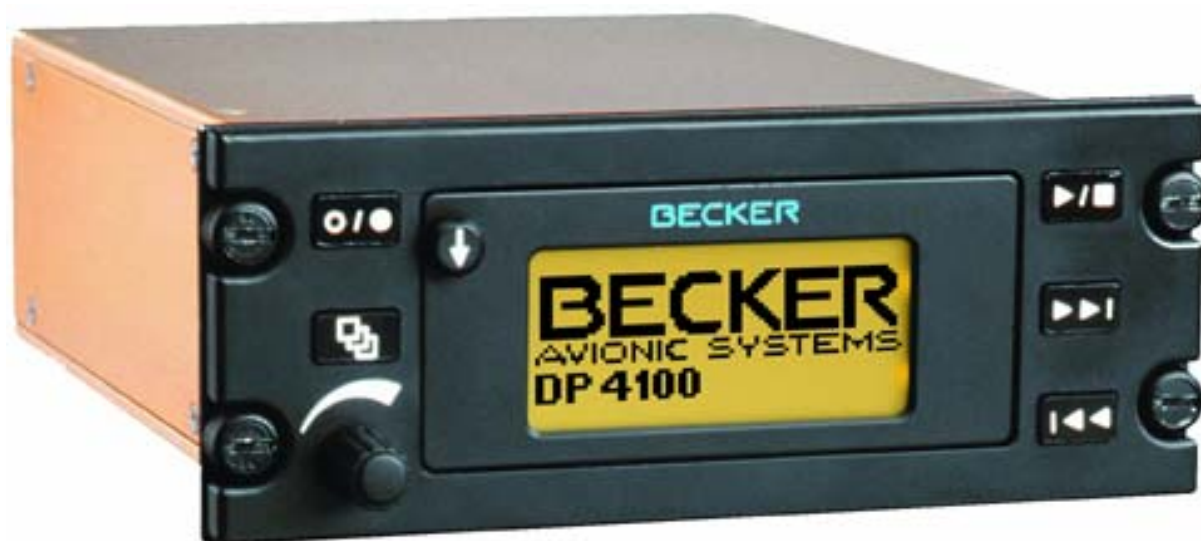
Digital Player
DP4100

Article-No.: 0530.727-071

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INTRODUCTION

Thank you for purchasing the BECKER Digital Player DP4100.

The DP4100 can be installed in the instrument panel of an aircraft and is easy to operate. The used technology is to the state of the art.

Important

To fully utilize the capabilities of your DP4100, please carefully read these operating instructions, before you start operating the system.

This manual is written for software version 2.00 or later and is not suitable for earlier software versions. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

If you have any questions regarding the operation of the DP4100, please get in contact with your nearest BECKER dealer or with the BECKER customer service.

Keep these "Operating Instructions" carefully. It contains important safety and usability information for the DP4100.

The CAUTION and NOTE highlights in this manual have the following meanings:

CAUTION	Failure to comply or incorrect compliance with these instructions or procedures can lead to damage the equipment.
NOTE	Feature to which attention should be drawn.

Safety Information

- Do not connect the unit to a voltage source of more than $32.2V_{DC}$.
- Do not connect the unit to a power source with wrong polarity.
- Avoid installing and using the unit in environmental temperatures below -20°C or over +55°C.
- Switch off the unit when starting or shutting down motors or engines.
- The unit should be protected from the aircraft system by its own 350mA circuit breaker.

General Information

The Becker Digital Player DP4100 is an audio playback system for passenger information, safety instructions or music to be used in aircraft cabin environments.

It can act like a standard CD-player (music entertainment) or an announcement system with a display based user guidance.

The audio tracks (music or announcements) are stored by using a special file and folder structure on standard PCMCIA flash memory cards which are inured for vibration or mechanical shocks. The MPEG2 Layer3 (MP3) file format is used to ensure an easy and up to date handling. By this, standard tools can be used for recording of new announcements or music.

The file and folder structure on the used memory card decides the kind of operation of the DP4100. There are 2 types of cards supported:

- "Music-Card"   The DP4100 acts like a CD-player.
- "Announcement-Card"   The DP4100 acts as an announcement system.

The "Music-Card" can be used to playback up to 999 music tracks from one memory card. The number of tracks which can be stored on a card depends to the available memory size and the used bitrate.

With an "Announcement-Cards", the DP4100 supports up to 99 missions stored on a card.

The DP4100 supports ATA-Flash-Cards with a memory space up to 2GByte. The used standard for the cards is the PCMCIA PC-Card type. With an adapter available by third parties, Compact Flash Cards can be used as well.

The ATA-Norm ensures that the memory cards can be read and written with a standard personal computer. Please advise that the file naming must be in accordance to the DOS constraints which means up to 8 chars for the name and up to 3 chars for the file extension.

For preparation of cards to be used inside the DP4100 system, a special software tool running on standard personal computers is available. This tool is delivered on a CD-ROM which also contents the system and software manuals.

CAUTION

*The DP4100 operates with ATA-flashcards only. SRAM cards
or other memory card standards will not be accepted.*

For retrofit reasons, the DP4100 is pin compatible with the TP3100
analog audio tape player provided by BECKER in the past.

The DP4100 supports several interfaces for flexible system integration in
a wide range of fixed and rotary wing aircraft.

Available Versions

DP4100-(001)   Article-No.: 0527.343-925
- Control output for external eject indication
- Rated output: 0.775V at 600Ω

DP4100-(002)   Article-No.: 0527.351-925
- Control output for external run indication
- Rated output: 0.775V at 600Ω

DP4100-(003)   Article-No.: 0527.361-925
- Volume control with max. 20dB attenuation
- Rated output: 0.775V at 600Ω

DP4100-(004)   Article-No.: 0527.378-925
- Volume control with max. 60dB attenuation
- Rated output: 0.775V at 600Ω

DP4100-(005)   Article-No.: 0543.284-925
- Control output for external eject indication
- Rated output: 2.4V at 600Ω

Accessories

The following articles are contained in the scope of delivery:

Name of the item	*Article-No.*
DP4100 Cardsetup Software (CD-ROM incl. manuals in PDF format)	0546.763-909

The following articles are not contained in the scope of delivery:

Name of the item	*Article-No.*
Cable Jack 25-pin (incl. locking device)	0430.293-254
Demo Flashcard 64MB	0546.658-909
PCMCIA ATA Flashcard 16MB	0551.635-965
PCMCIA ATA Flashcard 32MB	0549.126-965
PCMCIA ATA Flashcard 48MB	0552.550-965
PCMCIA ATA Flashcard 64MB	0549.134-965
PCMCIA ATA Flashcard 128MB	0549.142-965
PCMCIA ATA Flashcard 256MB	0549.150-965
PCMCIA ATA Flashcard 512MB	0577.847-965
PCMCIA ATA Flashcard 700MB	0592.730-965
PCMCIA ATA Flashcard 1GB	0592.749-965
PCMCIA ATA Flashcard 1.6GB	0592.757-965
PCMCIA ATA Flashcard 2GB	0592.765-965

OPERATING CONTROLS
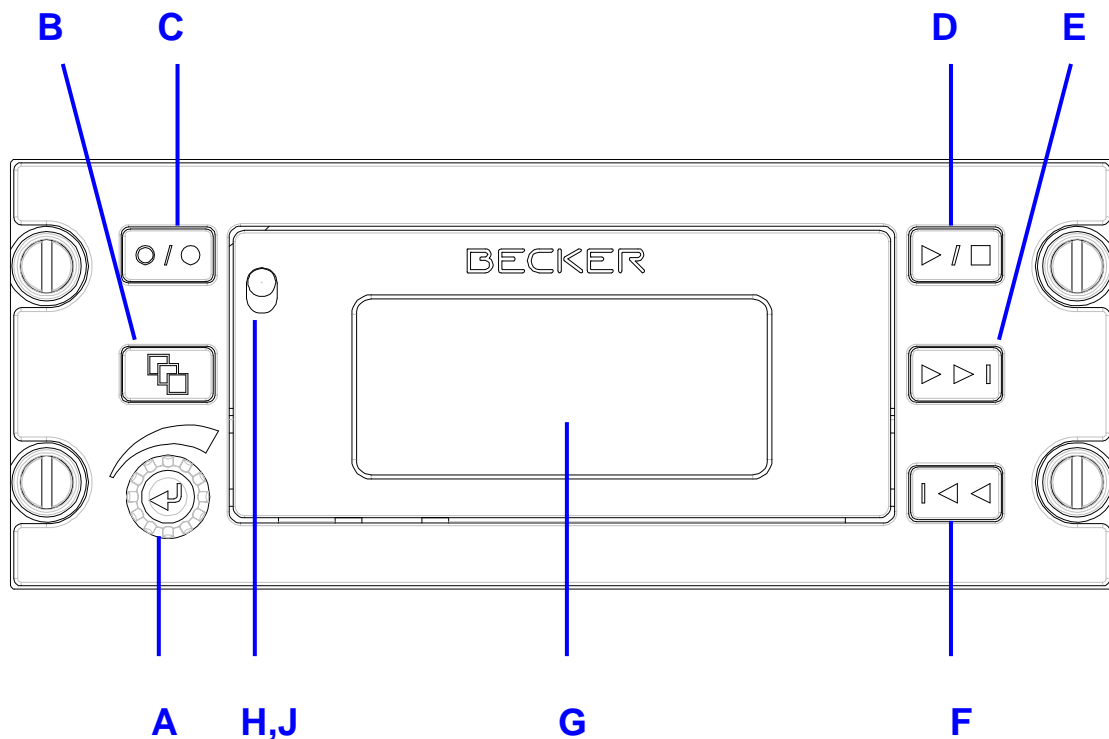
Description and Function of Operating Controls

Fig.	Control	Description	Function
A	Data Selector	Rotary switch with push button	Data selection or volume control
B	Menu Button	Push button	Menu selection
C	On/Off Button	Push button	System on/off switch
D	PLAY/PAUSE/STOP button	Push button	Start, pause and stop of audio playback
E	SELECT RIGHT button	Push button	Forward selection
F	SELECT LEFT button	Push button	Backward selection
G	Display	Dot-matrix LC-Display	Displaying system status and selection possibilities
H	RELEASE Button	Slide button	Unlock display flap
J	Slot	PCMCIA slot	Memory card adaptation

Operating Instructions

Memory Card Exchange

Before using the DP4100 please ensure that a memory card is inserted.

The memory card slot is located behind the display. For access please move the *RELEASE Button* (H) down to unlock the display flap. The flap will open by turning down and the card slot is in sight.

Insert your prepared memory card into the slot, as far as it goes.

CAUTION

Ensure that the memory card is from the correct type and its top and bottom side is not confused when you insert it into the slot.

To exchange already inserted cards, please press the remove push button on the right side of the slot. This button stays impressed if no card is in the slot.

Power On

The DP4100 can be switched on by pressing the *On/Off Button* (C) for a short time. By doing this, the initialization process of the system is started. In parallel, the Becker logo is viewable on the display. In the background, a self test routine is processed which checks the internal system functionalities and the presence of a correct memory card. If the memory card is identified, the card information is shown on the display for some seconds and afterwards the system switches to the "STOP" mode and is available for operation.

Depending on the file structure on the memory card, the DP4100 operates in two different operating modes. Either the file structure is in accordance to a "Music-Card" and the DP4100 acts like a CD-player or it is in accordance to an "Announcement-Card" and the functionalities are prepared for an announcement system.

"Music-Card" Operations

"STOP" Mode

After the start-up procedure and reading of the card data, the DP4100 switches automatically into the "STOP" mode. This is the normal start or full-back mode of the system.
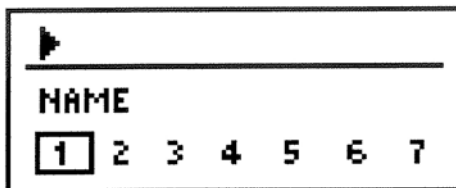
This mode is displayed like following:
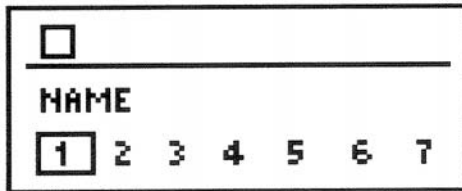
Upper line	□	=	STOP indication
Inner line	NAME	=	Title of the active music track
Bottom line		=	List of available track identifiers

"PLAYBACK" Mode

Pressing the *PLAY/PAUSE/STOP Button* (D) while in "STOP" mode, will switch the system into "PLAYBACK" mode. The playback of the current music track starts immediately.

This mode is displayed like following:

Upper line	►	=	PLAYBACK indication
Inner line	NAME	=	Title of the active music track
Bottom line		=	List of available track identifiers

After finishing the playback of the current music track, the next title out of the available list will be played until the last title is played or the operating mode is changed by the user.

Pressing the *SELECT RIGHT Button* (E) skips the current tile and switches to the next one. The playback of the new title starts.

Pressing the *SELECT LEFT Button* (F) restarts the current title. A double press skips to the previous music track, if available. In the bottom line of the display, the current title is marked by a frame.

The volume of the audio signal can be adjusted during playback by turning the rotary knob (A).
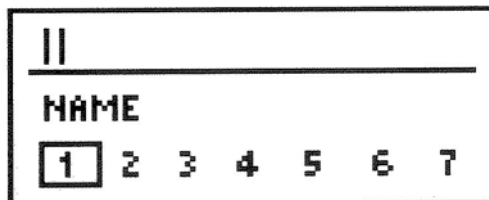
NOTE

The volume adjust functionality depends to the type of DP4100 you are using. By configuration, the volume can be adjusted via the front panel of the unit or by an external potentiometer. In addition, the range of adjustment can be narrowed.

Pressing the *PLAY/PAUSE/STOP Button* (D) for a time longer than 1 second, stops the playback of the music and the DP4100 goes back into the "STOP" mode.

"PAUSE" Mode

Pressing the *PLAY/PAUSE/STOP Button* (D) for a time shorter than 1 second while the DP4100 is in "PLAYBACK" mode, the playback of the current title will be paused.

This mode is displayed like following:

Upper line	**II**	=	PAUSE indication
Inner line	NAME	=	Title of the active music track
Bottom line		=	List of available track identifiers

By pressing the *PLAY/PAUSE/STOP Button* (D) once more, the DP4100 continues playing the current track.
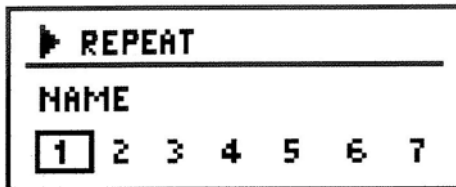
NOTE

The PAUSE mode can be activated by a discrete input on the system connector. As long as this input is activated, the playback will be paused. The display will also identify this as described before.

"REPEAT" Mode

The DP4100 provides continuous playback functionality in addition. Simultaneously pressing the buttons *SELECT RIGHT* (E) and *SELECT LEFT* (F) while the system is in "STOP" mode, activates this operating mode.

This mode is displayed like following:

```
┌─────────────────────────┐
│ ▶ REPEAT                 │
│ ─────────────────────────│
│ NAME                     │
│ ┌─┐                      │
│ │1│ 2  3  4  5  6  7     │
│ └─┘                      │
└─────────────────────────┘
```

Upper line	►Repeat	=	PLAYBACK indication
Inner line	NAME	=	Title of the active music track
Bottom line		=	List of available track identifiers

The continuous playback will start immediately with the current music track. After playing the last available title, the playback will be continued with the first title.

Pressing the *PLAY/PAUSE/STOP Button* (D) for a time shorter than 1 second will exit the "REPEAT" mode and switch the system into the STOP" mode.

Playlist Preparation

To prepare a user defined playlist out of the available music tracks, the DP4100 provides a "PROGRAM" mode.

Pressing the *MENU Button* (B) while the system is in "STOP" mode, activates this operating mode.

The "PROGRAM" mode is displayed like following:

```
PGM MODE
 TRACK 3
 NAME
 1   4   3
```

Upper line	PGM MODE =	PROGRAM mode indication
Inner lines	=	Track number and title
Bottom line	=	just selected items for playlist

Pressing the *SELECT RIGHT/LEFT Button* (E,F) or turning the *DATA SELECTOR* (A) scrolls trough the available audio tracks (titles). The selection of a title for usage in the playlist is done by pressing the *DATA SELECTOR push button* (A). If necessary, the same title can be used in the playlist several times.

After completion of the playlist, the playback can be started directly by pressing the *START/PAUSE/STOP Button* (D).

Playlist Playback

The playback of a playlist can be operated in the same way as described in the standards "PLAYBACK" mode. The availability of a playlist is identified by "Pgm Play" in the upper line of the display behind the play/pause/stop identification.

Playlist Deletion

Pressing the *MENU Button* (B) while in the DP4100 is in "STOP" mode

with "☐ Pgm Play" identification, will delete the prepared playlist. After a short message on the display, the system switch back to the standard "STOP" mode (see page 11).
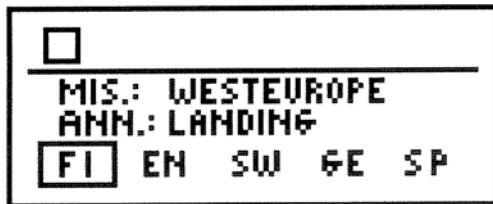
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"Announcement-Card" Operations

"STOP" Mode

After the start-up procedure and reading of the card data, the DP4100 switches automatically into the "STOP" mode. This is the normal start or full-back mode of the system.

This mode is displayed like following:

Upper line	□	=	STOP indication
Inner lines	MIS.:	=	Identifier of the selected mission
	ANN.:	=	Identifier of the current announcement
Bottom line		=	List of available languages

The displayed identifiers for mission and announcement depend on the configuration of the memory card. Either they are the filenames or a term which is stored in dedicated text files. Please read the CardSetup Software manual for details.

The current announcement can be changed by using the *SELECT RIGHT* (E) / *SELECT LEFT* (F) buttons or the *DATA SELECTOR* (A) rotary switch.
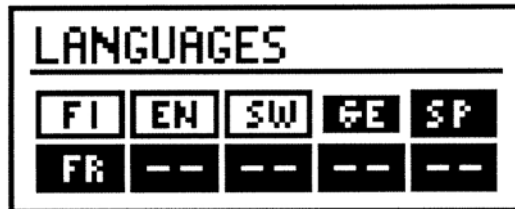
Pressing the *MENU Button* (B), gives the operator the possibility to select the languages for playback or changing the current mission.

Language Selection

By pressing the *MENU Button* (B) the first time, the system will switch into the "SELECT LANGUAGE" mode.

This mode is displayed like following:

Upper line	LANGUAGES	=	Language selection indication
Other lines		=	List of available languages

Up to 10 languages can be defined for a mission. They will be displayed in two lines by their identifiers in small boxes. Unused boxes (less than 10 languages used) are marked with two dashes. Languages which are activated for playback are displayed with a frame; deactivated languages are displayed inverse. The just edited language item has a frame which is blinking.

Using the *SELECT RIGHT/LEFT Buttons* (E,F) or the *DATA SELECTOR* (A) scrolls trough the list of available language items. The status (activated or deactivated) of the just marked item can be changed by pressing the *ENTER Knob* (A).

NOTE

The settings for activated or deactivated languages will not be stored permanently. This means, after restart of the DP4100, all available languages for the missions are activated.

Mission Selection

By pressing the *MENU Button* (B) the second time, the system will switch into the "SELECT MISSION" mode.

This mode is displayed like following:

Upper line	MISSIONS=	Mission selection indication
Other lines	=	List of available missions

Using the *SELECT RIGHT/LEFT Buttons* (E,F) or the *DATA SELECTOR* (A) scrolls trough the list of available missions. The mission in the middle of the 3 lines (identifier with bigger letters) framed by triangles represents the currently selected mission.

A triangle at the bottom or top line of the listed items shows that additional missions are available in the list.

NOTE

If prepared on the used memory card, a mission called "MUSIC" can be selected. By selection of this mission, the DP4100 operates similar to a CD-player. In this "mission", all audio tracks will be played in succession.

By pressing the *MENU Button* (B) once again, the system will switch back into the "STOP" mode.

"PLAYBACK" Mode

Pressing the *PLAY/PAUSE/STOP Button* (D) while in "STOP" mode, will switch the system into "PLAYBACK" mode. The playback of the current announcement starts immediately.

This mode is displayed like following:

Upper line	►	=	PLAYBACK indication
Inner lines	MIS.:	=	Identifier of the selected mission
	ANN.:	=	Identifier of the current announcement
Bottom line		=	List of available languages

The selected announcement is played with all of the selected languages. Already finished languages are marked inverse and the just played one is shown by a blinking frame.

The volume of the audio signal can be adjusted during playback by turning the *DATA SELECTOR* (A).

NOTE

The volume adjust functionality depends to the type of DP4100 you are using. By configuration, the volume can be adjusted via the front panel of the unit or by an external potentiometer. In addition, the range of adjustment can be narrowed.

Pressing the *PLAY/PAUSE/STOP Button* (D) for a time longer than 1 second, stops the playback of the announcement and the DP4100 goes back into the "STOP" mode.

"PAUSE" Mode

Pressing the *PLAY/PAUSE/STOP Button* (D) for a time shorter than 1 second while the DP4100 is in "PLAYBACK" mode, the playback of the current announcement will be paused.

This mode is displayed like following:

Upper line	II	=	PAUSE indication
Inner lines	MIS.:	=	Identifier of the selected mission
	ANN.:	=	Identifier of the current announcement
Bottom line		=	List of available languages

By pressing the *PLAY/PAUSE/STOP Button* (D) once more, the DP4100 continues playing the current track.

NOTE

The "PAUSE" mode can be activated by a discrete input on the system connector. As long as this input is activated, the playback will be paused. The display will also identify this as described before.

System Properties

The DP4100 provides a possibility for the operator to adjust several parameters which affect the behavior of the system. The adjustments can be done in a special "PROPERTIES" mode that will be activated by pressing the *MENU Button* (B) for a time longer than 2 seconds.

This mode is displayed like following:

```
PROPERTIES
▶VOL ▄▄▄▄▄▄▄▄▄▭ 37
 BASS ▄▄▄▄▄▭▭▭▭ 14
 TREB ▄▄▄▄▄▄▄▭▭ 18
```

Upper line	PROPERTIES	=	PLAYBACK indication
Other lines		=	List of available parameters

Several parameters can be selected by pressing the *SELECT RIGHT/LEFT Buttons* (E,F)or the *ENTER Knob* (A), whereby the selected parameter is marked by a triangle. The display scrolls down and up if necessary to show all items in the list.

Turning the *DATA SELECTOR* (A) changes the value of the selected item inside its given range.

The following parameters are available:

No.	Identifier	Range	Description
1	VOL	0…44	Minimum volume of audio signal
2	BASS	0…18	Bass adjustment of the audio signal
3	TREBLE	0…18	Treble adjustment of the audio signal
4	LIGHT	0…63	Dimming of the display backlight
5	KEYS	0…63	Dimming of the panel backlight
6	DELAY	200…2500	Delay between audio tracks (in steps of 50msec)
7	AUDIO	Mono/Stereo	Kind of audio output signal
8	SORT	On/Off	Alphabetical sort function for music tracks
9	AUTOPLAY	On/Off	Automatic start of playback after system switch on.

Property "Volume"

The volume of the audio output can be limited to a minimum value by setting this property. A value higher than 0 ensures, that the audio playback has a minimum output level to prevent for example loss of played back information by faulty operation by a cabin crew.

Property "Bass"

The "Bass" parameter gives the possibility to increase the playback volume of lower frequencies in the audio signal.
There are 19 steps available. The value "0" means that the lower frequencies will be played back as they are recorded within the audio tracks, the value "18" means that they will be hearable emphasized.

Property "Treble"

The "Treble" parameter gives the possibility to increase the playback volume of higher frequencies in the audio signal.
There are 19 steps available. The value "0" means that the higher frequencies will be played back as they are recorded within the audio tracks, the value "18" means that they will be hearable emphasized.

Property "Light"

The brightness of the DP4100 front panel display (LCD) can be adjusted in 64 steps.

The value "0" means that the brightness will be at the most low level, the value "63" means that it will be at maximum.

Property "Keys"

The brightness of the DP4100 front panel illumination (backlight) can be adjusted in 64 steps.
The value "0" means that the brightness will be at the most low level, the value "63" means that it will be at maximum.

Property "Delay"

The DP4100 has the possibility to insert a delay between the playback of audio tracks (music or announcements). This delay can be adjusted in a range between 200 and 2500msec in steps of 50msec.

Property "Audio"

Audio output of the DP4100 can be used either in Stereo or in Mono. This can be selected by using the "Audio" property.

Property "Sort"

The music titles which are available on a prepared memory card can be sorted in 2 ways for playback with the DP4100. Either they are listed and played in the order as they were stored on the memory card (sort = off) or in an alphanumeric order (sort = on). The sort option is useful for music cards with a lot of titles.

Property "Autoplay"

To ease the operation of the DP4100, an automatic start of playback after system switch on can be activated. If activated, the playback will start automatically with the first music title (music card) or the first announcement (announcement card)

System Self Test

For safety reasons, the DP4100 provides a build in self test functionality. This test is running continuously in the background when the system is switched on.

In the case that an error is detected, this will be shown by an error message on the display.

```
┌─────────────────────┐
│ ERROR 4             │
│ Card Format         │
└─────────────────────┘
```
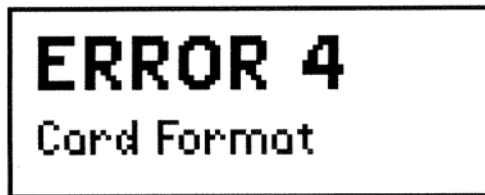
Upper line   =   Error identifier
Bottom line   =   Short description of the error

If there is more than one error detected at the same time, this will be displayed by a triangle behind the error identifier. Pressing the *SELECT RIGHT/LEFT Buttons* (E,F) scrolls trough the list of detected failures.

The following error identifiers are possible:

Identifier	*Description*	*Remark*
Error 1	Card Format	File structure on the used memory card is faulty
Error 2	No Card	There is no card inside the slot
Error 3	Audio System	The audio processing functionality is faulty
Error 4	RAM	Failure inside operating memory system
Error 5	ROM	Failure inside program memory

Technical Data

Mechanical Data

Size	HxWxD 56.8 x 145.8 x 170.3mm (without connected cable)
Weight	≤0.8kg
Card Slot Type	PCMCIA PC-Card Type 1 or 2

Electrical Data

Power Supply Voltage	+27.5V_{DC} nominal
Power Supply Voltage Range	+18V_{DC} … +32.2V_{DC}
Power Consumption	approx. 0.2A at 27.5V_{DC} (without backlight)
Display Technology	LCD (positive) with backlight
Dimming	Panel backlight and display independent (individually adjusted by properties)
Operating Temperature	-20°C … +55°C
Altitude	50,000ft (max.)

Amplifier Data

Audio Input	775mV (at 7kΩ)
Audio Output	3.5V / +13dBm (across 600Ω balanced)
Volume Adjustment Range	≥60dB

Digital Player Data

Number of Missions	up to 99
Number of Audio Tracks	up to 999
Supported Memory Cards	ATA Flash Cards up to 2GByte
Signal Processing	MPEG2-Layer3 (MP3)
Data Transfer	TTL level (positive logic)
Frequency Response	50Hz …16,000Hz (depending on MP3 bitrate)
Distortion	≤1% (at 0dBm and 1kHz into 600Ω)
Monitor Output	+10dBm (across 600Ω)

Repair Instructions

If a problem occurs which can be assigned to a failure in the DP4100, please send the unit to a BECKER dealer or the BECKER customer service with a failure description. A detailed description of the problem shortens the repair time and hence reduces the resultant costs.

This "Operating Instructions" do not replace the equipment manuals listed below:

Aircraft Maintenance Manual

DV62500.03   Article-No.: 0530.700-071

Component Maintenance Manual

DV62500.04   Article-No.: 0530.719-071

Cardsetup Software Manual

DV62500.05   Article-No.: 0544.736-071

Notes

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Subject to technical changes!