Audio Control Unit

ACU6101-1-(xxxx)
ACU6101-2-(xxxx)

Installation and Operation

Manual DV 64470.03
Issue 6 February 2015

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DV 64470.03 / Article Number 0614.564-071

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Section 1 GENERAL INFORMATION

1.1 Introduction

The Audio Control Unit ACU6101 is described in the ”Installation and Operation” DV 64470.03 and “Maintenance and Repair” DV 64470.04 manuals.

The manuals contain the following sections:

Section		DV 64470.03	DV 64470.04
1	General Information	X	X
2	Installation	X	X
3	Operation	X	X
4	Theory of Operation	N/A	X
5	Maintenance and Repair	N/A	X
6	Illustrated Parts List	N/A	X
7	Modification and Changes	N/A	X
8	Circuit Diagrams	N/A	X
9	List of the used Abbreviations	N/A	X

1.2 Application

The Audio Control Unit is part of the Digital Voice Communication System DVCS 6100 and provided for installation in an aircraft. It serves for the control of REU6100 Remote Electronic Unit. Maximum six Audio Control Units can be connected to the Remote Electronic Unit at the same time.

1.3 General description

1.3.1 Mechanical description

The Audio Control Unit is designed for installation in the operator console of an aircraft. The dimensions correspond to the ARINC 601 standard for control units. Installation is by means of four DZUS fasteners.

The Audio Control Unit consists of the following electrical assemblies respectively circuit boards:

- Illumination board
- Rotary board
- Volume board
- Processor board
- Connector board

1.3.2 Electrical description

1.3.2.1 General functions

The Audio Control Unit provides the following functions independently:

- Driving of up to 8 transceivers.
- Indication of transmission via status lights.
- Monitoring of up to 8 transceivers with a capability of individual volume control.
- Monitoring of up to 5 receivers with a capability of individual volume control.
- Monitoring of up to 6 fixed inputs.
- Monitoring of up to 10 internally generated signal tones. 8 tones can be activated by discrete control lines from external (aural alert tones).
- Main volume control.
- Aircraft intercommunication in either VOX, IC-key or PTT-controlled mode.
- 2 intercom circuits to separate cockpit and cabin communication.
- Optical call indication for intercom request plus acoustical call alert for combining or separating the different intercom circuits assigned to the individual control unit.
- P-BIT, I-BIT, C-BIT functionality with optical indication of test status/result.

The functional inscriptions of key caps, rotary switch, and increment sensor are finished in white translucent characters. Illumination available in white, warm white and NVIS green B compatible (MIL-STD3009, RTCA DO-275).

Every Audio Control Unit has a microcontroller to process switch and button activations as well as indication signals. Control data are transferred via a dual redundant can bus interface. SLAVE position and Back-up switch are not be routed through the interface but must be hard-wired in order to allow Back-up operation, if the unit will fail.

Audio Control Units are factory configurable to different operation profiles, e.g. disabling certain transceiver or receiver accessibility in the cabin / passenger area. Audio Control Units may also be equipped with front panels imprinted to customer requests.

Rotary board:

The following is mounted on the rotary board.

- 1 rotary switch, 8 positions, to preselect the active transceiver or Intercom mode. Also to select slave and backup mode.

Processor board:

The following is mounted on the processor board.

- Dual potentiometer to set the individual main volume control (outer rotary knob) and to set the individual IC volume control (inner rotary knob).
- 5 monitoring buttons to switch on /off transceiver monitoring and individual volume control.

Volume board:

The following is mounted on the volume board.

- 5 monitoring buttons to switch on /off receiver monitoring combined with 5 potentiometer for individual channel volume control.
- VOX potentiometer to switch on/off VOX functionality and set the individual VOX threshold level.

Illumination board:

The following is mounted on the illumination board.

- VOICE button with LED to switch on and off the ident filter (green LED: filter on, ident frequency 1020 Hz suppressed).
- SPKR button with LED to switch on and off the speaker (green LED: speaker on).
- ISOL /CALL with LED to control the intercom functions between cockpit and cabin.
- PTT button to activate transmit mode.

Note

There are only 2 of the above mentioned buttons available on a dedicated variant of ACU6101-1-(XXXX) or ACU6101-2-(XXXX).

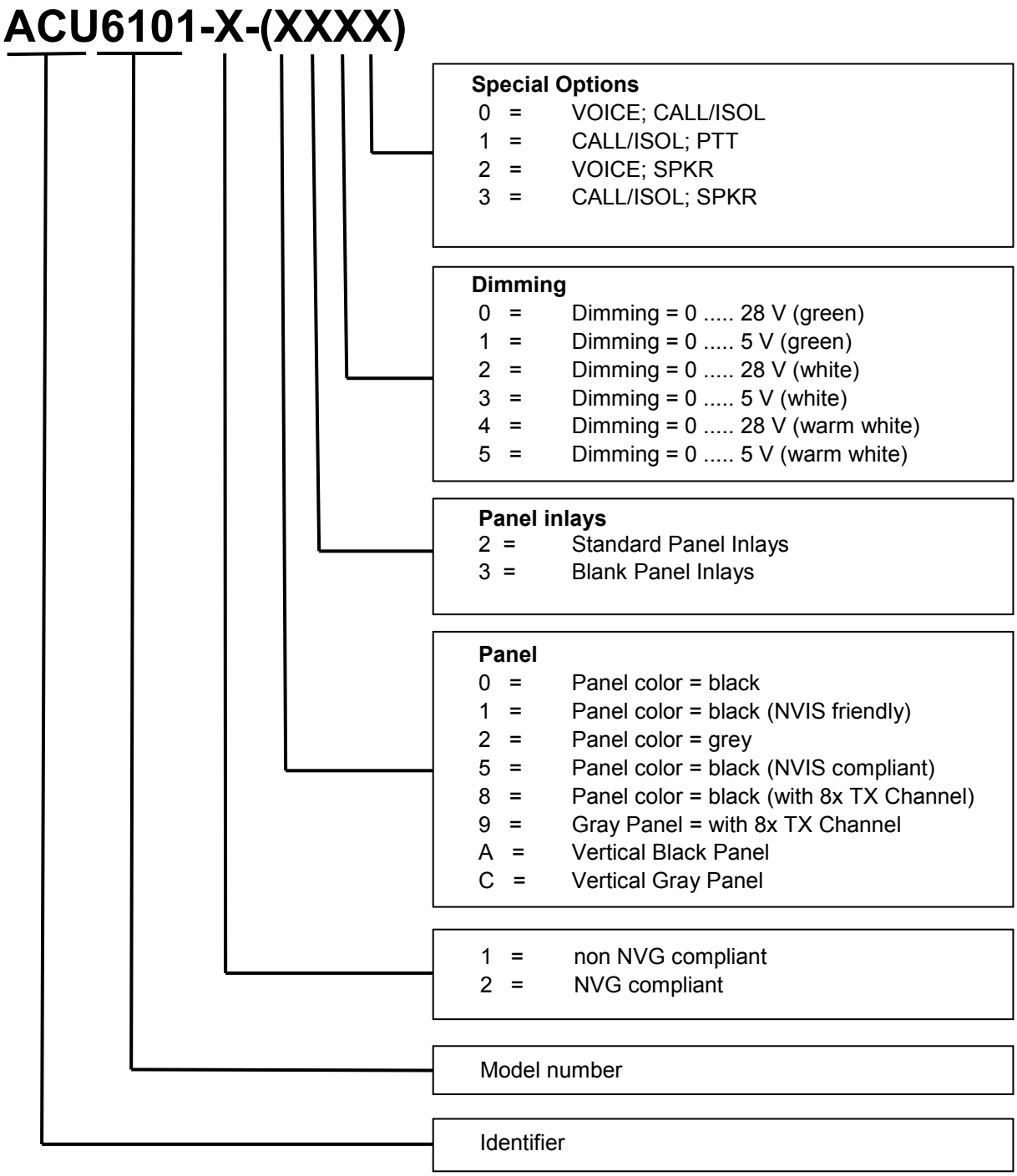
Connector board:

The two unit connectors are fitted on the connector board.

1.4 Identification of article

1.4.1 Types of Audio Control Unit

Audio Control Unit — Part Number ACU6101-X-(XXXX)



1.5 Technical data

1.5.1 Power supply

Supply voltage (Bus) I	27.5 V DC nominal 18.0 V DC emergency
Supply voltage (Bus) II	27.5 V DC nominal 18.0 V DC emergency
Power consumption	≤ 150 mA Inclusive illumination
Dimming input:	
Dim control input 1	0 V .... 27.5 V DC (panel illumination)
Dim control input 2	0 V .... 27.5 V DC (LED brightness)

1.5.2 Control data transfer ACU-REU

Interface	Dual CAN Bus (redundant)
Protocol	BFW specific

1.5.3 Control inputs (Discrete)

PTT	low active ≤ 0.3V
Hot Mike In	low active ≤ 0.3V

1.5.4 Mechanical data

Width	145.8 mm
Height	47.6 mm
Depth	93 mm
Standard	ARINC 601 5HE
Weight	≤ 600 g
Mounting	D-ZUS

1.5.5 Unit connectors

Unit connector P1	10-pol.
Control bus- connector P2	19-pol.
- locking device	bayonet

1.6 Software

All data for ACU 6101 are stored in the microcontroller. If the control elements are altered, a data transmission immediately takes place to the Remote Electronic Unit. The software is classified as level C in accordance with EUROCAE / RTCA document ED12B / DO-178B.

1.7 Approvals

ETSO	ETSO-C50c EASA.21O.10031765
TSO	TSO-C139

Note:

“The Audio Control Unit ACU610X-X-(), up to 6 total, must be connected to a Remote Electronic Unit P/N REU6100-X-() in order to satisfy FAA TSO-C139.”

Software	EUROCAE ED-12B Level C RTCA DO-178B

1.8 Environmental qualification (EUROCAE/RTCA ED-14E/DO-160E)

Characteristic ED-14E/DO-160E	Section	Category	Condition
Temperature / Altitude	4.0	D1	
Low Ground Survival Temperature	4.5.1	D1	-55 °C
Low Operating Temperature	4.5.2	D1	-40 °C
High Ground Survival Temperature	4.5.3	D1	+85 °C
High Short-Time Operating Temperature	4.5.3	D1	+70 °C
High Operating Temperature	4.5.4	D1	+70 °C
In-Flight Loss of Cooling	4.5.5	X	no auxiliary cooling required
Altitude	4.6.1	D1	50,000 ft.
Temperature Variation	5.0	B	5 °C per minute
Humidity	6.0	B	48h at 65 °C and 95 % RH
Shock	7.2	B	6 g in all directions
Crash Safety	7.3	B	20 g shock; 20 g acceleration
Vibration	8.0	S, U	M, G
Explosion Atmosphere	9.0	X	
Waterproofness	10.0	X	
Fluids Susceptibilities	11.0	X	
Sand and Dust	12.0	X	
Fungus Resistance	13.0	X	
Salt Spray	14.0	X	
Magnetic Effect	15.0	Z	less than 0.3 m
Power Input (DC)	16.0	B	
Voltage Spike	17.0	A	
Audio Frequency Conducted Susceptibility	18.0	B	
Induced Signal Susceptibility	19.0	AC	
Radio Frequency Susceptibility	20.0	WR	
Emission of RF	21.0	M	
Lightning Induced Transient Susceptibility	22.0	A3E3X	
Lightning Direct Effects	23.0	X	
Icing	24.0	X	
Electrostatic Discharge (ESD)	25.0	A	
Fire, Flammability	26.0	X	

1.9 Available variants

ACU6101-1-(0320) Audio Control Unit	Article-No.: 0612.871-921
ACU6101-1-(0321) Audio Control Unit	Article-No.: 0612.881-921
ACU6101-1-(0322) Audio Control Unit	Article-No.: 0612.898-921
ACU6101-1-(0323) Audio Control Unit	Article-No.: 0612.901-921
ACU6101-1-(0340) Audio Control Unit	Article-No.: 0614.769-921
ACU6101-1-(0341) Audio Control Unit	Article-No.: 0614.785-921
ACU6101-1-(0342) Audio Control Unit	Article-No.: 0614.793-921
ACU6101-1-(0343) Audio Control Unit	Article-No.: 0614.807-921
ACU6101-1-(0350) Audio Control Unit	Article-No.: 0640.786-921
ACU6101-1-(8340) Audio Control Unit	Article-No.: 0627.471-921
ACU6101-1-(8341) Audio Control Unit	Article-No.: 0631.035-921
ACU6101-2-(8301) Audio Control Unit	Article-No.: 0620.165-921
ACU6101-2-(8311) Audio Control Unit	Article-No.: 0632.351-921
ACU6101-2-(5300) Audio Control Unit	Article-No.: 0605.123-921
ACU6101-2-(5301) Audio Control Unit	Article-No.: 0612.911-921
ACU6101-2-(5302) Audio Control Unit	Article-No.: 0612.928-921
ACU6101-2-(5303) Audio Control Unit	Article-No.: 0612.936-921
ACU6101-2-(5310) Audio Control Unit	Article-No.: 0634.298-921
ACU6101-2-(A301) Audio Control Unit	Article-No.: 0627.747-921

1.10 Accessories (not contained in the scope of delivery)

Connector Kit CK5102-C	Article-No.: 0586.889-954
consisting of	
10-pol. cable connector, crimp	Article-No.: 0858.188-277
19-pol. cable connector, crimp	Article-No.: 0794.279-277
Connector Kit CK5104-C (Commital)	Article-No.: 0614.971-954
consisting of	
10-pol. cable connector, crimp	Article-No.: 0614.998-277
19-pol. cable connector, crimp	Article-No.: 0615.005-277
CSW6100-2 configuration software set	Article-No.: 0608.602-919
consisting of	
CAN-USB-Adapter	
Code Meter Stick	

Manuals:

Installation and Operation DV 64470.03	Article-No.: 0614.564.071
Maintenance and Repair DV 64470.04	Article-No.: 0614.572.071
Installation and Operation Configuration Software CSW6100-2 DV 64492.01	Article-No.: 0608.939.071
Operating instructions	Article No.: 0615.730-071

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Section 2 INSTALLATION

2.1 General

The installation of the Audio Control Unit depends on the type of aircraft and its equipment and therefore only general information can be given in this section.

2.2 Inspection before installation

Before installing the Audio Control Unit in an aircraft, carry out a visual inspection for any transport damage, paying particular attention to the following:

- Dirt, dents, scratches, corrosion, broken attaching parts on the housing and housing parts.

- Dirt and scratches on the identification plate, front panel and marking.

- Dirt, bent or broken pins, cracked connector inserts.

- Dirt and mechanical damage on the rotary switches, push-buttons and knobs.

- Missing screws.

2.3 Continued Airworthiness

Maintenance of the Audio Control Unit is “on condition” only. Periodic maintenance of this product is not required.

2.4 Mechanical installation

The Audio Control Unit is designed for installation in the operator console of an aircraft. The necessary dimensional details are given in Fig. 2-1. The unit is fixed using four DZUS fasteners.

2.5 Aircraft wiring

2.5.1 General

The Audio Control Unit connections can be seen in Fig. 2-4 to Fig. 2-7. The following points are to be observed for the wiring:

a. Only cable fit for aviation (self-extinguishing) may be used. AWG 20 for power supply and AWG 24 for other cables.

b. The interface lines are each to be laid as 2-core twisted and screened (AWG 24) cables.

c. Every single cable harness of a unit connector must get a separate screening.

d. Rubber sleeves are to be fitted over the soldering points on the unit connector.

e. No HF cable should be included in the cable harnesses. Laying connecting cables together with cables which carry AF power or impulses is also be avoided.

f. Check the wiring carefully before switching on the units, particularly that (UB+) and (GND) have not been mixed up.

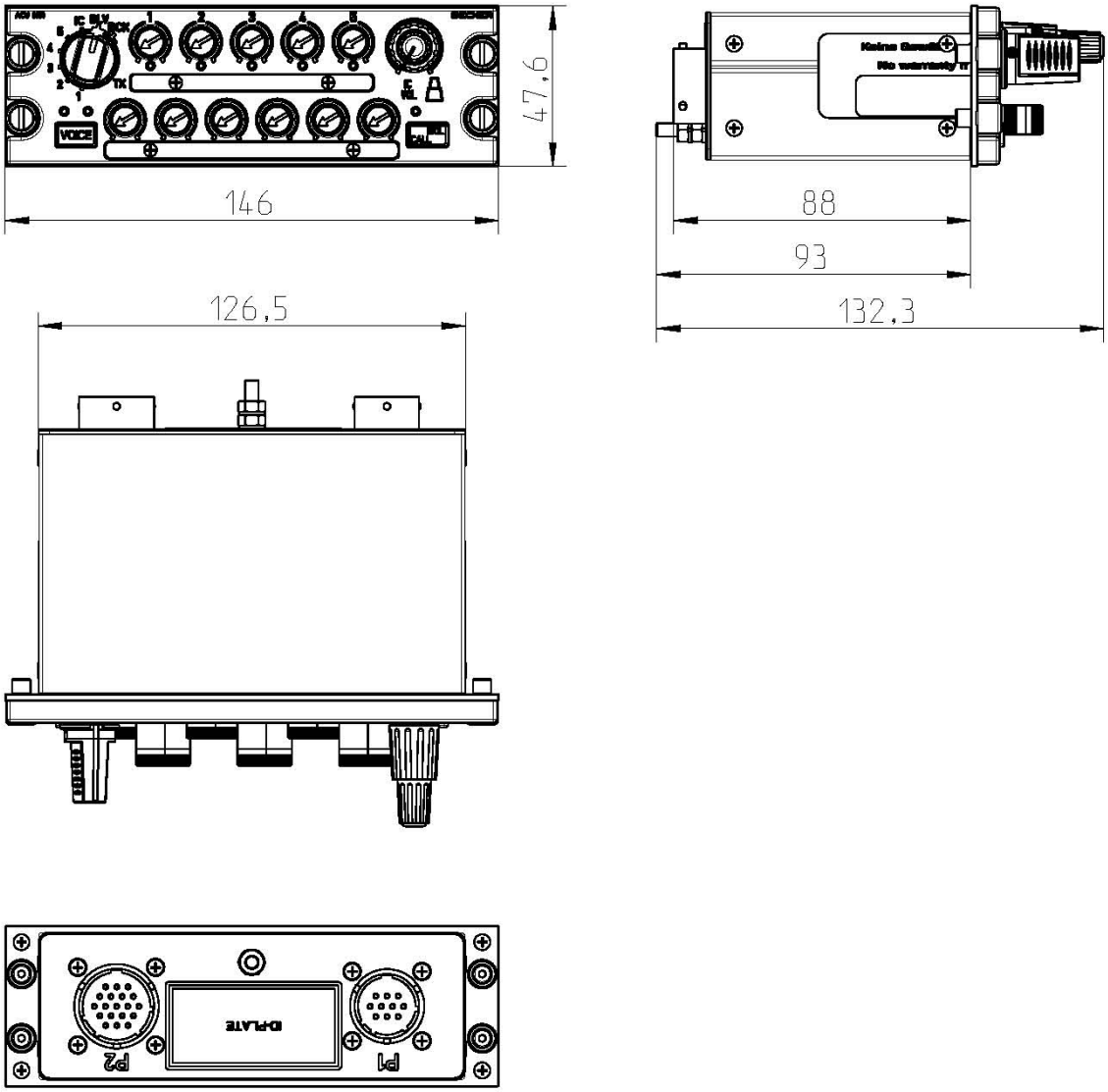

Fig. 2-1 Installation dimensions Audio Control Unit (measures in mm)

2.6 Laser Plate Installation

The laser plate strip LP6100 which identify the function of TX and RX controls are prepared for customer individual configuration and therefore must be purchased separate from the ACU6100 unit. On delivery, the ACU6100 comes with installed blank label strips. Before installation of an ACU6100 unit the blank label strip must be replaced by the customized laser plate strip which comes delivered separate from the ACU.

Procedure

Remove the left and right screw from each label strip and replace the blank by the printed laser plate strip. Reinstall and tighten carefully the crews on both label strips.
Note: Do not exceed a torque of 0.18 NM.

Each variant of the label strip LP6100 receives an individual part number for identification in this format (0XXX.XXX-XXX). For information of available pre-defined label strips, or providing a definition template to create a new label strip, please contact Becker Avionics.

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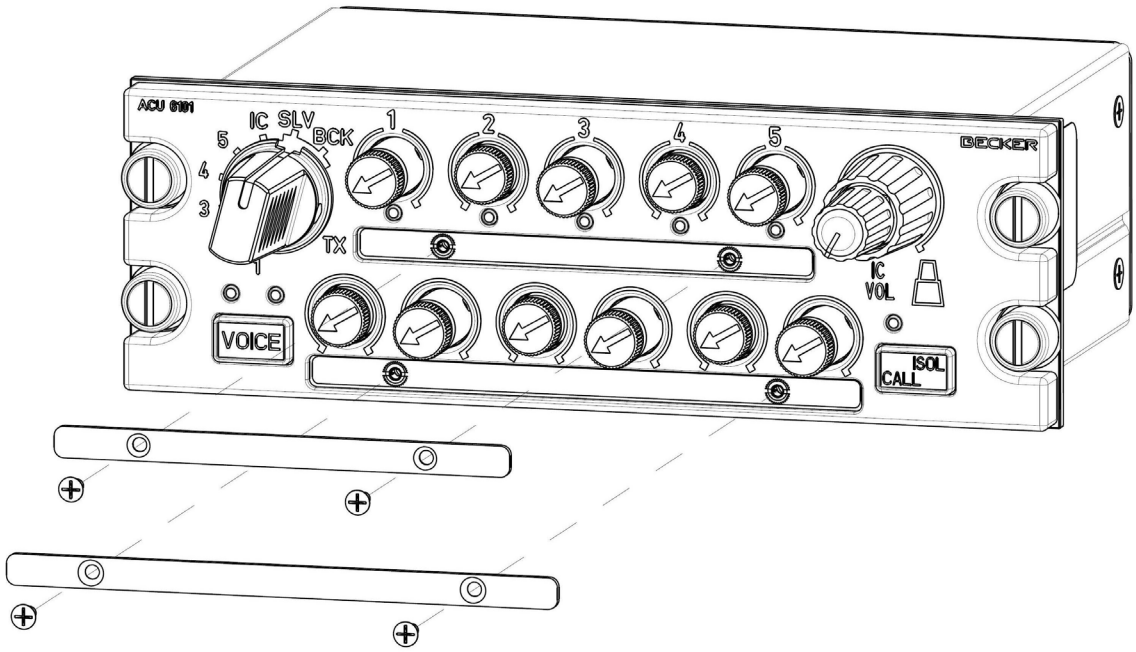

Fig. 2-2 Laser Plate Installation

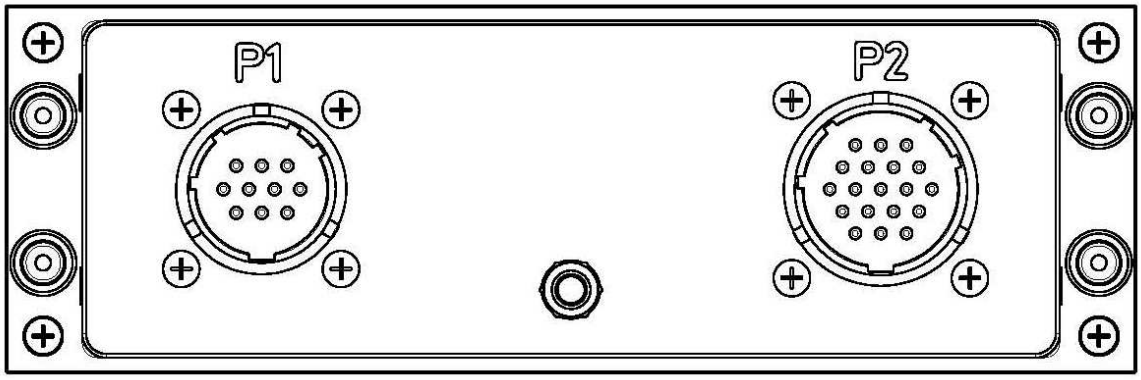

Fig. 2-3 Physical locations of Audio Control Unit connectors

Fig. 2-4 Logical pin assignment Audio Control Unit

2.7 Panel illumination

The Audio Control Unit is fitted with panel lighting. It can also be connected via a dimmer system.

Panel illumination connection	*Remark*
Plug P 1 - Pin E	Dim Control in 1 (panel illumination)
Plug P 1 - Pin A	Dim Control in 2 (brightness of LEDs)

2.8 Connector pin assignments

Table P1 10-pol., bayonet

Pin	*Connection*	*Remark*
C	DC1	+27.5 V
D	GND1	
G	DC2	+27.5 V
F	GND2	
H	PTT output	
B	Back-up switch out	
K	Slaved switch out	
J	Hot mike in	
E	Dim Control in 1	panel illumination
A	Dim Control in 2	brightness of LED’s

Table P2 19-pol., bayonet

Pin	*Connection*	*Remark*
L	Device Address Bit 0	
M	Device Address Bit 1	
A	Device Address Bit 2	
B	Device Address Bit 3	
U	Reset out	
V	Reset in	
N	GND	
C	CAN1 in HI	
D	CAN1 in LO	

Pin	Connection	Remark
P	CAN1 in Shield	
E	CAN1 out HI	
F	CAN1 out LO	
R	CAN1 out Shield	
G	CAN2 in HI	
H	CAN2 in LO	
S	CAN2 in Shield	
J	CAN2 out HI	
K	CAN2 out LO	
T	CAN2 out Shield	

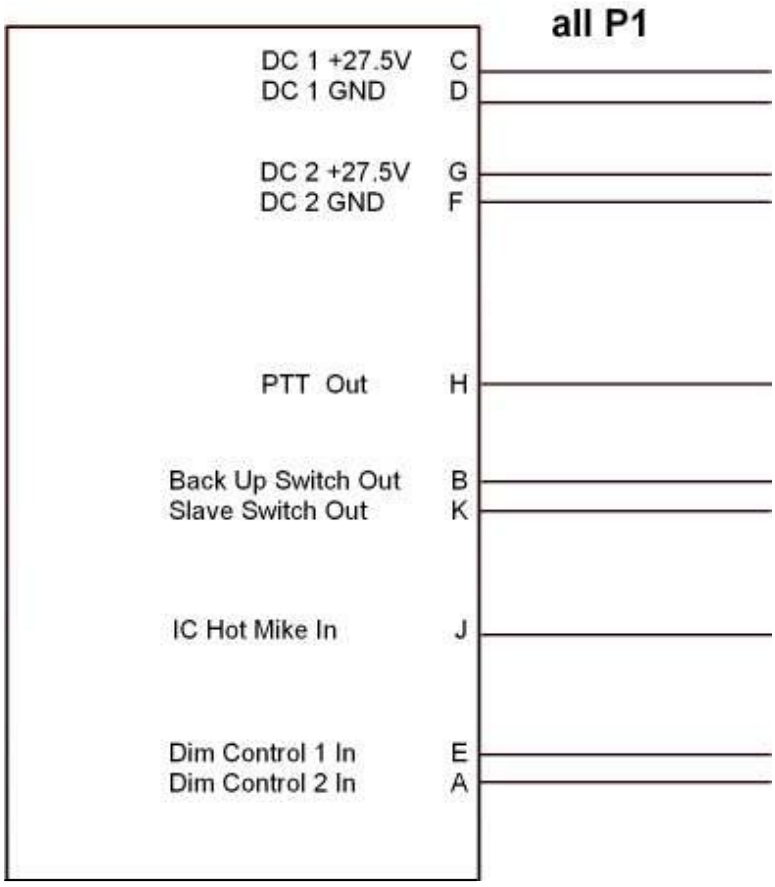

Fig. 2-5 Audio Control Unit power connections P1

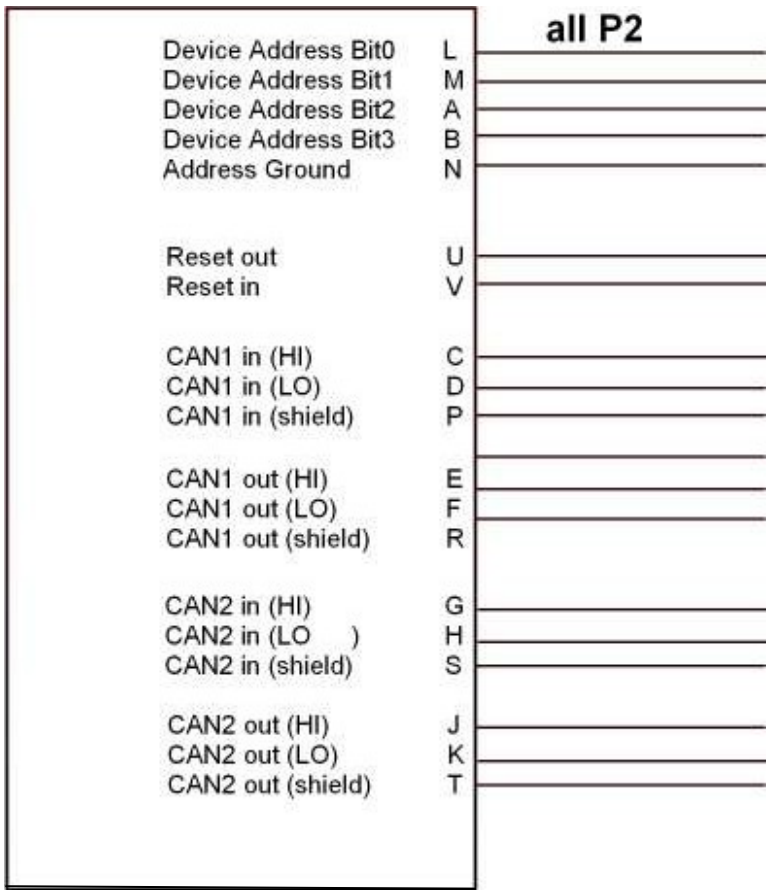

Fig. 2-6 Audio Control Unit connections P2

Note

The complete interwiring diagram for the Audio Control Unit and Remote Electronic Unit is located in the Manual “Installation an Operation” DV 64470.03.

2.9 Configuration software

The configuration of the System can be changed by using a Personal Computer or Laptop and Configuration Set CSW6100-x.

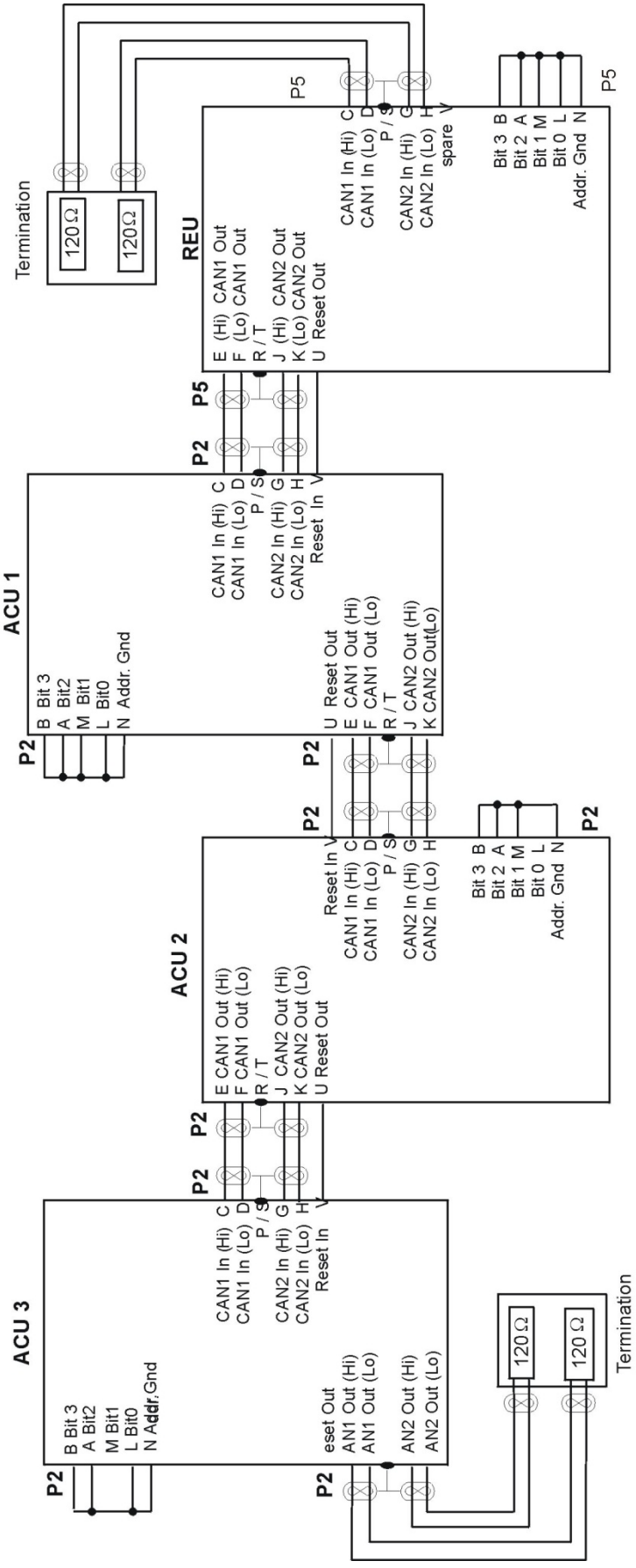

Fig. 2-7 Bus interwiring with 3 ACUs

Note

The ends of each bus must be terminated with 120 Ohm. It can be in the harness or on a separate junction block.

For correct operation with one ACU removed, a dummy mating connector will have to be connected in it's place.

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Section 3 OPERATION

3.1 Operating controls

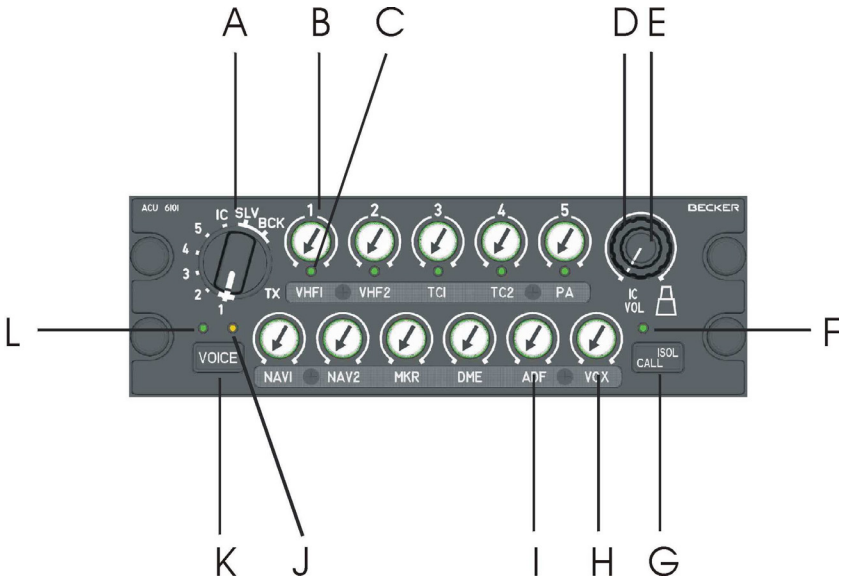


Fig. 3-1 Front panel of the Audio Control Unit with generic button-inscription

3.2 Description and function of the operating controls and indicators

Item	Control / Indicator	Description	Function
A	Transmitter selector switch	Rotary switch with 8 lock positions	Position 1 to 5 preselection of TX channel for transmission Position IC Intercom PTT mode Position SLV Selection of Slave mode Position BCK Backup mode
B	TX1 to TX5 controls	5 potentiometer with push-push switches	On/Off switch for each TX channel and individual volume adjust for audio monitoring

Item	Control / Indicator	Description	Function
C	TX indicators 1 to 5	5 LED (green)	Indication of individual TX channel status LED on = channel is preselected for transmission LED blinking = transmission is active LED blinking = Selective "CALL" is active fast
D	Volume control	Potentiometer	Main volume control
E	IC volume control	Potentiometer	Volume adjustment for intercom
F/L	"ISOL/ CALL" indicator	LED (green)	LED on = cockpit and cabin intercom circuits are isolated LED off = cockpit and cabin intercom circuits are connected LED blinking = intercom request "CALL" is active
G/K	"ISOL/ CALL" button	Push-button	Cockpit: Connect or truncate the cockpit and cabin intercom circuits Cabin: Initiates an intercom request "CALL" if the intercom circuits are isolated
F/L	"VOICE" indicator	LED (green)	LED on = voice filter is active LED off = voice filter is not active
G/K	"VOICE" button	Push-button	On/Off switch for VOICE filter (for configured RX channels)
G	PTT button	Push-button	Button pressed = selected transmitter is keyed
F/L	Speaker indicator	LED (green)	LED on = Speaker is on LED off = Speaker is off
G/K	"Speaker" button	Push-button	ON/OFF switch for audio monitoring via the speaker
H	VOX level adjustment VOX ON/OFF switch	Potentiometer with push-push switch	VOX sensitivity selection ON/OFF switch for VOX activation
I	RX1 to RX5 controls	5 potentiometer with push-push switches	On/Off switch for each RX channel and individual volume adjust for audio monitoring

Item	Control / Indicator	Description	Function
J	"TEST" indicator	LED (yellow)	LED on = internal self test is running LED blinking = the internal self test detected an failure

3.3 Operating instructions

3.3.1 Preparations (power-up test)

1. Switch on the unit by using the audio selector master switch (circuit breaker).
2. When the Audio Control Unit is powered, the device starts an internal self test procedure. All the microprocessors and memories are tested as well as data transfer between Audio Control Units and Remote Electronic Unit.

While test is running, the yellow TEST LED illuminates. The test needs about 4 seconds.

After the test the following results are shown:

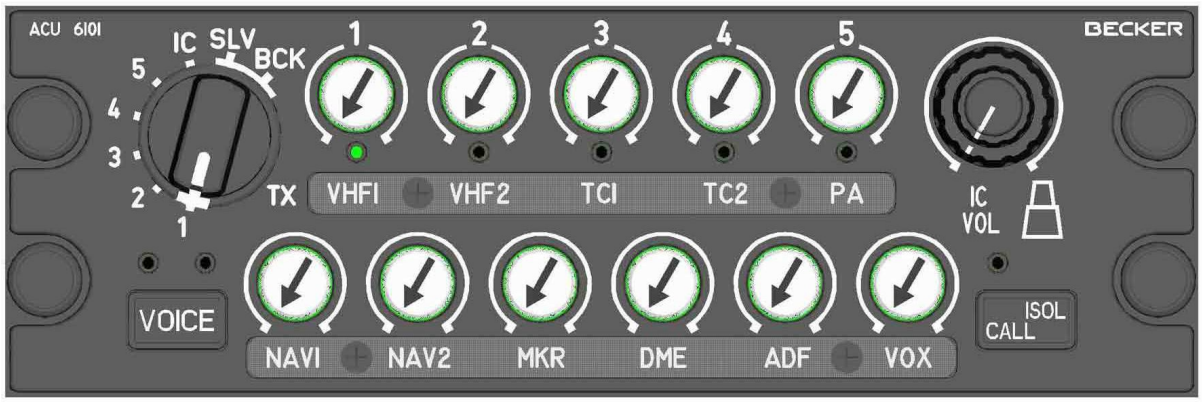
- No failure detected yellow LED is off; the system is in normal mode
- Failure detected yellow LED is blinking

If internal test routine detected a failure (yellow LED is blinking), the operator has 2 possibilities:

- By pressing of any button on the panel the failure can be acknowledged. In case of a permanent problem inside the system, it will be detected by continuous self test routine and indicated again.
- Switching into slaved or emergency mode by using the rotary switch.

3.4 Transceiver operation

3.4.1 Transceiver monitoring



For transceiver monitoring, a TX-channel is activated by push release of the respective knob.

- Knob released monitoring ON
- Knob pressed monitoring OFF

Several transceivers may be selected for monitoring at the same time.

3.4.2 Individual transceiver channel volume adjustment

The individual volume for the monitored channels can be selected by turning the respective knob.

3.4.3 Monitored TX-channel visualization

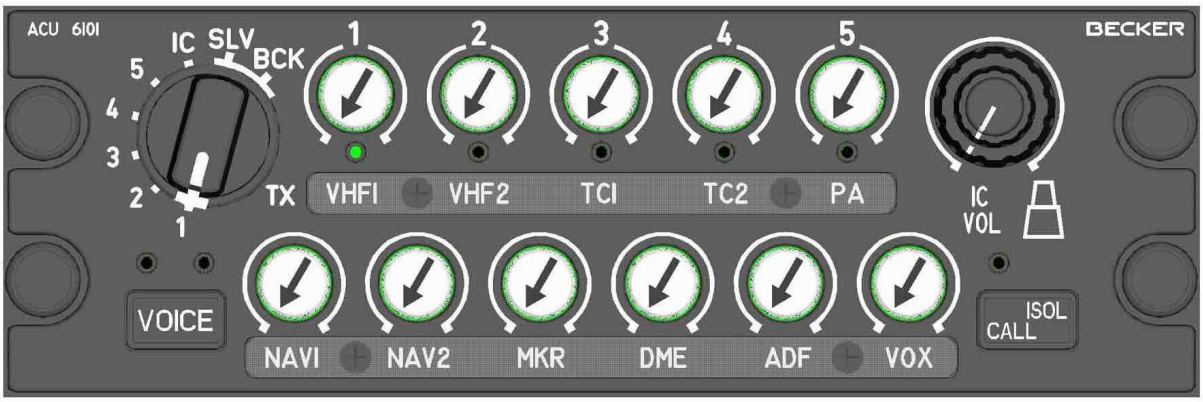
The activated TX-channel (released) knobs are illuminated.
By looking at the panel from an angle that's unequal to the rectangular top view, it's easy to detect the activated and deactivated channels.

An arrow on top of each knob helps the user to pick the selected volume of the several channels quickly.

3.4.4 Main volume adjustment

Main volume can be adjusted at any time by turning just the VOL control. This action adjusts the sum-volume of all activated TX- and RX-channels and the fixed inputs 4 to 6.

3.5 Selection of transmission mode



3.5.1 Selecting a radio for transmission

For transmission with an individual radio, the transceiver is pre-selected by means of the TX-selector rotary switch of the Audio Control Unit. In the given example TX-channel 1 is pre-selected for transmission. The green LED illuminates (TX channel 1).

3.5.2 Selection of intercom PTT

The last unlocked position (by turning clock wise) “IC” of the TX-selector rotary switch selects the “intercom by PTT” mode.

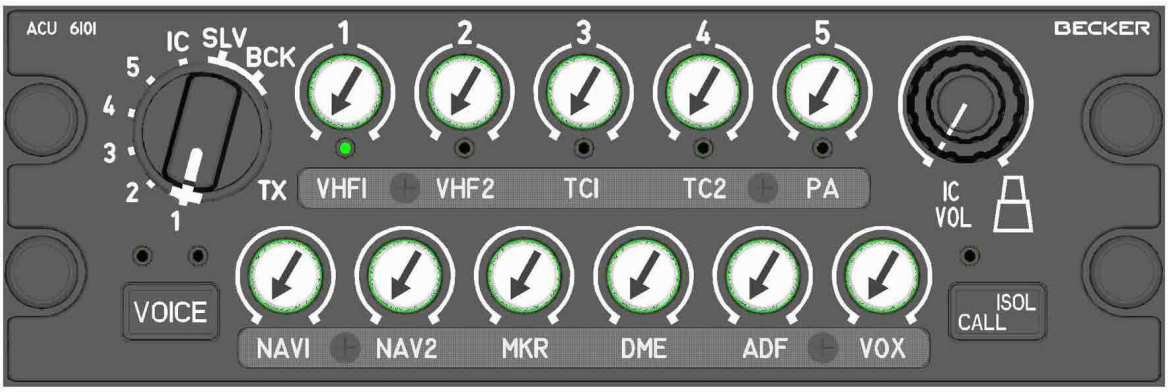
3.5.3 Forced monitoring

The reception signal of the radio which is pre-selected for transmission is monitored, even if it was not active for monitoring before (forced monitoring).

Using the respective knob, the monitoring volume can be adjusted.

Forced monitoring can be deactivated during installation setup by configuration.

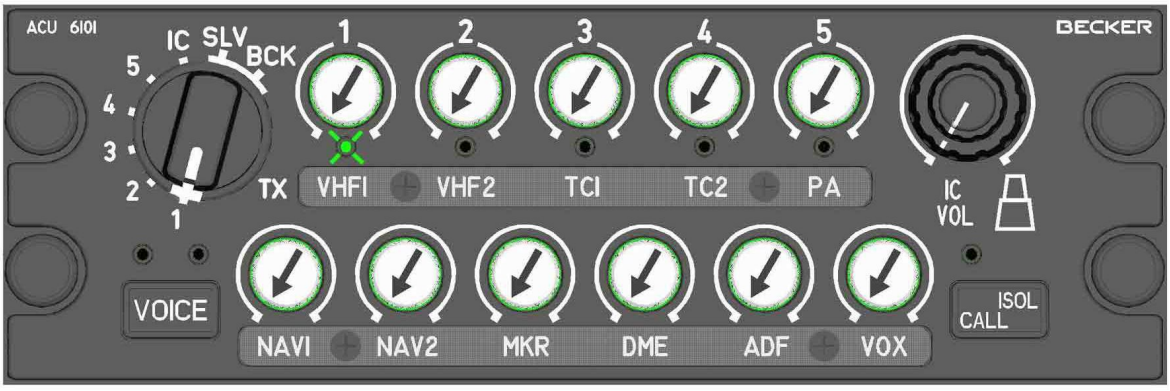
With activated ”Forced Monitoring”, in the following example, TX-channel 1 would be audible thus it is not manually activated (knob not released).



3.5.4 Transmission mode

If transmission mode is activated by pressing a PTT button (on panel or external)
the selected transmitter will be keyed and the corresponding status green LED is blinking.

- The green LED below the associated channel volume knob is flashing.



Note:

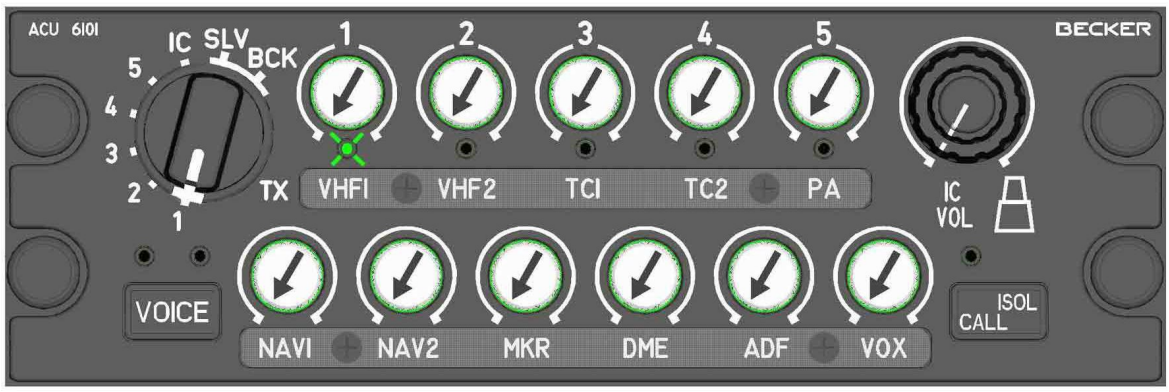
Only those warning tones which have been programmed as essential during installation setup, are still audible when transmitting.

If loudspeakers are provided and if the one related to the individual control unit had been switched on prior to transmitting, it will be muted to avoid acoustic feedback to the micro-phone.

By speaking into the microphone while in transmission mode, the following actions will result:

- The activated transmitter is modulated
- A sidetone is audible with a volume that is in accordance with the preselection in the installation setup. The individual volume for the monitored channels can be selected by turning the respective knob.
- The TX indications (blinking LED) assigned to an individual transmitter is active on all ACUs when keyed by any operator.
- Any transmitter could be modulated by different operators simultaneously.

By releasing the PTT switch (on panel or external), the following actions will result:



- The transceiver turns back to receive mode
- The green LED lights up (stops flashing)
- All previously selected signals, intercom, and warning tones are resumed.
- If the loudspeaker was activated before pressing PTT, it is switched on again.

3.6 Receiver operation

3.6.1 Receiver monitoring

For receiver monitoring, a RX-channel is activated by push release of the respective knob:

- Knob released monitoring ON
- Knob impressedmonitoring OFF

Several receivers may be selected for monitoring at the same time.

In the given example, RX-channel 1, 2 and 4 are selected for monitoring.

3.6.2 Individual receiver channel volume adjustment

The individual volume for the monitored channels may be controlled by turning the respective knobs.

3.6.3 Monitored RX-channel visualization

The activated RX-channel (released) knobs are illuminated.

By looking at the panel from an angle that's unequal to the rectangular top view, it's easy to detect the activated and deactivated channels.

An arrow on top of each knob helps the user to pick the selected volume of the several channels quickly.

3.6.4 Main volume adjustment

Main volume can be adjusted at any time by turning the VOL control. This action adjusts the sum volume of all activated TX- and RX-channels.

3.6.5 Voice filter activation

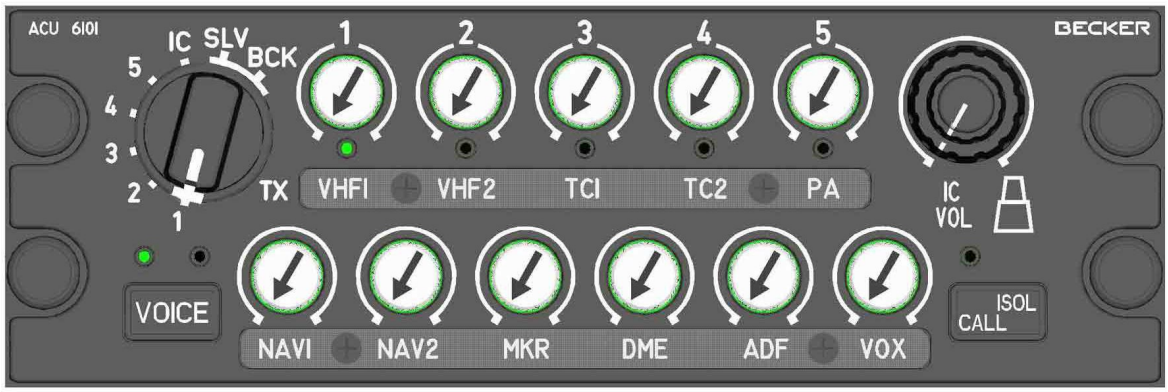
Note:

This function is not available for same variants of ACU6101.

The system has the possibility to activate a 1020Hz notch filter for all the RX-channels. This is to surpress identification codes in the incoming audio signals from navigation receivers (e.g. for listening to weather information).

In the configuration of the system, the system integrator can define the RX-channels that will have this filter.

Whilst operating, the filter can be activated and deactivated by pressing the ”VOICE” push button. The status of voice filter activation is visible by a green LED in top of that push button:



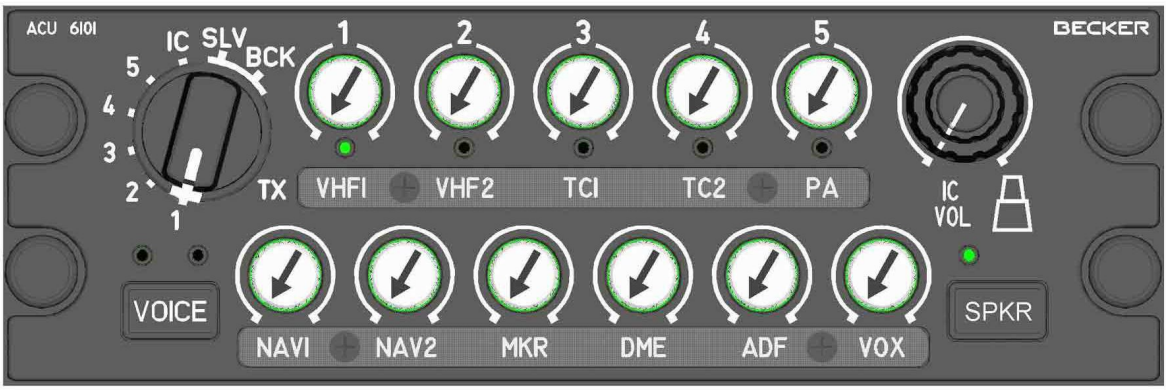
- “VOICE” LED on voice filter is active
- “VOICE” LED off voice filter is not active

3.6.6 Loudspeaker operation

Note:

The system provides two speaker channels which are assigned in the standard version to ACU1 and ACU2.This function is not available for all variants of ACU6101.

Pressing the ”SPKR” button briefly, switches on the loudspeaker that is related to this control unit. All selected TX/RX channel signals and warnings are reproduced through the loudspeaker. The green LED above the button indicates the speaker mode.



Pressing the key once again, the speaker is switched off and the LED goes off.

When speaker mode is active with an individual Audio Control Unit, voice controlled intercommunication (VOX) is disabled.

Intercom is still possible by activating the external IC button or by pressing the PTT button while the TX-selector rotary switch is in position ”IC”. In both cases, the loudspeaker is muted to avoid acoustic feedback.

3.7 Intercommunication

3.7.1 Virtual Intercom Circuits

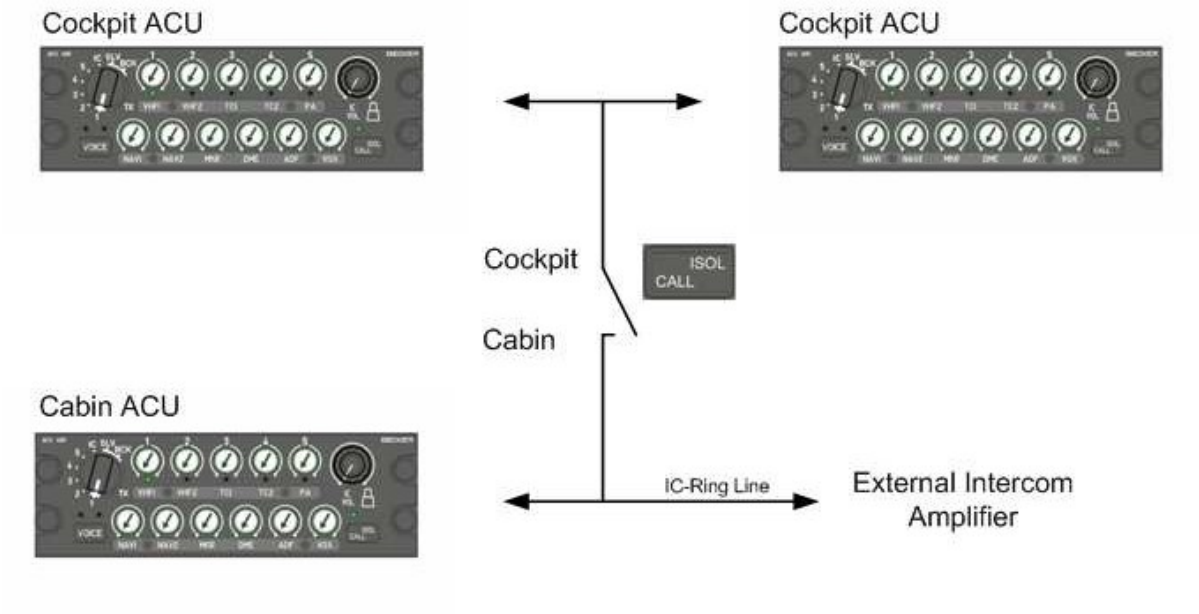
There are four Intercom Circuits provided by the DVCS6100 System.

1. Cockpit Crew
2. Cabin Crew
3. Third Circuit (controlled by a external switch, refer to the REU6100 manual)
4. IC-Ring Line (connected to the cabin, Cockpit or 3rd intercom circuit; configurable by the CSW - Software).

Two of the intercom circuits (Cockpit and Cabin) can be direct controlled by the Control Unit.

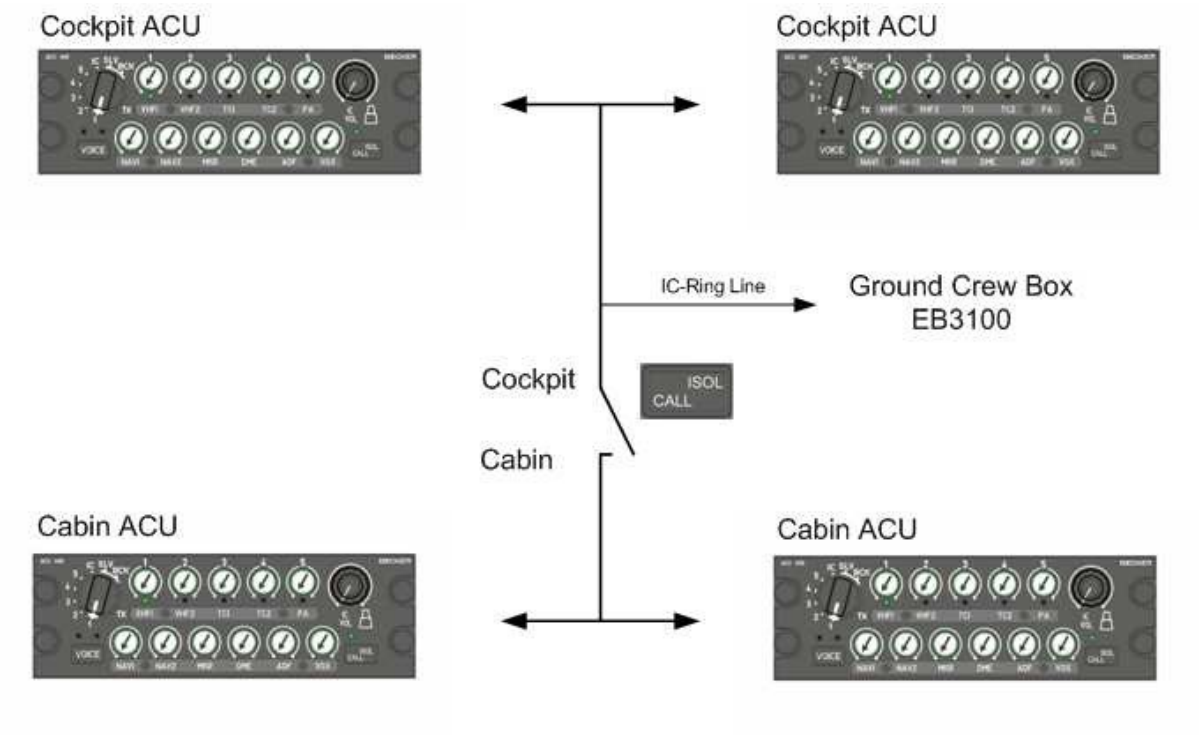
The Intercom between cockpit and cabin can be truncated by pressing the “ISOL/CALL” push button. When the intercom mode between cockpit and cabin is interrupted, the green LED above the “ISOL/CALL” button is illuminated.

Intercom extension for passengers:



By using an additional intercom amplifier (e.g. Becker IC3100) passengers can be connected with the intercom system. These passengers are representing a fourth intercom circuit which is connected with the cabin intercom circuit of the DVCS6100 system. It can be truncated by an external switch which is not shown in the above diagram.

Intercom extension for Ground Crew:



By using an additional ground crew box (e.g. Becker EB3100) ground crew can be connected with the intercom system. That ground crew is representing a fourth intercom circuit which is connected with the cockpit intercom circuit of the DVCS6100 system.

3.7.2 Cockpit “ISOL/CALL” Functionality

In the cockpit, the ”ISOL/CALL” button is used to toggle the connection/disconnection between the cockpit and the cabin intercom circuits.

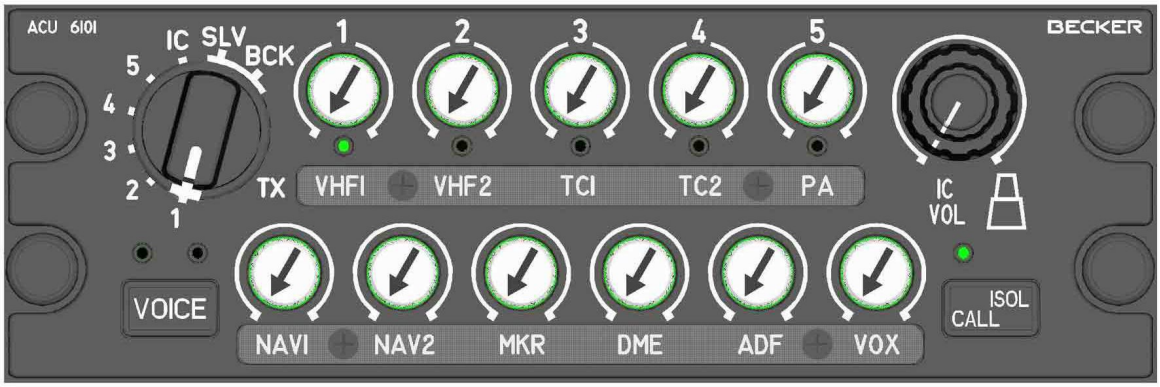
A LED above this button indicates the actual status of the connection:

- LED on cockpit and cabin intercom circuits are isolated
- LED off cockpit and cabin intercom circuits are connected

3.7.3 Cabin “ISOL/CALL” Functionality

The “ISOL/CALL” button on the cabin ACUs gives the cabin passengers the possibility to call for a connection. The cockpit crew can react to this call by ending the isolation mode.

The LED above the “ISOL/CALL” button shows the call status in the following way:



- LED off Cockpit and cabin intercom circuits are connected
- LED blinking The ”CALL” button was pressed and the system is in call mode. By pressing the “ISOL/CALL” key at his Audio Control Unit the pilot or copilot can reestablish the connection between the passengers. While the LED indications are blinking, a CALL tone is audible in the cockpit. The “CALL” tone can be enabled/disabled by configuration.
- LED on The intercom system is in isolation mode

If the system is in call mode (blinking LED), there are two possibilities:

- the cockpit crew leave the isolation mode and connect the intercom circuits (LED off).

- the cabin crew presses the ”CALL” button once again and the system stays in isolation mode (LED on).

If the intercom circuits are connected (no isolation mode), the “ISOL/CALL” button on the cabin ACUs has no function.

3.8 Intercom activation

Intercommunication between the different users can be activated in three ways:

- Voice controlled
- PTT controlled
- External Switch controlled

3.8.1 Voice Controlled Intercom

In positions ”1” to ”5” of the TX selector rotary switch, Voice Controlled Intercom (VOX) is established without the need for any further action (assuming no transmitter is keyed).

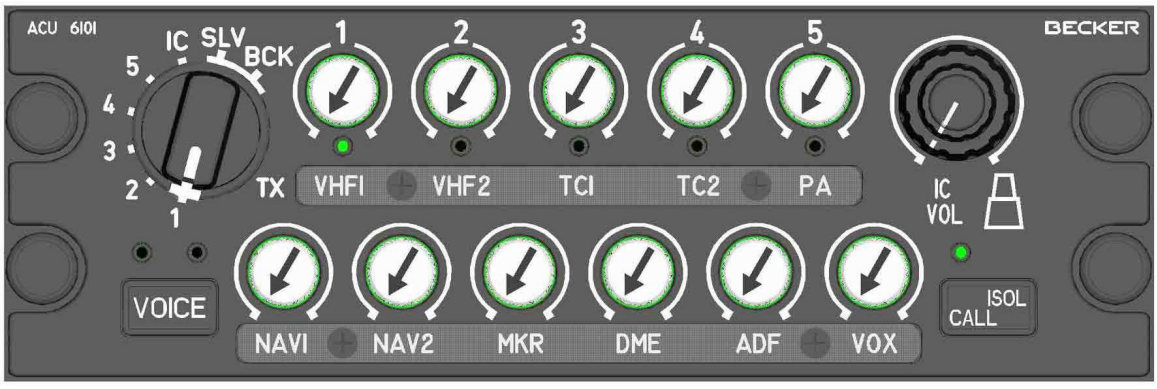
Voice Controlled Intercom can be activated or deactivated by switching functionality of the VOX knob.

- VOX knob released — Voice Controlled Intercom ON
- VOX knob impressed — Voice Controlled Intercom OFF

The switch function of the VOX knob can be activated or deactivated by the Configuration Software.

3.8.2 VOX level adjustment

The VOX level of the microphones associated with each ACU can be adjusted independently for each ACU by turning the VOX potentiometer knob.



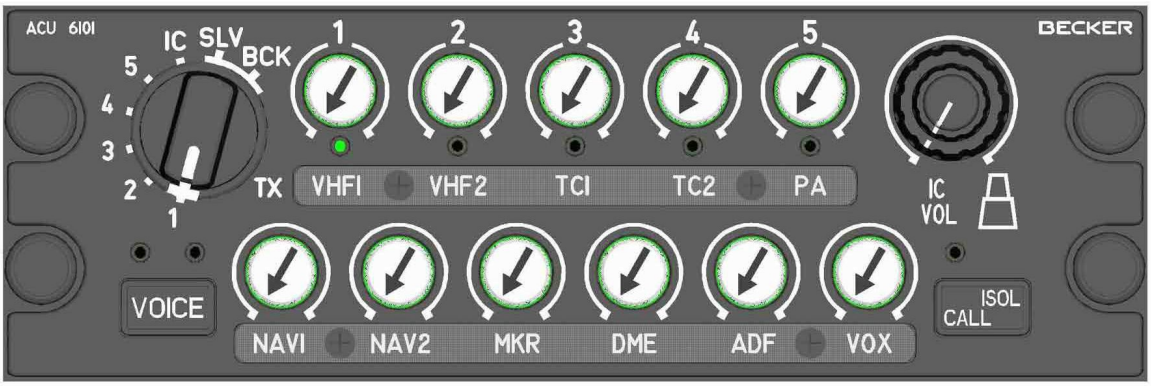
3.8.3 PTT controlled intercom

Setting the TX selector to position IC, enables intercom by using the PTT button. In this case, the mike signal is forwarded to the intercom amplifier when the PTT switch is pressed only.

3.8.4 External switch controlled intercom

Each ACU supports an external momentary or 2-state switch for activation of a ”Hot Mike Mode”. If this switch is activated, the mike line is ”open” and the signal is forwarded directly to the intercom amplifier.

3.8.5 IC volume adjustment



For individual intercom volume adjustment, the ACU provides a dedicated potentiometer on the front panel. The intercom volume is independent from the main volume.

The transmission mode always has a higher priority than the intercommunication mode. If an operator activates the transmission mode for any transceiver, the ACU stops its ”VOX” or ”HOT MIKE” mode and carries out transmission mode. Other ACUs are not affected and their operators may continue intercommunication.

3.8.6 Winchman intercom

By pressing the special external push button the winchman function is activated.

With this, the winchman is able to increase the VOX level and the main volume for his headset. The external push buttons (connected via discrete input lines at REU6100) are mounted separately from the corresponding ACU in the winchman working area (near the cabin door).
By configuration, it is possible to assign the winchman functionality to any ACU.

The following sub paragraphs describe the winchman external buttons functionality in detail.

3.8.6.1 Winchman VOX level functionality

If the VOX level push button is pressed for a short time (0.3s to ≤ 3s), the VOX level is increased by one step, until the maximum value is reached. If the VOX level push-button is pressed for a time ≥ 3s, the VOX level will be reset to the value selected on the corresponding ACU panel. The VOX level can be reset too, when the volume control or VOX control on the ACU is changed.

3.8.6.2 Winchman volume level functionality

If the winchman volume push button is pressed a short time (0.3s to ≤ 2s), the volume level is increased by one step, until the maximum value is reached. If the winchman volume push button is pressed for a time ≥ 3s, the volume level will be reset to the value selected on the corresponding ACU panel. The VOX level can be reset also, when the main volume control on the related ACU is changed.

3.8.7 Emergency CALL function

The System provides an “Emergency CALL” (E-CALL) via a dedicated discrete input. If this discrete input is activated, the “E-CALL” tone is audible for cockpit ACU operators. The “E-CALL” tone is different from the intercom request CALL- tone.

The “E-CALL” functionality can be deactivated via system configuration.

3.9 Selective CALL function

A “Selective CALL” functionality is provided by the System in a configurable way.
The system detects selective call status via a discrete input line.

The behavior of the Audio Control Unit selective CALL functionality can be selected by configuration of the system.

3.9.1 Allocation of “Selective CALL”

The “Selective CALL” function can be allocated to one of the 8 TX-channels white system integration setup.

3.9.2 Selective CALL indication

As long as the “Selective CALL” discrete input is activated, the LED below the associated TX-channel will blink with double frequency. The operator can react to this indication by activating the corresponding channel for monitoring (if not yet done) or starting communication.

3.9.3 Selective CALL forced monitoring

If forced monitoring for “Selective CALL” is activated in the configuration of the system, the associated TX-channel is automatically monitored as long as the selective CALL is active.

If this channel is being already monitored, there is no additional action.

3.10 Built in test

3.10.1 Power-up built in test (P-BIT)

Every time the system is powered, an internal self test procedure is started.

While the test is running, the Test LED illuminates. The test lasts up to 4 seconds. After the test, the following results are shown:

- No failure detected yellow LED is off; the system is in normal mode
- Failure detected yellow LED is blinking

If the internal test routine detected an failure (yellow LED is blinking), the operator has 2 possibilities:

- By pressing any button on panel, the failure can be acknowledged. In case of a permanent problem inside the system, it will be detected by the continuous self test routine and indicated again.
- Switching into the slaved or emergency mode by using the rotary switch.

3.10.2 Continuous built in test (C-BIT)

During normal operation of the system, a permanent background test routine is continuously running. If an error is detected, the ”TEST” LED starts to flash. If it is not a fatal error, the operator can acknowledge the failure by pressing the any button.

In case of notable degradation in unit or system performance, the operator can turn to emergency operation, either in ”SLAVED” or ”BACK-UP” mode.

3.11 Emergency operation

3.11.1 Slave operation

Copilot ACU Pilot ACU

When switching the rotary switch to position ”SLAVED” on ACU 1 or ACU 2, the matching headset is disconnected from it’s audio processing circuits in the Remote Electronic Unit and it’s mike and phone capsules are directly paralleled to the headset of the remaining ACU.

No further action is possible on the slaved Audio Control Unit.

”SLAVED” mode is a first step of security in case where one of the control panels appears to be defective or not working.

3.11.2 Back-Up switch activated

The pilot or copilot have the possibility to activate the back-up mode by switching the rotary switch to position BCK (after unlocking by pulling its lever) in position ”BCK”.

In this mode, the microphone and headphone amplifier is powered via an external emergency supply provided by the aircraft.

The following signal routings and functionalities are active in back-up mode:

- Headphone 1 - TX 1 & FIX 1
- Headphone 2 - TX 2 & FIX 2
- Intercom volume level is fixed to 50%
  CVR 1 and 2 level is fixed to 50%
- No actions on the ACUs are supported

3.11.3 Back-Up automatic activation

When the two main power supply busses fail or if a fatal defect occurs within the unit’s internal supply, the security logic falls back to Back-Up operation even if the ”BACK-UP” switch had not been activated.

3.12 Special Version ACU6101-X-(8XXX)

This ACU6101-X-(8XXX) supports control of 8 TX-CHANNEL. Two remaining RX-CHANNEL SELECTOR can be still used to monitor RX-Channel 7+8. In addition Double Transmit or Simulcast can be configured during configuration setup.

3.12.1 Dual, Multi Transmission mode

Dual Transmission

If the TX-selector rotary switch is turned to position ”D/S”, the operator activates 2 transceiver simultaneously for dual transmission. The green LED`s (transceiver monitoring) from the selected transceivers illuminate. The selection of the two transceiver for dual transmission is configured during installation setup of the control unit.

By pressing a PTT switch (on panel or external), the transmission is indicated by the corresponding green LED`s flashing as long as the PTT switch is held.

By configuration the system is able to be configured for Dual TX or Multi TX operation. The dual transmission mode can be blocked by system configuration.

Multi Transmission

If the TX-selector rotary switch is turned to position ”D/S”, the operator activates (TX-knob released) several transceivers simultaneously for transmission. The green LED`s (transceiver monitoring) from the selected transceivers illuminate. The selection of the function for simulcast is configured during installation setup of the control unit.

By pressing a PTT switch (on panel or external), the transmission is indicated by the corresponding green LED`s flashing as long as the PTT switch is held.

By configuration the system is able to be configured for Dual TX or Multi TX operation. The simulcast transmission mode can be blocked by system configuration.

BLANK

BLANK