ACTU STNA

Auxiliary Control Tower Unit
for STNA

(Ref. No. 83011 38590)

Technical Manual

Description and Operation

As for details, the electrical and mechanical information given in the documentation supplied with each equipment prevails

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PRELIMINARY REMARKS

The equipment manual for the ACTU STNA comprises:

PART	CONTENTS	CODE NO.
–	Description and Operation	–

This Technical Manual includes the Description and Operation with the chapters below:

1 Description

2 Installation and Operation

Since it is not possible to include modifications, such as those which may be made to circuitry details or dimensioning in the interests of technical progress, in the Technical Manual, we should point out that questions of detail should always be answered using the technical documentation supplied with the system. It is possible that drawing numbers used in this description are no longer contained in the set of drawings supplied, but rather than (to conform with the system) they have been replaced by new drawings with another number. Please carry out a once–only check on the basis of delivery list supplied and exchange where appropriate.

MARK SYMBOLS

To get the best out of the equipment you should study the contents of this manual carefully. In particular you should familiarize yourself with the marks given in this manual which are highlighted for easy recognition:

CAUTION

Cautions call attention to methods and procedures which must be followed to avoid damage to equipment.

WARNING

Warnings call attention to methods, procedures or limits which must be followed precisely to avoid injury to persons.

NOTE or **REMARK :** For more information about operations.

List of effective pages

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CHAPTER 1
DESCRIPTION

1.1 OVERVIEW

See Fig. 1−1.

The Auxiliary Control Tower Unit (ACTU) is a device which acts as a status display and runway select switch for an ILS system consisting of the subsystems Localizer, Glidepath, DME and Far Field Monitor (FFM). The status of each subsystem is displayed on the front panel (NORMAL, WARNING, ALARM). The ACTU is an option, which can be installed instead of the standard devices Control Tower Unit (CTU) and RWY select switch. The ACTU is connected with a parallel OIO−interface to an existing RCSE system. The ACTU will be typically installed in the visual control room (VCR) in the control tower. The ACTU is used for:

- Subsystem status indication
- ILS system select
- Localizer system select
- Audible alarm
- Brightness controlled status display visibility

In addition three fixed auxiliary switching signals are available set with jumper selection.

The overview of an ILS/DME installations is shown in Fig. 1−1. The installation has the following components:

- 1 Localizer station
- 1 Glide Path station
- 1 DME station
- 1 Farfield Monitor station
- 1 remote control system

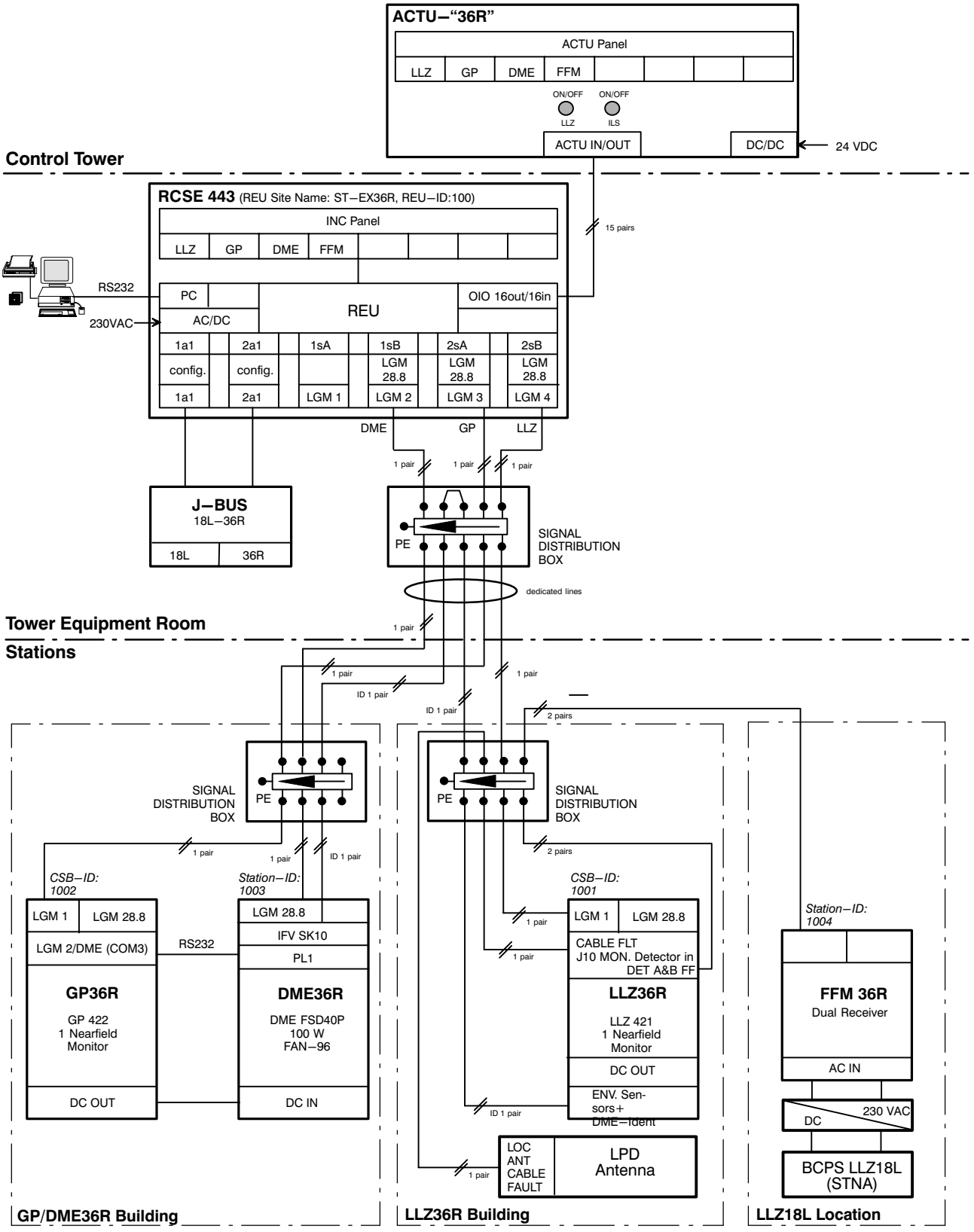


Fig. 1–1 Remote control configuration example (ILS/DME)

The ACTU consists of a front panel and a printed circuit board (see Fig. 1−2).

The front panel comprises LED indicators for the subsystem states of the connected stations, and additional indicators for the state of the ACTU to RCSE communication via OIO interface. Two control keys are available each for ILS runway select and localizer select (push button with integrated LED indicator). The keys have a toggle function.

Two pushbuttons are used for test purposes and acknowledgement of alarm occurrence and status change indication.

The ACTU consists of an I/O driver unit, a LED indicator driver, an alarm buzzer and key activities. Power supply is provided by an external low voltage power supply (24 VDC), internally converted by a DC regulator unit to 12 VDC to supply the OIO devices (galvanic isolation of OIO). The DC supply input is protected with a fuse (1.0 AT).

Sound and volume control of the audible alarm can be tuned by two potentiometers, which are both achievable on the front panel.

Brightness control of subsystem status indication on LEDs proportional to the background lightness is realized with a photosensitive resistor.

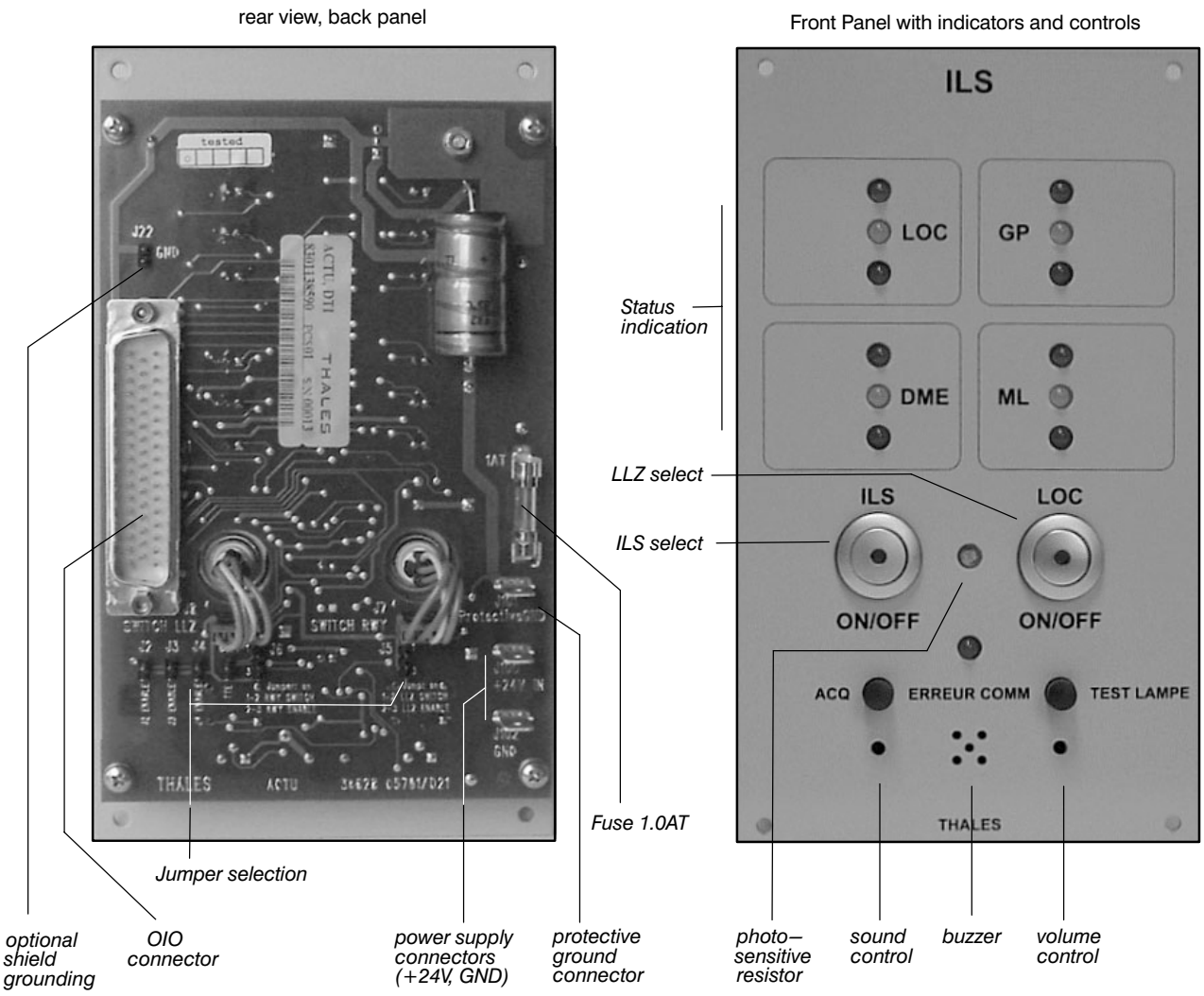


Fig. 1−2 Auxiliary Control Tower Unit (ACTU, Ref. No. 83011 38590)

1.2 TECHNICAL DATA

For standard applications, the ACTU is mounted as a front panel to a suitable subrack.

Power supply	
DC in	nominal 24 VDC range 15...27 VDC
Power consumption	approx. 10 W
Dimensions (W x H) Front panel	approx. 103 x 176 [mm]
Dimensions (W x H x D) for installation	approx. 97 x 151 x 30 [mm]
Weight	approx. 270 g

1.3 DESCRIPTION

See Fig. 1–3.

The ACTU comprises the following main functions:

- DC voltage regulation
- I/O and drivers for indicators and controls
- LED status indication
- Brightness control
- Sound/volume control

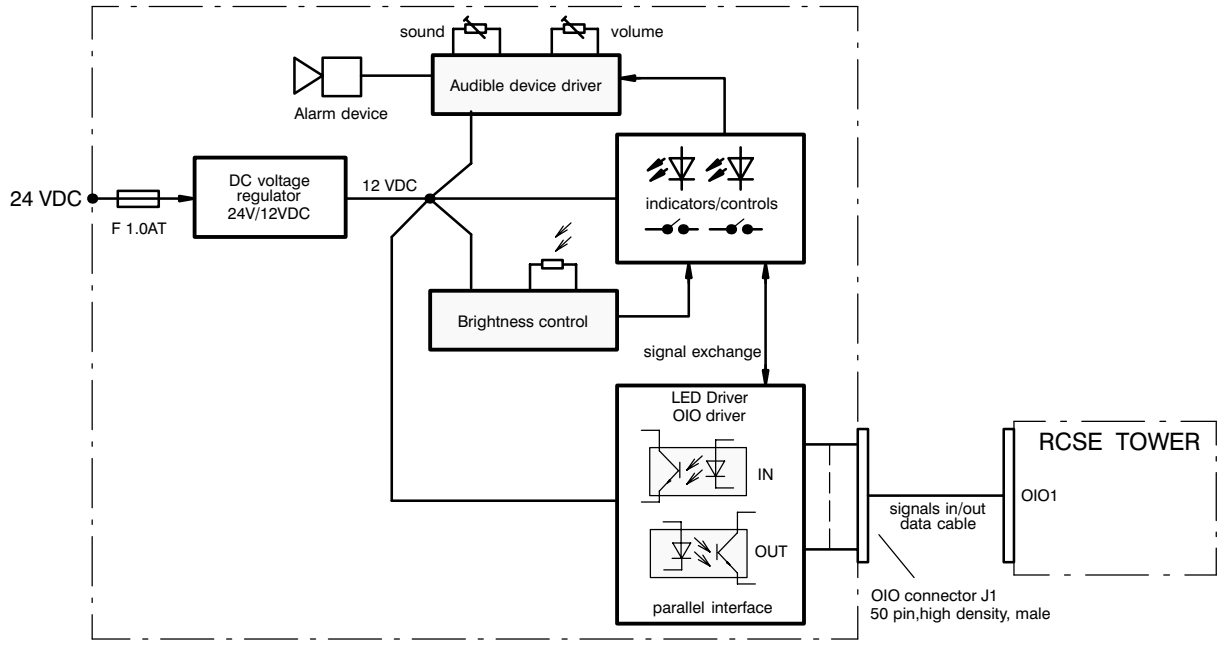


Fig. 1–3 ACTU, block diagram

Fig. 1−4 shows the front panel of the ACTU with control and indication elements. Operation details are given in section 2.3.

The 24 VDC of an external power supply bus is internally converted to 12 VDC to supply the ACTU.

The ACTU outputs are connected by cable to the optocoupler inputs of the REU OIO−card, driven by simple key (push button) activities. The minimum current to signalize a logical “1” is $\geq$ 10 mA, maximum is $\leq$ 20 mA. Three auxiliary enabling ’high’ signals for individual purposes can be selected with jumper setting.

The ACTU provides two keys to enable/disable an ILS system and separately a Localizer System. The enable status is indicated by a LED within the push button.

Station status indication is realized by brightness controlled LEDs. Brightness control is achieved by a pulse width modulation of the LED current. A photosensitive resistor controls the ratio of the pulse width modulated LED current proportional to the background lightness.

Alarm is performed by a frequency alternated sound transducer. Sound control and volume control of the alarm tone can be tuned by two potentiometers, which are both achievable on the front panel. Selection between single tone mode or dual tone mode will be defined by a jumper on the printed circuit board (see section 2.2.1, jumper J24).

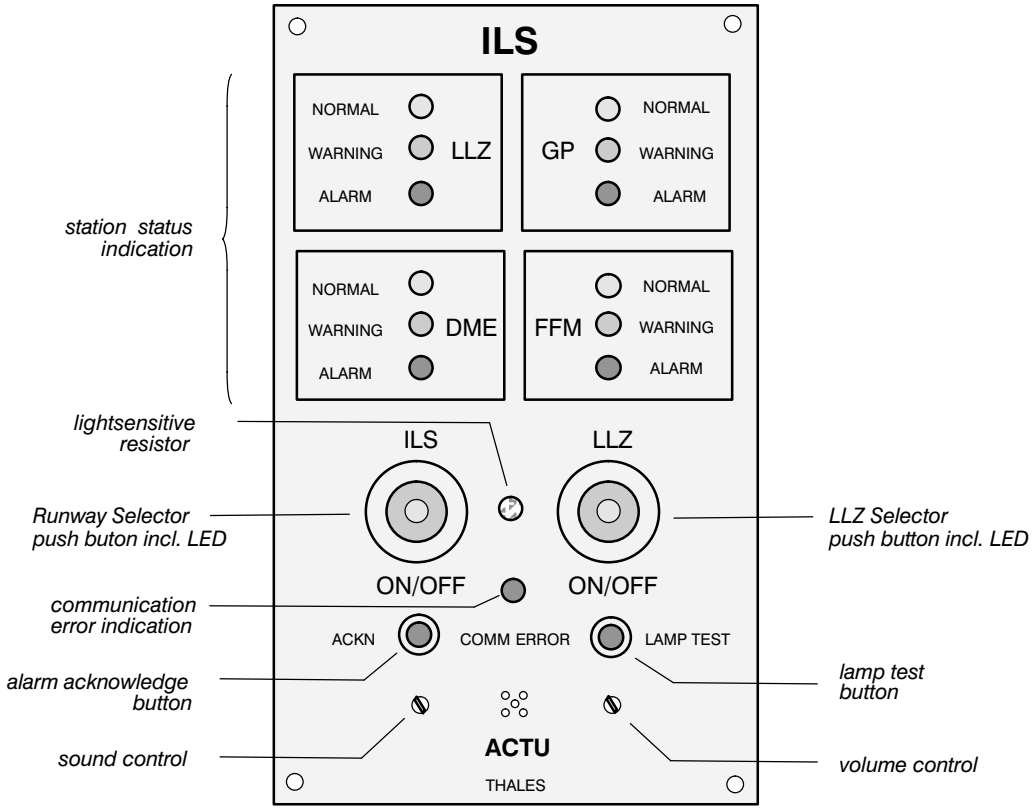


Fig. 1−4 Front panel of ACTU

CHAPTER 2
OPERATION

2.1 GENERAL

The Auxiliary Control Tower Unit (ACTU) in the ILS system is connected to and managed by the Tower RCSE 443. The following sections describe the installation, switch on and the operating of the ACTU.

2.2 INSTALLATION

See Fig. 2−1.

The ACTU is to be mounted in an appropriate subrack or tower console panel. Four screws connect the front panel and the printed circuit board.

To startup the ACTU the following steps have to be performed (refer also to section 2.2.1):

– Check position of jumper J5: set, i.e. ILS select key enabled.
– Check position of jumper J6: set, i.e. LLZ select key enabled.
– Check position of jumper J22: set, i.e. connector shield connected to ground.

NOTE: Three auxiliary enabling 'high' signals for individual purposes can be selected setting jumpers J2, J3 or J4. This is user defined and should be checked here if need be.

– Interconnect ACTU connector J1 with data cable from/to the RCSE (OIO1).
– Connect protective ground to connector J101 of ACTU.
– Connect the ACTU connectors J102 (GND) and J100 (+24V) to the external 24 VDC bus.

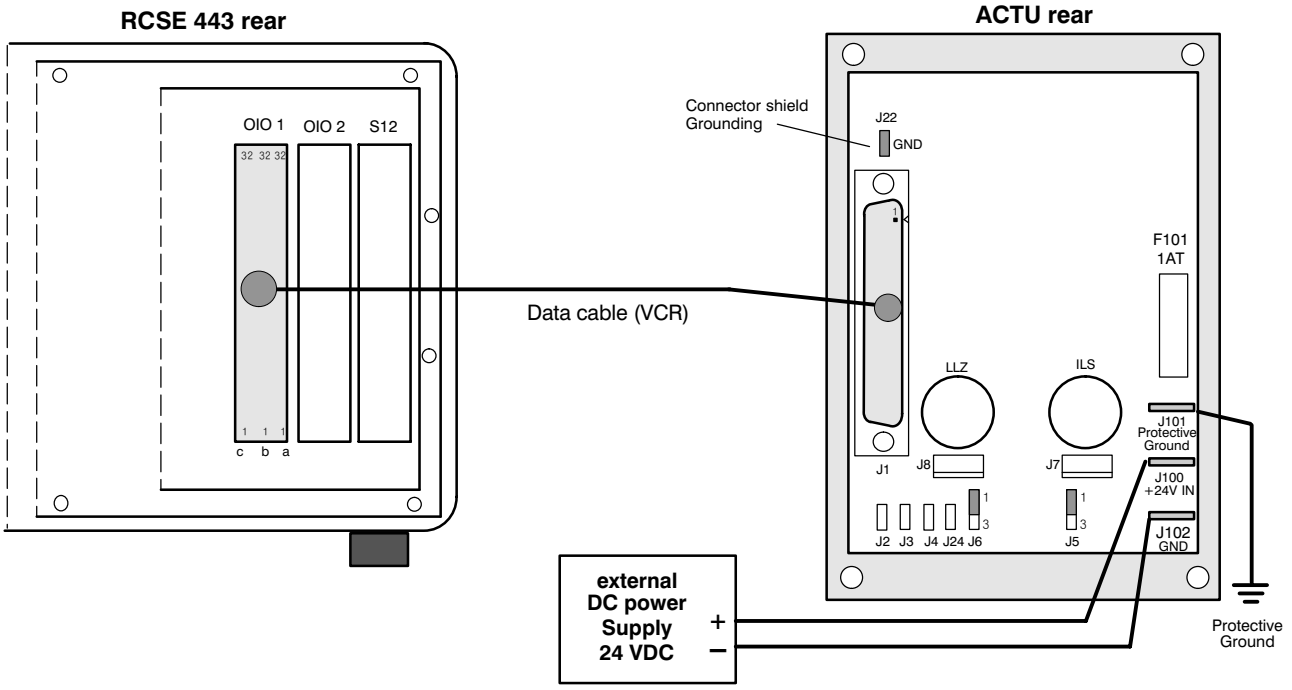


Fig. 2−1 ACTU, interconnection to RCSE 443 and Power Supply

2.2.1 Jumper Settings

The jumpers on the printed circuit board are situated at the solder side of the board which is the rear side of the ACTU. The fuse (F101, 1AT) is positioned at the solder side, so it is accessible from the rear. The controls (sound/volume) are accessible through openings in the front of the ACTU panel, see Fig. 1−4. Fig. 2−2 shows the location of jumpers on the ACTU board.

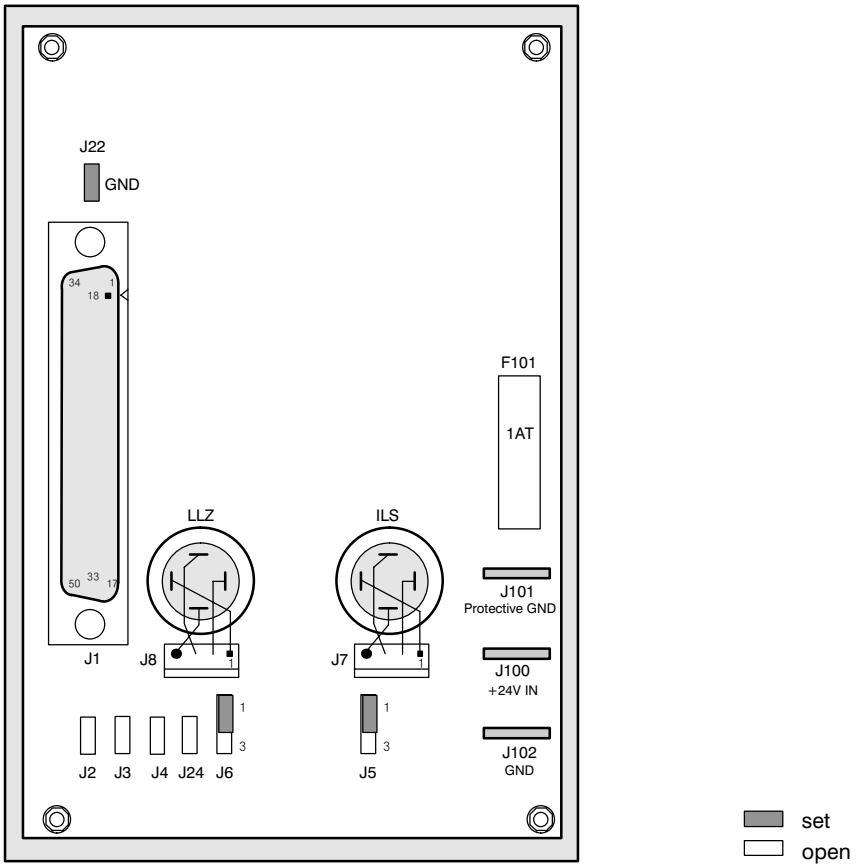


Fig. 2−2 Location of jumpers, rear of ACTU board

JUMPER	POSITION	DEFINITION	REMARKS
J2	open set	OUT J2, PIN43 connected to 'low' (GND) OUT J2, PIN43 connected to 'high' (Vcc)	default setting –
J3	open set	OUT J3, PIN44 connected to 'low' (GND) OUT J3, PIN44 connected to 'high' (Vcc)	default setting –
J4	open set	OUT J4, PIN45 connected to 'low' (GND) OUT J4, PIN45 connected to 'high' (Vcc)	default setting –
J5	1−2 2−3	ILS selector key enabled. ILS selector key disabled. ILS always enabled	default setting –
J6	1−2 2−3	LLZ selector key enabled. LLZ selector key disabled. LLZ always enabled	default setting –
J22	open set	Connector shield disconnected from ground. Connector shield connected to ground.	– default setting
J24	open set	TTE: selection of tone mode (sound) single tone mode dual tone mode	default setting –

2.2.2 Interface between ACTU OIO and RCSE OIO

ACTU OIO (J1, 50 pin)		Function, Control/indication on ACTU panel	RCSE OIO1 (16in/16out)	
IN	pos.	normal status of station LLZ, indicated via LLZ LED 'NORMAL'	OUT9c	pos.
IN2	neg.		OUT9a	neg.
IN3	pos.	warning status of station LLZ, indicated via LLZ LED 'WARNING'	OUT10c	pos.
IN4	neg.		OUT10a	neg.
IN5	pos.	alarm status of station LLZ, indicated via LLZ LED 'ALARM'	OUT11c	pos.
IN6	neg.		OUT11a	neg.
IN7	pos.	normal status of station DME, indicated via DME LED 'NORMAL'	OUT12c	pos.
IN8	neg.		OUT12a	neg.
IN9	pos.	warning status of station DME, indicated via DME LED 'WARNING'	OUT13c	pos.
IN10	neg.		OUT13a	neg.
IN11	pos.	alarm status of station DME, indicated via DME LED 'ALARM'	OUT14c	pos.
IN12	neg.		OUT14a	neg.
IN13	pos.	normal status of station GP, indicated via GP LED 'NORMAL'	OUT15c	pos.
IN14	neg.		OUT15a	neg.
IN15	pos.	warning status of station GP, indicated via GP LED 'WARNING'	OUT16c	neg.
IN16	neg.		OUT16a	neg.
IN17	pos.	alarm status of station GP, indicated via GP LED 'ALARM'	OUT25c	pos.
IN18	neg.		OUT25a	neg.
IN19	pos.	normal status of station FFM, indicated via FFM LED 'NORMAL'	OUT26c	pos.
IN20	neg.		OUT26a	neg.
IN21	pos.	warning status of station FFM, indicated via FFM LED 'WARNING'	OUT27c	pos.
IN22	neg.		OUT27a	neg.
IN23	pos.	alarm status of station FFM, indicated via FFM LED 'ALARM'	OUT28c	pos.
IN24	neg.		OUT28a	neg.
IN25	pos.	status of communication RCSE to ACTU, indicated via LED 'COMM ERROR'	OUT29c	pos.
IN26	neg.		OUT29a	neg.
IN27	pos.	alarm or status change, alarm buzzer on/off	OUT30c	pos.
IN28	neg.		OUT30a	neg.
OUT29	pos.	status of communication ACTU to RCSE, communication check	IN1a	pos.
OUT30	neg.		IN1c	neg.
OUT31	pos.	ACTU Runway (ILS) Select key	IN2a	pos.
OUT32	neg.		IN2c	neg.
OUT33	pos.	ACTU button acknowledgement 'ACKN'	IN3a	pos.
OUT34	neg.		IN3c	neg.
OUT35	pos.	ACTU button 'LAMP TEST'	IN4a	pos.
OUT36	neg.		IN4c	neg.
OUT37	pos.	ACTU jumper J5 (ILS Runway Enabled), optional	IN5a	pos.
OUT38	neg.		IN5c	neg.
OUT39	pos.	ACTU LLZ Select key	IN6a	pos.
OUT40	neg.		IN6c	neg.
OUT41	pos.	ACTU jumper J6 (LLZ Enabled), optional	IN7a	pos.
OUT42	neg.		IN7c	neg.
OUT43	pos.	J2 out connected to 'high' (Vcc), if jumper J2 is set	IN8a	pos.
OUT44	pos.	J3 out connected to 'high' (Vcc), if jumper J3 is set	IN17a	pos.
OUT45	pos.	J4 out connected to 'high' (Vcc), if jumper J4 is set	IN18a	pos.
OUT46	neg.	common ground of J2 to J4	IN18c/IN8c/IN17c	neg.
IN47	pos.	ILS runway ON	OUT31c	pos.
IN48	neg.		OUT31a	neg.
IN49	pos.	LLZ ON	OUT32c	pos.
IN50	neg.		OUT32a	neg.

2.3 OPERATING

2.3.1 Switching On

– Connect ACTU to external 24 VDC. The ACTU is powered and operable.
– Check that LED of selector key ILS is lit: ON status (internal jumper J5 is set to *1–2*).
– Check that LED of selector key LLZ is lit: ON status (internal jumper J6 is set to *1–2*).

2.3.2 Normal Operation

– Lamp test:
Push button LAMP TEST and hold button. All LED indicators are on and the buzzer is activated. After releasing the button, the LED indicators go out and the buzzer is deactivated.
– Acknowledge and Silent:
With the push button ACKN a status change is acknowledged (buzzer is active) and/or the buzzer is switched off.
– ILS runway ON/OFF select:
With the selector key ILS the runway status is set. Pressing the key once the status is toggled between ON and OFF. The selection is reported to the RCSE. A feedback (RWY_ON) from the RCSE controls the LED indicator of the key. The ILS selector key is disabled if internal jumper J5 is set to *2–3*, i.e. the ILS runway is always enabled.
– LLZ select:
With the selector key LLZ the localizer status is set. Pressing the key once the status is toggled between ON and OFF. The selection is reported to the RCSE. A feedback (LLZ_ON) from the RCSE controls the LED indicator of the key. The LLZ selector key is disabled if internal jumper J6 is set to *2–3*, i.e. the LLZ is always enabled.

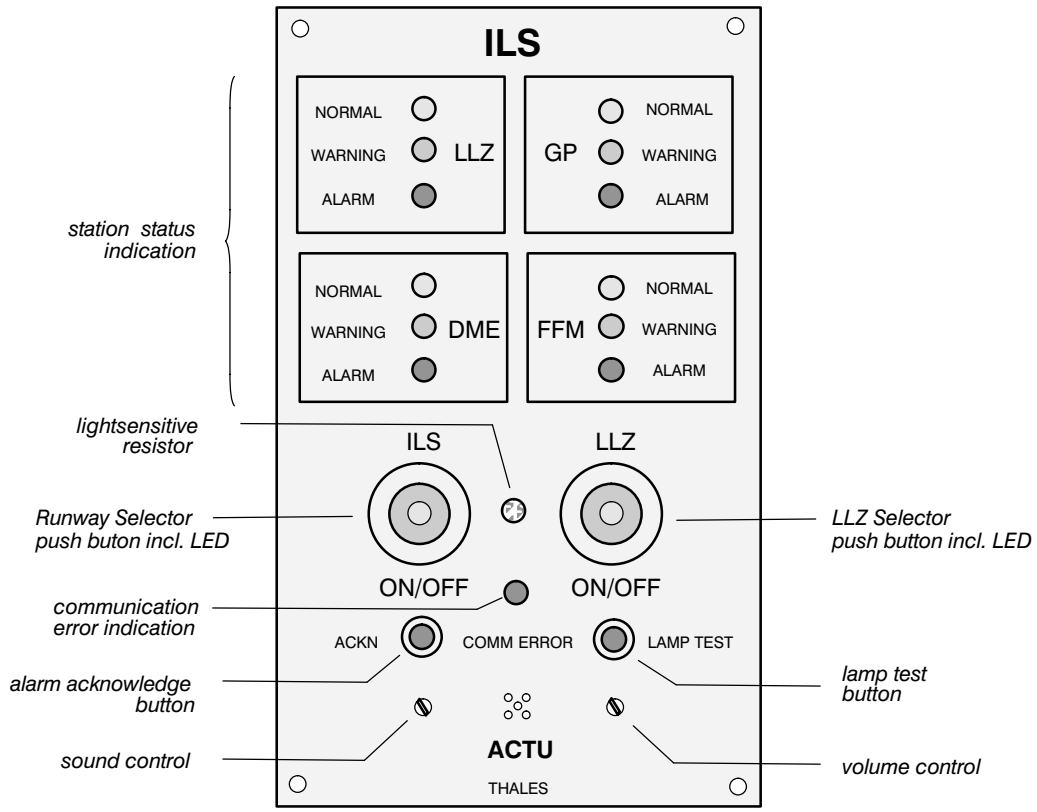


Fig. 2–3 ACTU front panel, controls and indicators

2.3.3 Indicators

See Fig. 2−3.

Status	**LED**
Normal operation: Station is switched on, initialized and fully serviceable. No Warning and no ALARM It is also required that the station is under remote control.	NORMAL green cont. WARNING off ALARM off
Warning condition (Maintenance Request): Any condition of the station, that would impair the system availability or continuity of service (De−Categorization), e.g Switch Over (Mon. Disagree, not ECU) or others or Stdby faulty	NORMAL off WARNING yellow cont. ALARM off
Alarm condition: Station is switched OFF, Both TX OP OFF, Shut down of the station, Local control of the station, Remote Maintenance, or Mon. Disagree, and ECU fault	NORMAL off WARNING off ALARM red cont.
RCSE−Station communication loss	NORMAL off WARNING off ALARM off
ACTU − RCSE communication failure or loss or RCSE not in operation	COMM ERROR red cont. NORMAL off WARNING off ALARM off

2.3.4 Controls

See Fig. 2−3.

ILS selector key (toggle switch)	pressed once: ON	ILS enabled (ON), LED lit
	pressed again: OFF	ILS disabled (OFF), LED off
LLZ selector key (toggle switch)	pressed once: ON	LLZ enabled (ON), LED lit
	pressed again: OFF	LLZ disabled (OFF), LED off
LAMP TEST (push button)	pressed	Lamp test, i.e. all lamps are blinking, and buzzer test (buzzer is on)
ACKN (push button)	pressed	switch buzzer off (silent)
Volume control	turn to right/left	increases/decreases volume of buzzer
Sound control	turn to right/left	increases/decreases tone pitch