

Approved per signature page

SERVICE MODULE
ONBOARD COMPUTER SYSTEM
MANUAL CONTROLS
(PCY)
CM.0

Issue Dates and Revision Log

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INTRODUCTION

These Manual Controls crew procedures contain information on the operational procedures for BBC manual controls and reference materials on panel commands.

These crew procedures are intended for trained crewmembers who have completed the full training course and simulations.

These crew procedures may be updated pending further systems modification, procedure validation, and release of new initial data.

These crew procedures are intended for BBC software version 4.

These crew procedures do not consider any of OS Solaris usage-specific issues.












These crew procedures list only annunciation types required for mandatory monitoring. All other annunciation types may be used and monitored per crew discretion.

ACRONYMS AND ABBREVIATIONS

| | |
|-------|--|
| AC | United States Orbital Segment, USOS |
| BBC | onboard computer system |
| БУ | control unit |
| ДнаЗ | report to MCC |
| ДпоУЗ | √MCC |
| ЗвН | continuous sound |
| ЗвП | intermittent sound |
| ЗвС | alarm (siren) |
| ИД | identifier |
| ИнПУ | integrated control panel |
| клав | pushbutton, pb |
| КЛД | date |
| кн | pushbutton, pb |
| КЦП | central post computer |
| МДМ | multiplexer/demultiplexer, MDM |
| ОЗУ | random access memory, RAM |
| ПВУ | program timing device |
| ПЗУ | read only memory, ROM |
| ПО | software |
| ПоРЭ | per crew discretion |
| ПоУЗ | on MCC GO, per MCC instructions |
| рзм | connector |
| РС | Russian Segment, RS |

| | |
|------|----------------------------------|
| СВД | light emitting diode, LED |
| СУБА | onboard equipment control system |
| СУБК | onboard complex control system |
| ТВМ | terminal computer |
| ТМБ | switch, sw |
| ТМИ | telemetry |
| УС | matching unit |
| ЦВМ | Service Module central computer |
| ЦП | central post |
| ЧТВ | current time clock |

SYMBOLS

| | |
|---|---|
|  | indicator illuminated (illuminates) |
|  | indicator not illuminated (de-illuminates) |
|  | indicator blinking |
|  | indicator status changes momentarily when command is issued |
|  | rotate clockwise |
|  | rotate counterclockwise |
|  | rotate counterclockwise to stop |
|  | rotate clockwise to stop |
|  | adjust by rotating |
|  | disconnect, demate |
|  | connect, mate |
| 03:10:20 | 3 hours 10 minutes 20 seconds |
| √ | check, place the item into desired state if possible |

1. GENERAL INSTRUCTIONS

1.1. CREW RESPONSIBILITIES

While operating manual controls, the crew is responsible for the following actions:

1. Perform operations per these procedures and **MCC** instructions.
2. Verify if **MCC**-provided initial data is sufficient to perform the task.
3. **Report to MCC** when operations are completed.
4. **√MCC**, when there is a deviation from nominal system operations not described in procedures.
5. Record nature and time of detection of all system problems.

While performing operations, the crew is responsible for the following actions:

1. Perform operations per these crew procedures and **MCC** instructions(comm passes or radiograms), in accordance with the crew functional responsibilities and current status of the onboard systems.
2. Monitor systems operation per these crew procedure and **MCC** instructions.
3. Prior to operations, perform indicator checks on the control panels to be used.
4. Record actual time spent performing operations.
5. **Report to MCC** completed operations and any system problems at earliest available com pass.
6. When there is a deviation from nominal systems operation, the crew is responsible for the following actions:
 - record the time when the deviation(malfunction) was detected;
 - record the nature of the deviation(malfunction);
 - **report to MCC** at earliest available comm pass.
7. When working with hardware (panels, cables, etc.) equipped with protective caps and covers:
 - remove caps and covers before operations;
 - re-install caps and covers after operations.

1.2. SAFETY PRECAUTIONS

To ensure nominal systems operations and crew safety, the crew is responsible for the following actions:

- when working with the system, use only hardware, tools, protective devices, designated by these crew procedures or by **MCC**;
- upon detection of an off-nominal situation not documented in these crew procedures, the crew is responsible for the following actions:
 - stop working with the system;
 - record time when the off-nominal situation was detected;
 - record nature of the off-nominal situation;
 - **report to MCC** at earliest available comm pass.

2. ИНПУ (INTEGRATED CONTROL PANEL)

This book is based on application software version 3.0.

Turn the panel on only when you need to use it.

SM ИНПУ is single fault tolerant. If one ИНПУ panel fails, use the other one.

CAUTION

Simultaneous operation of two ИНПУ is forbidden.

2.1. PURPOSE OF ИНПУ

ИНПУ panel is a component of the backup manual circuit of SM СУБА.

Panel performs the following functions:

- generation and output of commands to onboard systems and units via СУБА onboard matrix switching unit;
- reception of raw feedback signals from onboard systems and on-screen display of systems status;
- on-screen display of current time;
- telemetry output of panel operating status discrete signals and command output confirmation;
- exchange of command and signal status data via ARINC-429 bus between SM control panels and those located in other station modules.

2.2. ИНПУ CONTROLS

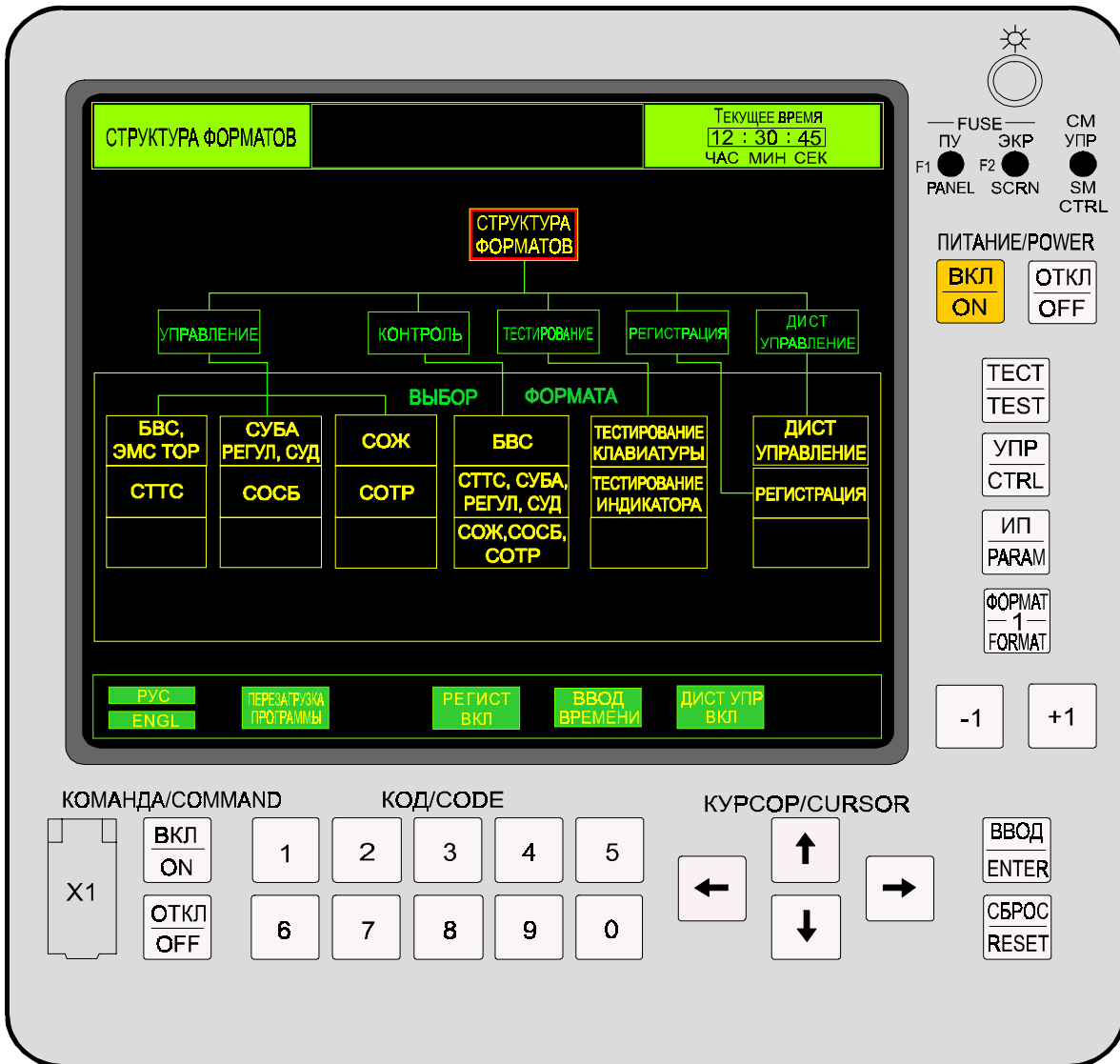


Fig. 2.2. ИнПУ Front Panel

Table 2.2.1. Purpose of ИнПУ Control Buttons

| NAME | PURPOSE |
|-----------|--|
| POWER ON | Panel Activation |
| POWER OFF | Panel Deactivation |
| TEST | Panel Operation Monitoring |
| CTRL | Onboard Systems Control Mode Activation |
| PARAM | Systems Status Monitoring Mode Activation |
| FORMAT 1 | Call Display 1 (i.e. show 'SM FORMAT STRUCTURE') |

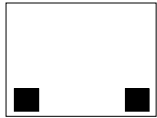
| | |
|-------------|---|
| +1,-1 | Go to Next (Previous) Display |
| ENTER | Input Data, Choose Mode, Choose Display |
| RESET | Clear Incorrectly Entered Code |
| ↑, ↓, ←, → | Move Cursor |
| 0-9 | Input Cipher Code |
| COMMAND ON | Execute Activation Command |
| COMMAND OFF | Execute Deactivation Command |

All control buttons are implemented without lock-in-position feature.

Table 2.2.2. Purpose of LEDs

| | |
|---------|---|
| PANEL | LED monitors fuse burnout in panel power circuit |
| SCRN | LED monitors fuse burnout in screen power circuit |
| SM CTRL | LED shows that the operator is working with panel via the SM panel. This indicator LED is not used in SM. |

SYMBOLS ON CONTROL DISPLAYS COMMAND CELLS



Command is executed only for activation (direct).



Command is executed only for deactivation (cancel).



Command is executed only after inhibit is removed.



Indicator status changes momentarily when command is issued. Command execution is not confirmed (cell color does not change).



Bright green color of cell shows that device is currently active.

2.3. SM ИНПУ BUSES POWERUP

| | | |
|--------|------------------------|-------------------|
| ППС-21 | sw INT CTRL PNL 1 | → ON (for ИНПУ 1) |
| ППС-22 | sw INT CTRL PNL 2 | → ON (for ИНПУ 2) |
| ППС-23 | sw КАН А, КАН Б, КАН В | → On |

2.4. ИИПУ ACTIVATION

00:00:00 pb POWER ON → Press
 pb POWER ON
 Screen
 LED SCRΝ
 LED PANEL
 OS boots, and panel performs functional self-test.
 FORMAT 1 display
 ≤ 00:00:10 '**SELF TEST RESULTS — OPERATIONAL**'

1. '**SELF TEST RESULTS — NOT OPERATIONAL**'

Perform panel test per Sect. 2.6.3.
 Turn panel off per Sect. 2.9.

MCC

2. LED SCRΝ (PANEL)

Replace fuse per Sect. 2.11.1.

2.5. CURRENT TIME SETTING AND ADJUSTMENT

NOTE

When ИИПУ panel is powered down, ИИПУ internal clock memory is erased.

1. sel EDIT TIME display button (use cursor keys ↑, ↓, ←, →)
2. pb ENTER → Press
 EDIT TIME display button
 edit time window
 cursor in the 1st column
3. Enter: ___hrs___min___sec
 entered time

If input was wrong, pb RESET → Press and repeat steps 2-3.

4. pb ENTER → Press
 EDIT TIME display button
 edit time window
 entered time

2.6. PANEL OPERATING MODES

Panel operates in the following modes:

- CONTROL - onboard systems control mode;
- STATUS - monitoring status mode of onboard systems and parameters indication;
- TEST - panel functional self-test mode;
- REMOTE CONTROL - remote control and monitoring mode (provided on SM panels only).
- EVENT - event logging mode.

2.6.1. CONTROL MODE

2.6.1.1. DISPLAY SELECTION

- pb CTRL → Press
 - CONTROL mode menu
 - SM БBC ЭMC TOP CONTROL display
- Select required display (use cursor keys ←, →)
 - selected display

- pb FORMAT 1 → Press
 - FORMAT 1 display
- Select required display (use cursor keys ↑, ↓, ←, →)
- pb ENTER → Press
 - FORMAT 1 display
 - CONTROL mode menu
 - selected display

2.6.1.2. DIRECT COMMANDS

NOTE

1. Prior to inhibited command output, remove inhibit. After enabling command, COMMAND INHIBITED changes to COMMAND ENABLED and cursor automatically goes to the selected command. If command is not output within 5 sec, inhibited status is automatically restored. After command has been output, inhibit is automatically restored.
2. NN – name of module where command is sent.
CC – display name.

Select system display per Sect. 2.6.1.1.

pb ENTER → Press

- cursor in command field

Select required command (use cursor keys ↑, ↓, ←, →)
sel COMMAND ON (COMMAND OFF) display button

- cursor in selected command cell
- √ (■) selected command cell

- ```

1. If no cursor
 √ 'NOT OPERATIONAL'
 Repeat command output
 If the problem persists, √MCC
2. 'INVALID COMMAND'
 If invalid command was output
 Select valid command

```

In other parts of the book, command output is given in shortened form:

```

ИНПУ NN: CC:
 Command name ON
 √ corresponding cell
ИНПУ NN: CC:
 Command name OFF
 √ corresponding cell

```

(LED status for panel activation and control is not shown)

### 2.6.1.3. COMMAND OUTPUT USING COMMAND ID CODE

- ```

Select CONTROL mode per Sect. 2.6.1.1.
Enter code of the system
   cursor at the selected system in CONTROL mode menu
pb ENTER → Press
   cursor at the 1st command in command field
00:00:00  Select command ID code in system
            fields with numbers of selected row and column
            cursor at selected command
00:00:02   fields with numbers of selected row and column
           √ command selection
           sel COMMAND ON (COMMAND OFF) display button
            cursor in selected command cell
           √  () corresponding cell
*****
1.  If no  cursor
    √  'NOT OPERATIONAL'
        Repeat command output
        If the problem persists, √MCC
2.   'INVALID COMMAND'
    Invalid command was output
    Select valid command
*****

```

2.6.1.4. DISPLAY EXIT

CAUTION

When work in CONTROL mode is complete, go to FORMAT 1 display

- pb FORMAT 1 → Press
- CONTROL mode menu
 - available display of CONTROL menu
 - FORMAT 1 display

2.6.2. STATUS MODE

2.6.2.1. DISPLAY SELECTION

- pb PARAM → Press
- STATUS mode menu
 - SM STATUS BBC display
- sel required display (use cursor keys ←, →)
- selected display

- pb FORMAT 1 → Press
- FORMAT 1 display
- Select required display (use cursor keys ↑, ↓, ←, →)
- pb ENTER → Press
- FORMAT 1 display
 - STATUS mode menu
 - selected display

2.6.2.2. ONBOARD SYSTEMS STATUS MONITORING

NOTE

When current status of any device is changing, ■ respective indicator cell. To cancel ■, pb RESET → Press. After pressing pb RESET, ■ is canceled in all STATUS displays.

- Select required STATUS display per Sect. 2.6.2.1.
- √ Status of required cell

2.6.2.3. DISPLAY EXIT

- pb FORMAT 1 → Press
- STATUS mode menu
 - STATUS display (which was used)
 - FORMAT 1 display

2.6.3. TEST MODE

- 1. pb TEST → Press
 - display with pushbutton test instructions

pb FORMAT 1 → Press
 FORMAT 1 display
 Select required display (use cursor keys ↑, ↓, ←, →)
 sel SM BUTTON TEST display button
 pb ENTER → Press
 FORMAT 1 display
 display with pushbutton test instructions

- 2. pb ENTER → Press
 - display with pushbutton test instructions
 - display with the picture of ИИПУ front panel
 - cursor on the first pushbutton to be tested
- 3. Cursor-highlighted pushbutton → Press

CAUTION

If pushbutton is not pressed within 10 sec, it is considered failed.

- message that pushbutton is OK or failed
 - failed pushbutton (if failure was detected)
 - cursor on the next pushbutton
- Test all pushbuttons

'INVALID BUTTON IS PRESSED'
 Press pushbutton highlighted by cursor

When the last pushbutton is pressed, report on the number of tested and failed pushbuttons.

'TO EXIT PRESS RESET BUTTON'

- 4. pb RESET → Press
 - display with indicator test instructions
- pb ENTER → Press
 - display with indicator test instructions
 - display with red field
- pb ENTER → Press
 - display with red field
 - display with green field

5. pb ENTER → Press
 - display with green field
 - FORMAT 1 display
6. **Report to MCC** all test results

2.6.4. EVENT MODE

NOTE

1. Prior to work in EVENT mode, panel should have current time correctly set.
2. After EVENT mode activation, EVENT LOG display button changes its name to EVENT LOG OFF. After mode deactivation - vice versa.

2.6.4.1. EVENT MODE SELECTION

- sel EVENT LOG display button (use cursor keys ↑, ↓, ←, →)
pb ENTER → Press
 - EVENT LOG display
 - cursor in the 1st cell of PAGE NUMBER SELECTION bar

- pb FORMAT 1 → Press
 - FORMAT 1 displaysel EVENT LOG display (use cursor keys ↑, ↓, ←, →)
pb ENTER → Press
 - FORMAT 1 display
 - EVENT LOG display

2.6.4.2. MESSAGE VIEWING

By moving cursor (use cursor keys ←, →) between numbered cells in the PAGE NUMBER SELECTION bar, check the required information about the past events

2.6.4.3. EVENT MODE EXIT

- sel EVENT LOG OFF display button (use cursor keys ↑, ↓, ←, →)
pb ENTER → Press
 - EVENT LOG display
 - FORMAT 1 display

2.6.5. REMOTE CONTROL MODE

NOTE

After REMOTE CONTROL mode activation, REMOTE CNTL ENABLE display button changes its name to REMOTE CNTL DISABLE. After mode deactivation – vice versa.

2.6.5.1. REMOTE CONTROL MODE SELECTION

sel REMOTE CNTL ENABLE display button (use cursor keys ↑, ↓, ←, →)
 pb ENTER → Press
 SM REMOTE CONTROL display
 cursor on COMM SETTING display button
 indicators of modules included into network configuration

pb FORMAT 1 → Press
 FORMAT 1 display
 sel REMOTE CONTROL display (use cursor keys ↑, ↓, ←, →)
 pb ENTER → Press
 FORMAT 1 display
 SM REMOTE CONTROL display
 cursor on COMM SETTING display button

2.6.5.2. NETWORK CONFIGURATION AND COMM SETTING

NOTE

Once set, the network configuration will be stored in non-volatile memory and remains preserved during subsequent activation, unless the operator intentionally changes it.

1. cursor key '↓' → Press
 cursor on SPP field (on NETWORK CONFIGURATION SETTING bar)
2. sel module with which comm should be established (canceled) by moving cursor (use cursor keys ←, →)
 pb ENTER (RESET) → Press
 (■) indicator of required module
3. Repeat step 2 to select all remaining required modules.
4. cursor key '↑' → Press
 cursor on COMM SETTING display button

- 5. pb ENTER → Press
 - COMM SETTING display button
 Comm with modules (selected in the network configuration) is being established.
 - 'COMMUNICATION SETTING'**
 - field of corresponding module in NETWORK CONFIGURATION SETTING bar
 - 'COMMUNICATION IS SET'**
 - field of corresponding module in NETWORK CONFIGURATION SETTING bar (visual indication appears for each module with which comm is being established)

- 'COMM ISN'T SET'**
- 1. If there is loss of power on peripheral module control panel:
 - ИНПУ SM: СУБА, REGUL, СУД CONTROL
 - ИНПУ PWR ALL - ON
 - Re-establish comm with module
- 2. If there is failure of peripheral module control panel:
 - Perform operations with control panel per Sect. 2.4.
 - √MCC
- 3. If comm line is disrupted
 - √MCC

2.6.5.3. MODULE SELECTION

- SM REMOTE CONTROL display
- cursor on COMM SETTING display button
- fields of modules with which comm is currently established
- cursor key '↑' → Press
- sel required module name in MODULE SELECTION bar by moving cursor (use cursor keys ←, →)
- 00:00:00 pb ENTER → Press
 - 'FORMAT IS LOADING'** (initial display is being loaded)

NOTE

During loading, SM and peripheral module control panels will not respond to pressing of pushbutton(s).

- ≤00:00:10
 - 'FORMAT IS LOADING'**
 - SM REMOTE CONTROL display
 - FORMAT 1display of selected peripheral module

1. **'COMMUNICATION IS ABSENT'**
 - Module with which no comm is established is selected
 - If necessary, establish comm with module per Sect. 2.6.5.2.
2. **'COMMUNICATION IS INTERRUPTED'**
 - SM REMOTE CONTROL display
 - Re-establish comm per Sect. 2.6.5.2.

2.6.5.4. CONTROL, STATUS AND EVENT MODE OPERATION

Operation in CONTROL, STATUS and EVENT modes is performed the same way as it is in the autonomous version.

NOTE

After output of command **'COMMAND IS SENDING'** (on SM and on the module where command is transmitted). When command output process is complete **"COMMAND IS SENDING'**.

1. **'USER IS BUSY'**

Peripheral module panel is in test, edit time modes or operates with the other SM control panel.

As soon as control panel is ready for operation, **'USER IS BUSY'**

2. **'COMMUNICATION IS INTERRUPTED'**

Re-establish comm per Sect.2.6.5.2.

2.6.5.5. TEST MODE OPERATION

NOTE

Peripheral module ИИПУ indicator (display) and pushbutton tests are not performed.

00:00:00 pb TEST → Press

00:00:05 **'SELF TEST RESULTS OPERATIONAL'**

If **'SELF TEST RESULTS NOT OPERATIONAL'**

Perform operation with failed control panel per Sect. 2.4.

2.6.5.6. EXIT FROM OPERATION WITH MODULE

sel REMOTE CNTL DISABLE display button (use cursor keys ↑, ↓, ←, →)

pb ENTER → Press

SM REMOTE CONTROL display

cursor on COMM SETTING display button

'COMMUNICATION IS ABSENT'

fields of modules, selected in NETWORK CONFIGURATION SETTING bar

If necessary, establish comm with required modules per Sect. 2.6.5.2.-2.6.5.3

2.6.5.7. EXIT FROM REMOTE CONTROL MODE

- sel REMOTE CNTL DISABLE display button (use cursor keys ↑, ↓, ←, →)
 pb ENTER → Press
 SM REMOTE CONTROL display
 FORMAT 1 display

2.7. SOFTWARE VERSION CHANGEOUT

Required hardware:
 socket wrench,
 flash-ROM card with software version update.

1. Deactivate control panel (per Sect. 2.9)
2. Remove six bolts along the perimeter on the panel front.
 Slide panel out 170-200 mm.

NOTE

If it is difficult to slide panel out, thread two mounting bolts (4-5 turns) into holes on panel mounting flanges: one — in upper left corner, the other — in lower right corner, and use them as handles for sliding panel out.

Remove bolts on panel top and slide cover (that closes the flash-ROM card slot) aside.

3. Activate control panel (per Sect. 2.4)
4. sel REBOOT display button (use cursor keys ↑, ↓, ←, →)
 pb ENTER → Press
 **'INSERT FLASH-CARD AND PRESS THE ENTER BUTTON.
 TO CANCEL THE REBOOT MODE, PRESS THE RESET BUTTON'**
5. Insert flash-ROM card with new version of software

CAUTION

Flash-ROM card to be installed should be positioned exactly as shown on the panel top decal.

00:00:00 pb ENTER → Press

CAUTION

To avoid corruption of system configuration file, do not powerdown control panel until reboot is complete.

Control panel reboots with new version of software.

00:08:00 □ 'REBOOT IS FULFILLED'

00:08:00 □ 'ABORT, RETRY, FAIL?'

Software reboot was unsuccessful (due to defective flash-ROM card or bad contact between flash-ROM card connector pins and slot sockets)

Remove flash-ROM card

Control panel → OFF (per Sect. 2.9)

Control panel → ON (per Sect. 2.4)

□ 'REBOOT IS FAILED'

Repeat steps 4, 5

- 6. Remove flash-ROM card by depressing the button in the card slot socket.
- 7. Control panel → OFF (per Sect. 2.9)
- 8. Reinstall cover and panel.
- 9. Control panel → ON (per Sect. 2.4)
- 10. Perform control panel test per Sect. 2.6.3.
- 11. **Report to MCC** software version changeout

2.8. MENU LANGUAGE SELECTION

NOTE

Once set, menu language will be stored in non-volatile memory and remains preserved during subsequent activation, unless the operator intentionally changes it.

1. ENABLING ENGLISH LANGUAGE MENU

sel ENG display button (use cursor keys ↑, ↓, ←, →)
pb ENTER → Press

2. ENABLING RUSSIAN LANGUAGE MENU

sel RUS display button (use cursor keys ↑, ↓, ←, →)
pb ENTER → Press

2.9. ИНПУ DEACTIVATION

pb POWER OFF → Press
 ■ Screen
 ■ pb POWER ON

2.10. SM ИНПУ BUSES POWERDOWN

ППС-21 sw INT CTRL PNL → OFF (for ИНПУ 1)
 ППС-22 sw INT CTRL PNL → OFF (for ИНПУ 2)
 ППС-23 sw КАН А, КАН Б, КАН В → Off

2.11. OFF-NOMINAL SITUATIONS

2.11.1. SCREEN OR CONTROL PANEL CIRCUIT BREAKER FUSE BURNOUT

Required hardware: socket wrench, 2 Amp fuse.

1. LED SCRΝ (PANEL)
 pb POWER OFF → Press
 ■ Screen
 ■ pb POWER ON
 ■ LED SCRΝ (PANEL)
2. Remove six bolts along perimeter of the front panel.
 Slide panel out 170-200 mm.
3. Replace the fuse SCRΝ (PANEL) with a new one from spares kit (ЗИП) (fuse is located on the control panel top).
4. Reinstall the control panel.
 Tighten six bolts along the front panel perimeter.
5. Control panel → ON (per Sect. 2.4)
 ✓ ■ LED SCRΝ (PANEL)
6. If failure persists:
 LED SCRΝ (PANEL)
 pb POWER OFF → Press
 ■ Screen
 ■ pb POWER ON
 ■ LED SCRΝ (PANEL)
 ✓ **MCC** for steps to eliminate malfunction causing fuse burnout

2.11.2. PANEL HARDWARE AND SOFTWARE MALFUNCTION

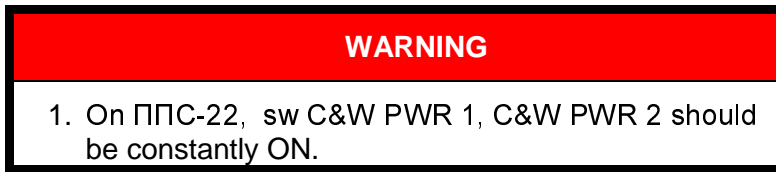
While operating, the panel periodically performs automatic self-test. If no malfunction is detected, the panel displays no OK status confirmation message.

NOTE

While the panel is powered up, a malfunction message remains on screen, unless its cause is eliminated.

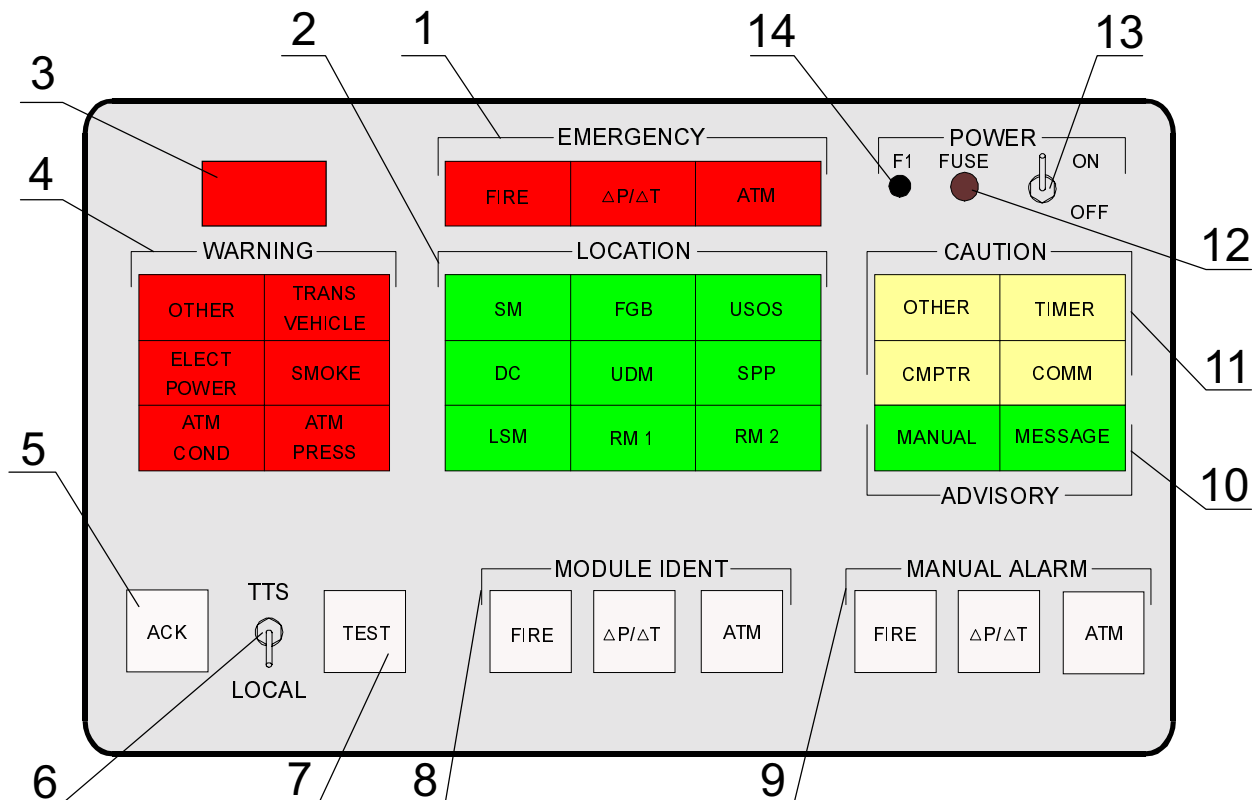
- **'SELF TEST RESULTS OPERATIONAL'**
Perform control panel test per Sect. 2.6.3.
Control panel → OFF (per Sect.2.9)
√**MCC**

3. PCC (CAUTION AND WARNING PANEL)



ПСС is intended for notification (using light and audio alarm annunciation) to the crew, located in ISS Russian Segment modules, about certain pre-emergency and emergency situations in all the RS and USOS modules of the ISS.

3.1. PCC FRONT PANEL VIEW



1. Emergency indicator lights - EMERGENCY class.
2. Indicator lights identifying location of the emergency.
3. General Alarm. Generalized emergency indicator light.
4. Emergency indicator lights - WARNING class.
5. Pushbutton to mute sound alarm, extinguish General Alarm, cancel memory log.
6. Toggle switch to enable [TTC] speaker (TTS position) or ПСС -П3С ПСС internal speaker (LOCAL position).
7. Pushbutton to activate panel self test.
8. Pushbutton to determine which module has reported the EMERGENCY event first.
9. Pushbutton to manually annunciate sound alarm of EMERGENCY class.
10. Emergency indicator lights of ADVISORY class.
11. Emergency indicator lights of CAUTION class.
12. 2 Amp Fuse.
13. ON/OFF panel power switch.
14. Panel circuit breaker LED (comes on after fuse burnout).

3.2. PCC OPERATION

| |
|-----------------------------------|
| CAUTION |
| 1. Panel should be constantly ON. |

3.2.1. PCC ACTIVATION

- sw POWER → ON
- √ LED F1
- √ sw <TTC>/LOCAL → <TTC>

If LED F1
 Replace fuse per Sect. 2.11.1

3.2.2. PCC ANNUNCIATION TEST

1. pb TEST → Press and hold
 - √ all indicator lights
 - √ GENERAL ALARM
 - √ Emergency class sound alarm (intermittent sound)

2. pb TEST → Release
 - all indicator lights (without alarm signal present)
 - GENERAL ALARM
 - Audio alarm stops

3. pb ACK → Press (ПСС is now back in operation)

| |
|--|
| CAUTION |
| 1. If pb ACK is not pressed, there will be no sound alarm annunciation for any of the future emergency events. |

4. **Report to MCC** test results

3.2.3. CREW ACTIONS IF EMERGENCY CLASS EVENT IS ANNUNCIATED VIA ПСС

| |
|--|
| <u>NOTE</u> |
| 1. Audio alarm is muted on all ПСС simultaneously, regardless on which particular ПСС pb ACK was pressed. |
| 2. Audio alarm, initiated by an incoming signal of a lower hierarchy, is overridden by a higher hierarchy incoming signal. |
| 3. Panel does not store incoming signals in memory. |

3.2.3.1. CREW ACTIONS AFTER EMERGENCY CLASS EVENT ANNUNCIATION

| |
|---|
| <u>NOTE</u> |
| 1. During $\Delta P/\Delta T$ type of emergency, module name is displayed 5 min after leak signal was received. |

- FIRE ($\Delta P/\Delta T$, ATM)
 - module name in LOCATION
 - GENERAL ALARM
- EMERGENCY audio alarm (intermittent sound) is annunciated
- pb ACK → Press
- GENERAL ALARM
- Audio alarm stops
- √ FIRE ($\Delta P/\Delta T$, ATM)
 - √ module name in LOCATION
- Perform EMERGENCY ACTIVITIES FOR EXPEDITION CREW

Report to MCC emergency

3.2.3.2. CREW ACTIONS AFTER WARNING CLASS EVENT ANNUNCIATION

- WARNING class emergency
- GENERAL ALARM
- WARNING audio alarm (siren) is annunciated
- pb ACK → Press
- GENERAL ALARM
- Audio alarm stops
- √ Information on emergency on RS Laptop
- Report to MCC** emergency

3.2.3.3. CREW ACTION AFTER CAUTION CLASS EVENT ANNUNCIATION

- CAUTION class emergency
- CAUTION audio alarm (continuous sound) is annunciated
- pb ACK → Press
- Alarm sound stops
- √ Information on emergency on RS Laptop
- Report to MCC** emergency

3.2.4. PINPOINTING EMERGENCY LOCATION BY MODULE

In case of simultaneous activation of two or three FIRE, $\Delta P/\Delta T$, ATM sensor types, crew may determine the module where each of these emergencies has occurred

1. pb MODULE IDENT FIRE → Press
 - √ LOCATION indicator light (only during fire)
2. pb MODULE IDENT $\Delta P/\Delta T$ → Press
 - √ LOCATION indicator light (only during leak)
3. pb MODULE IDENT ATM → Press
 - √ LOCATION indicator light (only during toxic atmosphere)

3.2.5. MANUAL ACTIVATION OF FIRE, $\Delta P/\Delta T$, ATM EMERGENCY EVENT ANNUNCIATION

If operator detects FIRE, $\Delta P/\Delta T$, ATM emergencies prior to automatic activation of corresponding detectors, it is possible to annunciate these emergencies manually.

- Remove protective cover from pb MANUAL ALARM (one of each emergency type)
- Press the required MANUAL ALARM pushbutton
 - FIRE ($\Delta P/\Delta T$, ATM)
 - module name in LOCATION
 - MANUAL indicator light
 - GENERAL ALARM
- Emergency audio alarm (intermittent sound) is annunciated

3.2.6. PCC DEACTIVATION

sw POWER → OFF

3.3. OFF-NOMINAL SITUATIONS

3.3.1. CIRCUIT BREAKER FUSE FAILURE

Required hardware: 2 Amp fuse.

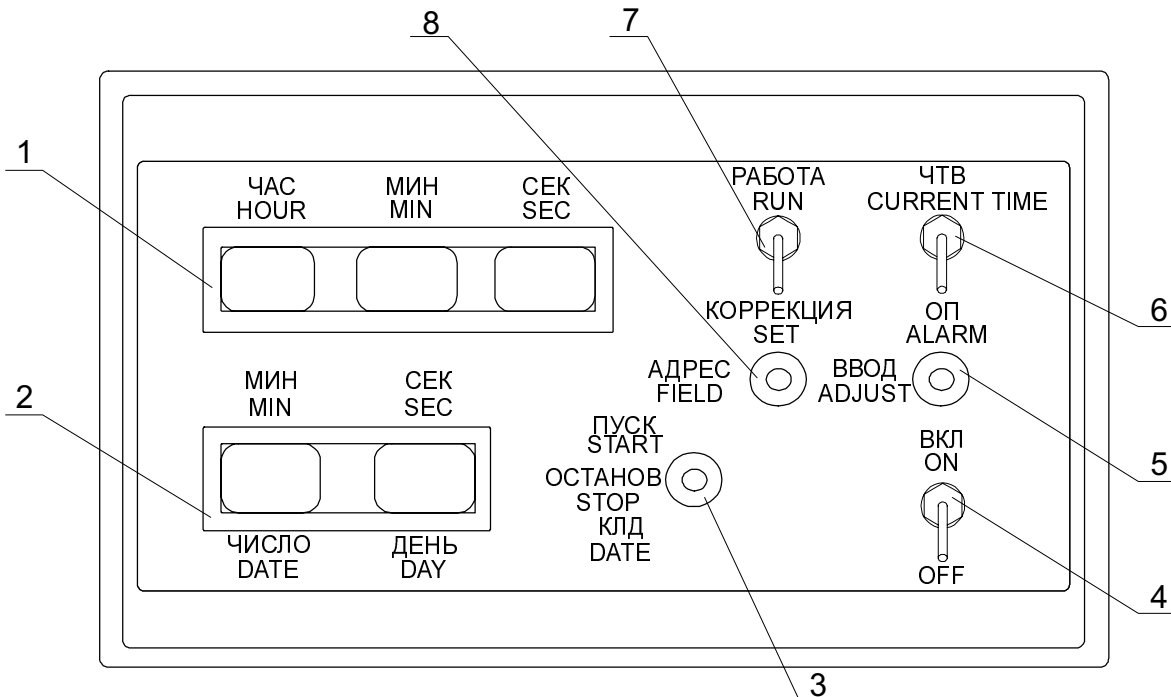
1. LED F1
 sw POWER → OFF
2. Replace 2 Amp fuse with a new one from kit 3ИП (fuse is on console front panel)
3. sw POWER → ON
 LED F1
 sw <TTC>/LOCAL → <TTC>
4. If problem persists:
 LED F1
 sw POWER → OFF
 MCC for steps to eliminate malfunction that caused fuse burnout

4. DIGITAL CLOCK (744K)

Integrated digital clock (744K) is intended for output of information on:

- current time;
- alarm clock function;
- stopwatch function.

4.1. DIGITAL CLOCK GENERAL VIEW



- 1 - current time digital display
- 2 - date and stop-watch digital display
- 3 - pb to start, stop, and reset stopwatch, as well as to retrieve information on current date
- 4 - On/Off switch
- 5 - ADJUST pushbutton
- 6 - switch to toggle between CURRENT TIME and ALARM displays
- 7 - switch to toggle between RUN and SET modes
- 8 - pushbutton to move between input fields when entering information into CURRENT TIME, ALARM and DATE fields

4.2. DIGITAL CLOCK OPERATION

Clock operating modes:

CURRENT TIME (ALARM)-RUN - to count off and display CURRENT TIME (ALARM) and DATE, with continuous sound buzzer (ALARM setting).

CURRENT TIME (ALARM)-SET- CURRENT TIME, DATE (ALARM) - to adjust settings
STOPWATCH

Smallest time increment is 1 sec

Smallest time increment for ALARM and CURRENT TIME settings is 10 sec

NOTE

During transfer to time count from internal generator,
□ point in 6th digit position.

When CURRENT TIME becomes the same as ALARM clock setting, audio alarm (continuous sound) is heard; to mute audio operator should:

sw CURRENT TIME-ALARM → ALARM
sw RUN-SET → SET

4.2.1. CLOCK ACTIVATION

ППС-21 sw CLOCK → On
ППС-23 sw CLOCK → On
CLOCK sw → ON (continuous sound)
ПСС pb ACK → Press
□ 0 0 0 0 0 0 (hr, min, sec)
□ 0 1 - 1 (date, day)

4.2.2. CURRENT TIME AND DATE SETTING OR ADJUSTMENT

NOTE

1. Time count is interrupted when pressing pb ADJUST in SET mode for the first time.
2. Digits are adjustable in all digit positions, except in 6th and 9th.

1. sw CURRENT TIME-ALARM → CURRENT TIME
sw RUN-SET → SET

2. Press pb FIELD any required number of times (N=1---8)
N DIGIT □ digit and point
6th DIGIT □ 0
pb ADJUST → Press and hold, until required digit is entered

Repeat this operation in all required digit positions

3. sw RUN-SET → RUN
N DIGIT ■ point

4.2.3. ALARM TIME SETTING AND ADJUSTMENT

NOTE

Time count is interrupted by pushing pb ADJUST in SET mode for the first time.

- | | | |
|---------|--|----------------|
| | 1. sw CURRENT TIME-ALARM | → ALARM |
| | sw RUN-SET | → SET |
| | 2. Press pb FIELD for any required number of times (N=1---5) | |
| N DIGIT | <input type="checkbox"/> digit and point | |
| 6 DIGIT | <input type="checkbox"/> 0 | |
| | Press and hold pb ADJUST, until required digit is entered | |
| | Repeat this operation in all required digit positions | |
| | 3. sw RUN-SET | → RUN |
| | sw CURRENT TIME-ALARM | → CURRENT TIME |
| N DIGIT | <input checked="" type="checkbox"/> point | |

4.2.4. STOPWATCH OPERATION

- pb START-STOP-DATE → Press (duration count)
- DATE data
 - 0 0 0 0
- pb START-STOP-DATE → Press (duration count)
- duration time
- pb START-STOP-DATE → Press (readout returns to DATE display)
- duration time
 - DATE reading

5. SIMVOL-TS EQUIPMENT

Simvol-Ts equipment is intended for on-screen display of current СУДН information and combined TV information from [TBC].

5.1. SIMVOL-TS ACTIVATION

NOTE

LEDs on either channel A or Б of Information Generation Unit (БФИ-А) and TV Signal Switching Unit (БКТС-А) may be lit depending on which channel Simvol-Ts is currently using.

pb ВКЛ → Press

- LED ВКЛ
- LED БФИ-А
- LED БКТС-А
- LED МАГ-А (Б)
- LED Д
- LED Н
- Format 0

Verify change of time reading in top right portion of screen

If time reading does not change:

pb ВЫКЛ → Press

■ all LEDs

Re-activate Simvol-Ts on the same channel

If the problem persists

Reconfigure Simvol-Ts to use other БКТС and БФИ channel

5.2. SIMVOL-TS RECONFIGURATION FOR OTHER БФИ AND БКТС CHANNELS

pb ВКЛ → Press

pb БФИ-А (БФИ-Б) → Press

pb БКТС-А (БКТС-Б) → Press

pb ВЫКЛ → Press

pb ВКЛ → Press

- LED ВКЛ
- LED БФИ-А (БФИ-Б)
- LED БКТС-А (БКТС-Б)
- LED МАГ-А (Б)
- LED Д
- LED Н
- Format 0

Verify change of time reading in top right screen corner

5.2.1. SIMVOL-TS CONTROL PANEL

Simvol-TS control panel is intended to activate/deactivate Simvol-Ts, operating mode selection, input of coded data for processing and display of information on Simvol-Ts TV color monitor screen

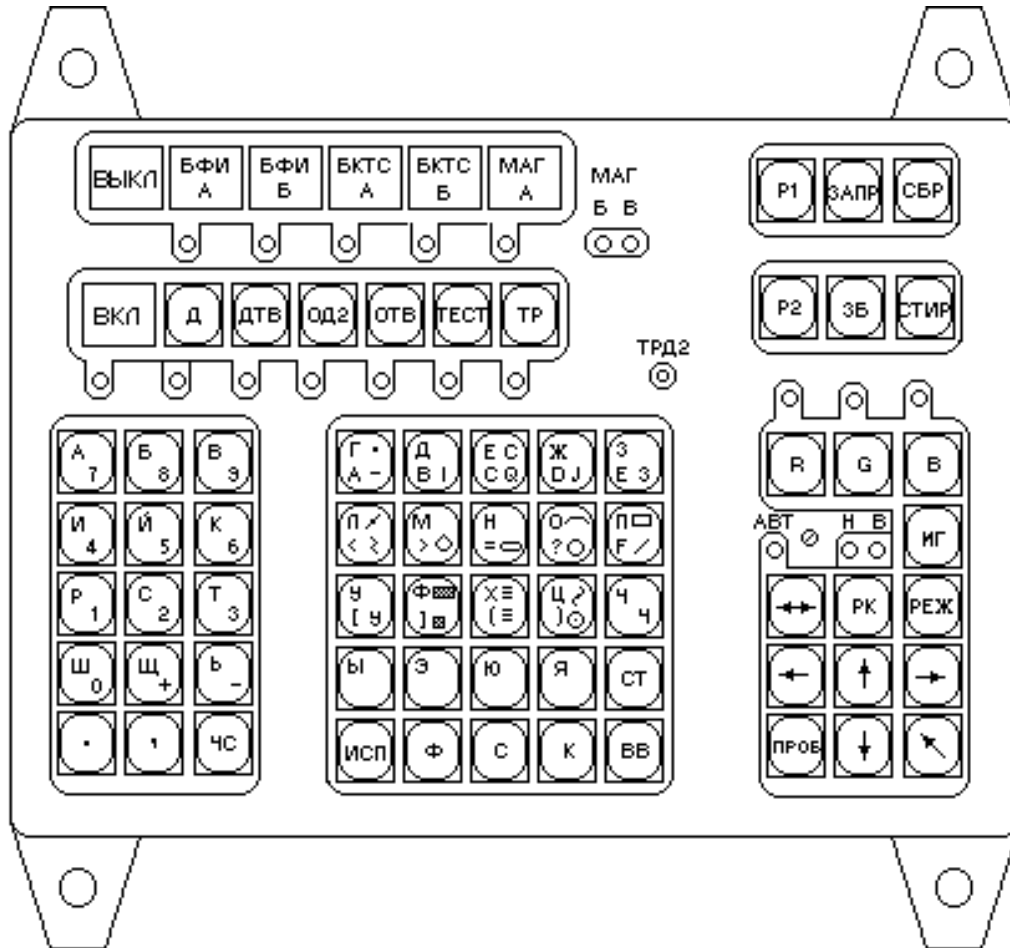


Table 5.2.1.1. Functions of control pushbuttons

| Pushbutton | Function | Execution Confirmation |
|------------|---|---|
| ВКЛ | Simvol-Ts powerup | <input type="checkbox"/> LED ВКЛ |
| ВЫКЛ | Simvol-Ts powerdown | <input checked="" type="checkbox"/> LED ВКЛ |
| БФИ-А | Activation of channel А of БФИ-Ц unit | <input type="checkbox"/> LED БФИ-А |
| БФИ-Б | Activation of channel Б of БФИ-Ц unit | <input type="checkbox"/> LED БФИ-Б |
| БКТС-А | Activation of channel А of БКТС-Ц unit | <input type="checkbox"/> LED БКТС-А |
| БКТС-Б | Activation of channel Б of БКТС-Ц unit | <input type="checkbox"/> LED БКТС-Б |
| Д | Activation of Display Mode | <input type="checkbox"/> LED Д |
| ДТВ | Activation of TV Display Mode | <input type="checkbox"/> LED ДТВ <input type="checkbox"/> LED ТР |
| ОД-2 | Unused mode (Display 2) | <input type="checkbox"/> LED ОД-2 |
| ОТВ | Activation of TV Display Mode | <input type="checkbox"/> LED ОТВ |
| ТР | Activation/deactivation of Broadcast Mode | <input type="checkbox"/> LED ТР |

| | | |
|------------|--|---|
| ТЕСТ | Activation/deactivation of Test Mode | <input type="checkbox"/> LED TECT <input type="checkbox"/> LED ABT |
| МАГ А | Not used | |
| P1 | Backup (reserved) pushbutton | |
| ЗАПР | Inhibits canceling of Simvol-Ts standalone operation mode via command from ЦВМ. Repeated pressing of this pushbutton enables canceling. | |
| СБР | Resets Simvol-Ts to initial state | |
| P2 | Backup (reserved) pushbutton | |
| ЗБ | Backspace (deletes character to the left of cursor) | |
| СТИР | Clears screen contents | |
| R | Selects docking assembly target, in Test Mode — adjusts density of red | <input type="checkbox"/> LED R |
| G | Selects docking assembly target, in Test Mode — adjusts density of green | <input type="checkbox"/> LED G |
| B | Inverts black and white, in Test Mode — adjusts density of blue | <input type="checkbox"/> LED B |
| ↔ | Activates Simvol-Ts standalone (autonomous) operation mode. Repeated pressing of this pushbutton enables Simvol-Ts and ЦВМ joint operation mode. | <input type="checkbox"/> LED ABT |
| ИГ | Preparation for Test Mode | |
| PK | Toggles character case (upper/lower) | <input checked="" type="checkbox"/> LED H <input type="checkbox"/> LED B |
| РЕЖ | Changes on-screen display in the following sequence: low res display (БФ), high res display (МФ), graphics display (ГИ) | |
| ПРОБ | Space | |
| ЧС | Backup (reserved) pushbutton | |
| СТ | Backup (reserved) pushbutton | |
| ИСП | Executes selected command | |
| Ф | Selects display | |
| С | Backup (reserved) pushbutton | |
| К | Backup (reserved) pushbutton | |
| ВВ | Data input | |
| А-Я | Alphanumeric buttons | |
| ←, →, ↑, ↓ | Moves cursor | |
| ↖ | Homes cursor (returns cursor to default position in the top left corner of the screen) | |

5.3. SIMVOL-TS FORMATS

Simvol-Ts is capable of data I/O on the following displays:

- Format 0 HELP (format selection)
- Format 1 STATUS
- Format 2 BUS-BUFFER
- Format 3 СБЛИЖЕНИЕ (Rendezvous)
- Format 4 МИШЕНЬ (Target)
- Format 5 МИШЕНЬ-СБЛИЖЕНИЕ (Target — Rendezvous)

5.3.1. FORMAT SELECTION

pb Φ → Press
pb with number of the required format → Press
pb ИСП → Press
□ selected format

5.3.2. HELP FORMAT (Φ)

This is a reference format and which serves to select formats.

| | |
|---|--------------|
| s 0 - string/ 1 - kadr F format F0 help | 00 : 00 : 00 |
| format 0 help | |
| F1 STATUS | |
| F2 BUS-BUSTER | |
| F3 СБЛИЖЕНИЕ | |
| F4 МИШЕНЬ | |
| F5 МИШЕНЬ - СБЛИЖЕНИЕ | |
| string | |

5.3.3. STATUS FORMAT (Φ1)

This format displays [TBM] operation status data.

| | |
|---|--------------|
| s 0 - string/ 1 - kadr F format F0 help | 00 : 00 : 00 |
| format 1 status | |
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |
| 0 | 300 |
| 0 | 0 |
| string | |

5.3.4. BUS-BUFFER FORMAT (Φ2)

This format displays status data on the current contents of the memory buffer.

| | | | | | |
|---|--------|------|----------|-----|--------------|
| s 0 - string/ 1 - kadr F format F0 help | | | | | 00 : 00 : 00 |
| format 2 bus-buffer | | | | | |
| bus | packet | slot | subframe | pfr | |
| CW | SW | | | | |
| string | | | | | |

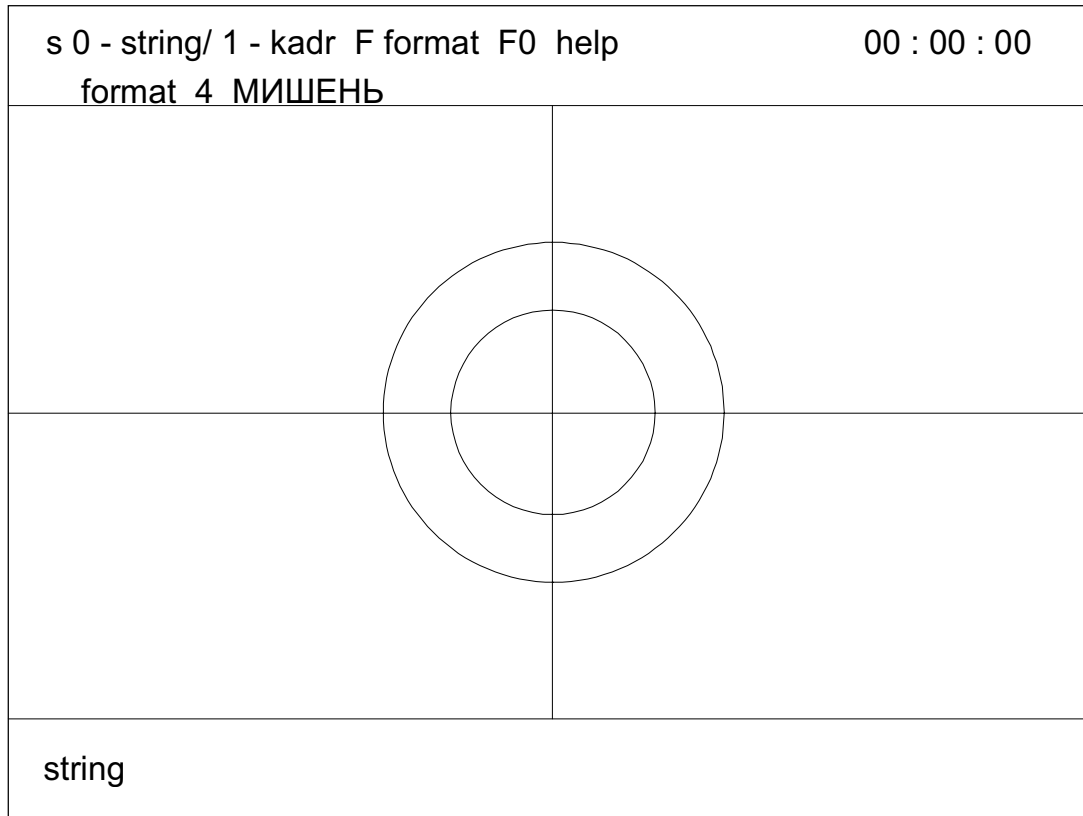
5.3.5. RENDEZVOUS FORMAT (Ф3)

This format displays information on ISS angular velocity, range, relative rate of approach, current attitude control mode, and Kurs system operation status.

| | | | |
|---|-------|--------------|-----|
| s 0 - string/ 1 - kadr F format F0 help | | 00 : 00 : 00 | |
| format 3 СБЛИЖЕНИЕ | | | |
| ОРИЕНТАЦИЯ | | | |
| ИО ВЫБОР | | КУРС | П |
| Wx | г / с | КОМПЛ | |
| Wy | г / с | УЗЕЛ | |
| Wz | г / с | | |
| | | A F | |
| | | A S | |
| КУРС - ММ | | | |
| КОМПЛ | | р | км |
| ГОТОВН | | р | м/с |
| string | | | |

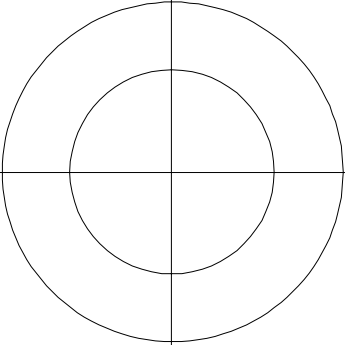
5.3.6. DOCKING TARGET FORMAT (Φ4)

This format displays docking target mask on the screen and allows to align the docking target mask center with the center of TV image.



5.3.7. TARGET — RENDEZVOUS FORMAT (Ф5)

This format is used during TORU mode and combines docking target mask image with rendezvous related information (ISS angular velocities, range, relative speed of approach, current attitude control mode, Kurs system operation status)

| | | | | |
|--|-------|--------------|---|----|
| s 0 - string/ 1 - kadr F format F0 help | | 00 : 00 : 00 | | |
| format 5 МИШЕНЬ-СБЛИЖЕНИЕ | | | | |
| ОРИЕНТАЦИЯ | | | | |
| ИО ВЫБОР | | КУРС П | | |
| Wx | г / с | КОМПЛ | | |
| Wy | г / с | УЗЕЛ | | |
| Wz | г / с | | | |
|  | | A F | | |
| | | A S | | |
| | | КУРС - ММ | | |
| | | КОМПЛ | ρ | км |
| ГОТОВН | ρ | м/с | | |
| string | | | | |

5.4. SIMVOL-TS OPERATING MODES

Simvol-Ts uses the following operating modes:

- Display Mode
- TV Display Mode
- TV Image Mode
- Broadcast Mode
- Test Mode

NOTE

When in Display, TV Image, and TV Display modes, activation of new mode will override the current mode.

5.4.1. DISPLAY MODE ACTIVATION

This mode provides onscreen display of information, generated within Simvol-Ts system.

- pb Д → Press
- LED Д

5.4.2. TV DISPLAY MODE ACTIVATION

This mode provides onscreen display of TV feed and features combined (superimposed) display of TV image and Simvol-Ts system generated information.

- pb ДTB → Press
- LED ДTB
- LED TP
- pb TP → Press
- LED TP

5.4.3. TV IMAGE MODE ACTIVATION

This mode provides reception of TV feed and display of B/W TV image

- pb OTB → Press
- LED OTB

5.4.4. BROADCAST MODE ACTIVATION

This mode provides for onscreen display of Simvol-Ts system generated information, and transmittal of this information in the form of complete TV signal (feed) into onboard telemetry system (BTC).

- pb TP → Press
- LED TP

5.4.5. TEST MODE

This mode provides functional test of Simvol-Ts equipment.

1. Activate Simvol-Ts per Sect 5.1. (БФИ-А, БКТС-А)
2. pb ДТВ → Press
 - LED Д
 - LED ДТВ
 - LED TP

Check proper operation in this mode (presence of both test and actual TV image)
3. pb TP → Press
 - LED TP

pb Д → Press

 - LED ДТВ
 - LED Д
4. pb ТЕСТ → Press
 - LED ТЕСТ
 - LED АBT
 - test image
 - high resolution display cursor to the left of 1.БKY header
5. pb ИГ → Press
 - high resolution display cursor to the right of 1.БKY header

pb R → Press

 - LED R

pb G → Press

 - LED G
6. By sequentially pressing alphanumeric (any 5-7 randomly chosen pushbuttons)
 - √ characters highlighted in yellow that correspond to pressed pushbuttons on all the columns of high resolution display
7. pb ИГ → Press
 - test image

pb ТЕСТ → Press

 - LED АBT

pb ТЕСТ → Press

 - LED ТЕСТ
 - Format 0

If no Format 0

pb СБР (Reset) → Press

8. pb БФИ-Б → Press
 LED БФИ-А
 LED БФИ-Б
 pb БКТС-Б → Press
 LED БКТС-А
 LED БКТС-Б
 pb ВЫКЛ → Press
 all LEDs

9. pb ВКЛ → Press
 LED ВКЛ
 LED БФИ-Б
 LED БКТС-Б
 LED МАГ-А (Б)
 LED Д
 LED Н
 Format 0

Verify change of time reading in top right screen corner

If time reading does not change:

- pb ВЫКЛ → Press
 all LEDs

Reactivate Simvol-Ts

10. Repeat steps 2---7.

11. pb БФИ-А → Press
 LED БФИ-Б
 LED БФИ-А
 pb БКТС-А → Press
 LED БКТС-Б
 LED БКТС-А

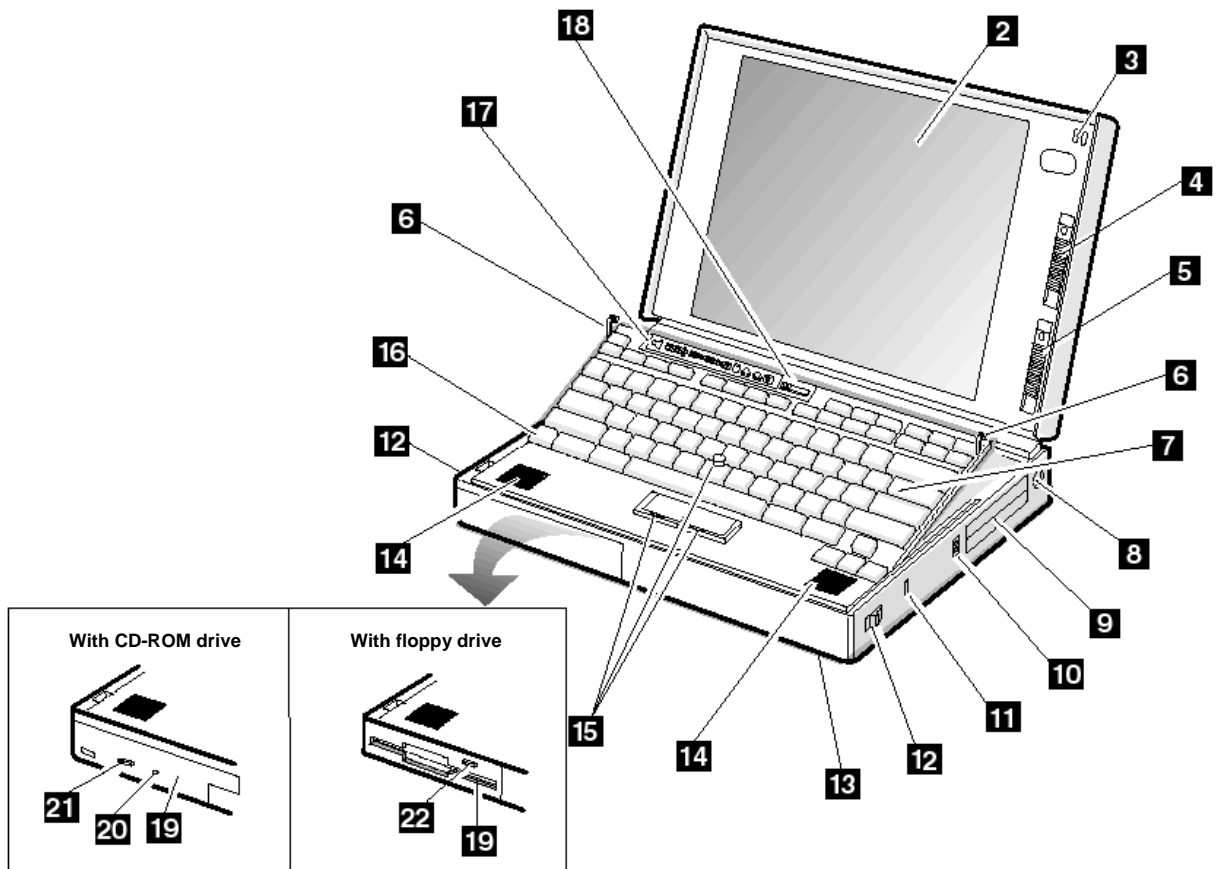
12. **Report to MCC** functional test results

5.5. SIMVOL-TS DEACTIVATION

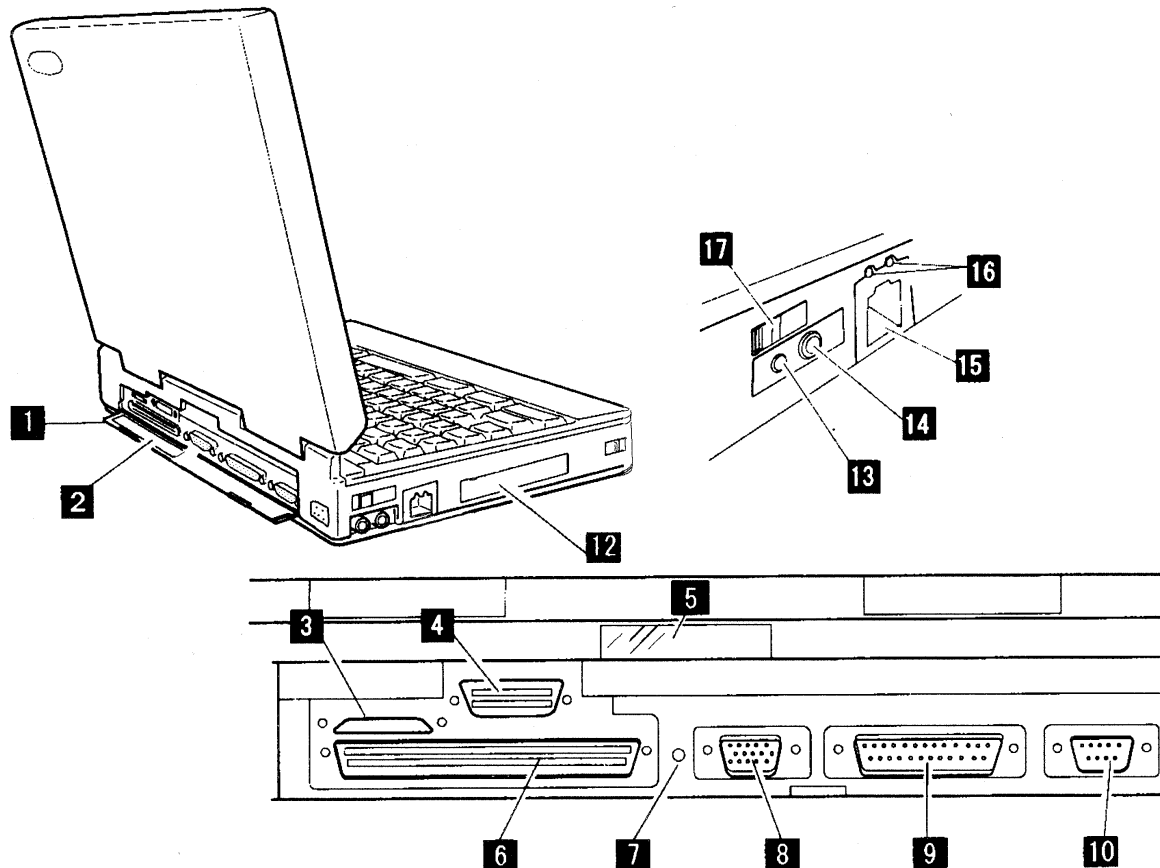
- pb ВЫКЛ → Press
 all LEDs

6. RS LAPTOP OPERATION

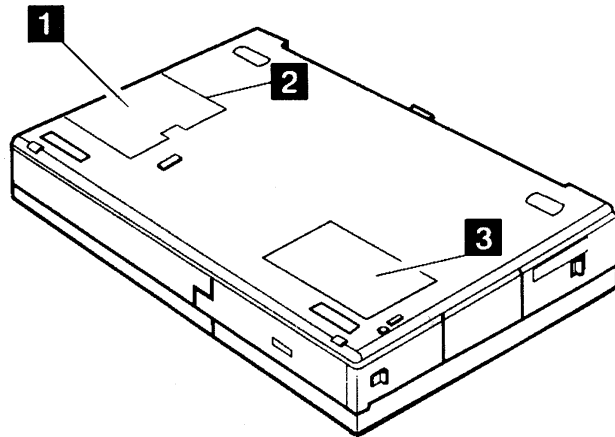
6.1. RS LAPTOP CONTROLS



1. Housing
2. Color LCD display
3. Built-in microphone
4. Contrast control
5. Brightness control
6. Keyboard raiser
7. Keyboard
8. External input device connector (PS/2 mouse socket)
9. PC Card slots
10. PC Card eject buttons
11. Security keyhole
12. Release latches
13. Front infrared port
14. Built-in speakers
15. Track Point III cursor-pointing device
16. Fn key
17. LCD indicator panel
18. Volume control
19. Removable CD-ROM drive
20. CD-ROM emergency eject hole
21. CD-ROM eject button



1. Rear door
2. Connector door
3. MIDI/joyystick port
4. External-diskette-drive connector
5. Rear infrared port
6. System-expansion connector
7. Power shutdown switch
8. External monitor connector
9. Parallel port
10. Serial port
11. Power jack
12. Option cover
13. Headphone stereo jack (\varnothing 3.5 mm)
14. Microphone stereo jack (\varnothing 3.5 mm)
15. Modem/fax port
16. Video I/O ports (S-Video)
17. Power switch

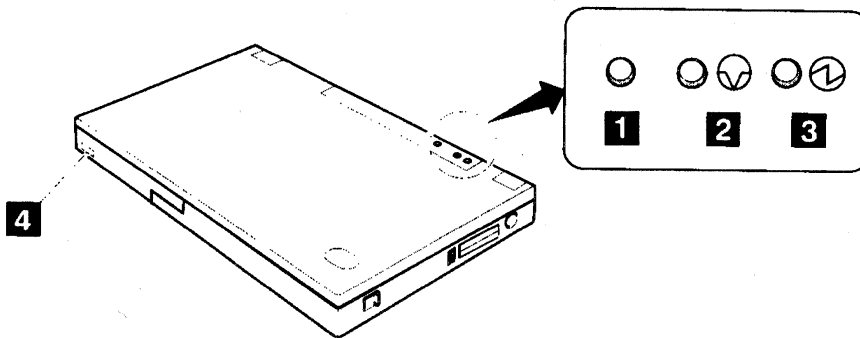


- 1. Memory slot
- 2. Memory slot cover
- 3. Serial number

6.2. RS LAPTOP STATUS INDICATORS

Status indicators consist of three indicator lamps (LEDs) and LCD indicator panel.

6.2.1. INDICATOR LAMPS (LEDS)

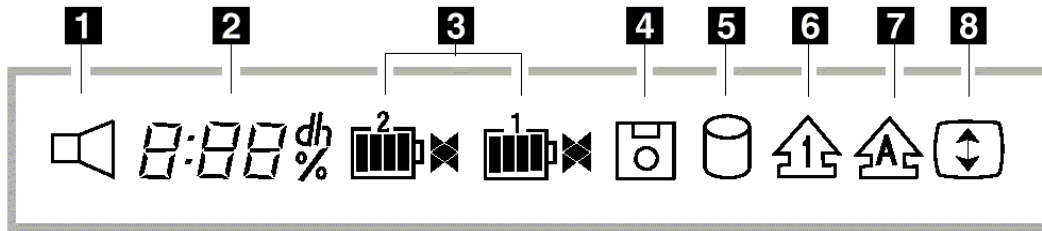


| LED | Item | Status | Description |
|-----|------------------|---|--|
| 1 | Battery | <input type="checkbox"/> Green | Enough battery power remains for operation |
| | | <input type="checkbox"/> Steady Orange | Battery is being charged |
| | | <input checked="" type="checkbox"/> Blinking Orange (3 beeps) | Battery needs charging |
| 2 | Suspend mode | <input type="checkbox"/> Steady Green | RS Laptop in suspend mode (■ LED power) |
| | | <input checked="" type="checkbox"/> Blinking Green | Change from/to suspend mode |
| 3 | Power | <input type="checkbox"/> Green | RS Laptop is operational (not in suspend mode) |
| 4 | CD-ROM operation | <input type="checkbox"/> Green | RS Laptop is reading from CD |

6.2.2. LCD INDICATOR PANEL

Indicator LCD panel is seen when RS Laptop cover is open.

Indicator shows current status of RS Laptop and its main elements.



| Icon | Element | Function |
|------|---|--|
| 1 | Speaker | Appears when internal speaker beeps |
| 2 | Remaining battery | Indicates the amount of remaining battery power by a percentage (%), d (day), h (hour), or hours and minutes (hh:mm) |
| 3 | Secondary battery status (if available) | Shows the amount of remaining battery power and battery usage status |
| 4 | Primary battery status | Shows the amount of remaining battery power and battery usage status |
| 5 | Diskette drive in use | Appears when data is read from or written to a diskette |
| 6 | Hard disk in use | Appears when data is read from or written to the hard disk |
| 7 | Numeric lock | Indicates that numeric keypad on the keyboard is enabled |
| 8 | Caps lock | Indicates the Caps Lock mode is enabled |
| 9 | Scroll lock | Alternately turns off and on the Arrow keys screen-scroll function |

6.3. RS LAPTOP MAINTENANCE

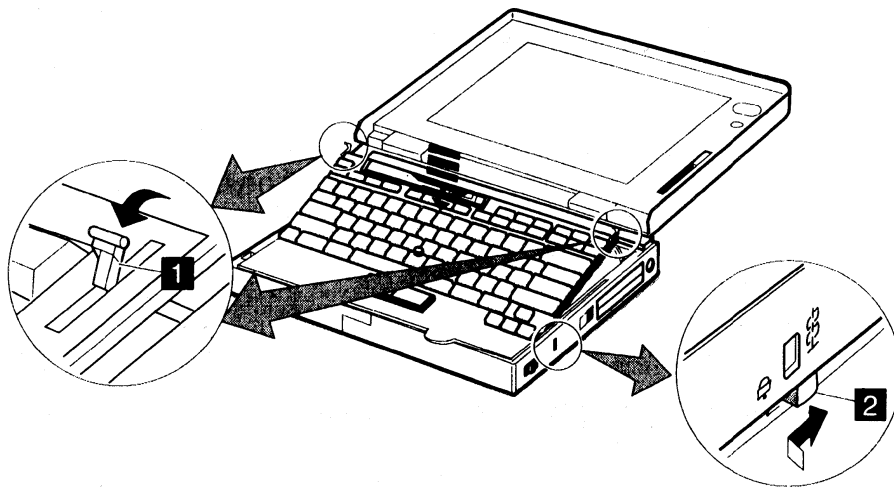
To perform RS Laptop maintenance, it is required to open keyboard panel.

6.3.1. OPENING KEYBOARD PANEL

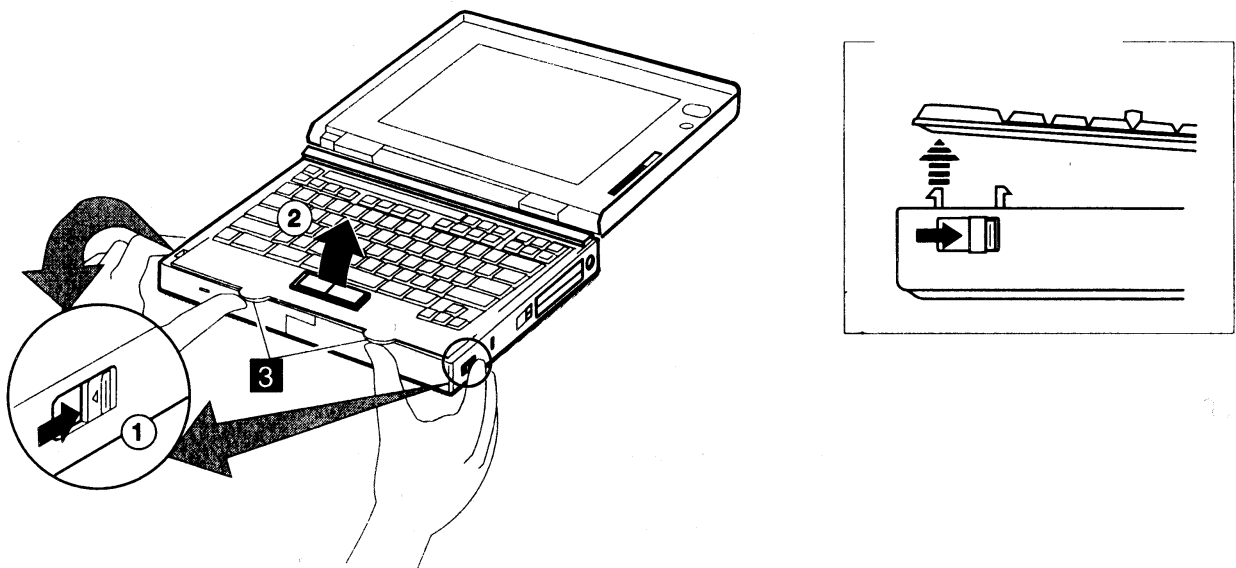
NOTE

Prior to opening keyboard panel, put it into horizontal position.

1. Keyboard panel → horizontal position (**1**).
2. ✓ release latch position — in the right position (**2**).



3. Release keyboard panel by moving release latches forward.



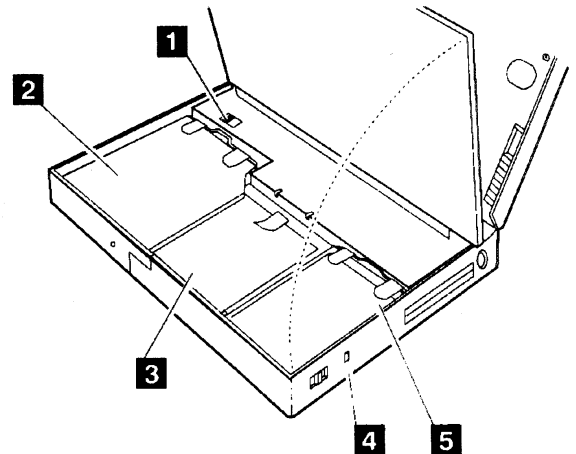
4. Raise keyboard panel by holding protrusions on its front portion (**3**).

6.3.2. LOCATION OF RS LAPTOP INTERNAL DEVICES

CAUTION

1. RS Laptop internal devices (CD-ROM drive, floppy drive, hard drive) are delicate instruments and should be handled with extreme care. Do not compress. Avoid hitting.
2. Perform removal or installation of RS Laptop internal devices only after RS Laptop is powered down.

1. Modem release latch (is not used).
2. UltraBay port for installing additional devices (CD ROM drive, floppy drive, additional battery and others).
3. Battery.
4. Security keyhole.
5. Hard drive (HD).

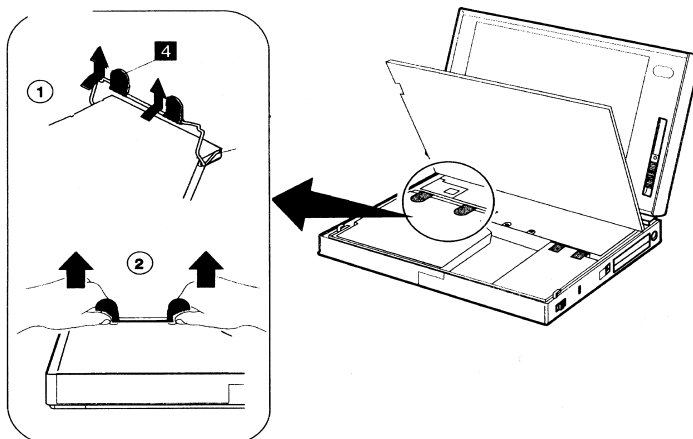


6.3.3. CD-ROM DRIVE REMOVAL

NOTE

Replace internal hardware devices when keyboard panel is open (see Sect. 6.3.1)

1. Raise CD-ROM drive handle by plastic tapes.
2. Remove CD-ROM drive by lifting it with some effort.



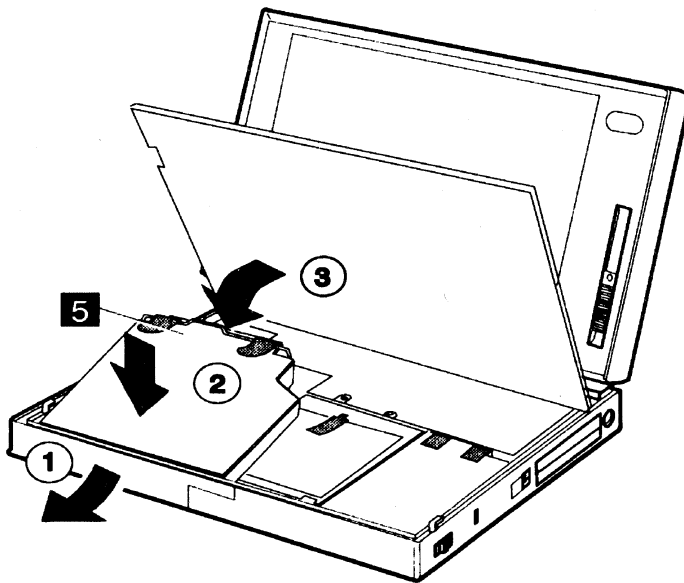
3. Stow removed CD-ROM drive (√MCC for storage location).

6.3.4. CD-ROM DRIVE INSTALLATION

NOTE

Replace internal hardware devices when keyboard panel is open (see Sect. 6.3.1)

1. Prepare new CD-ROM drive for installation.
2. Insert CD-ROM drive into RS Laptop left bay.
3. Press on CD-ROM drive top (5) until connectors are safely mated.
√ CD-ROM drive handle is in place and fits in snugly.

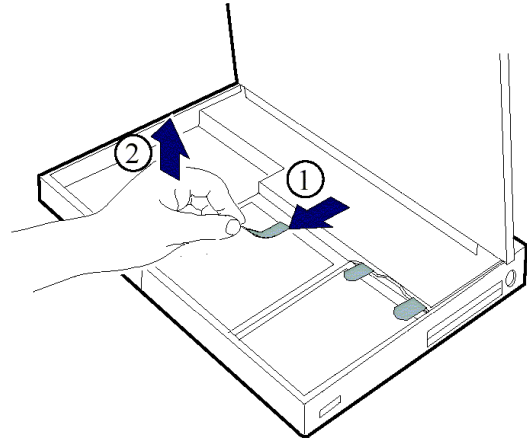


6.3.5. BATTERY REPLACEMENT

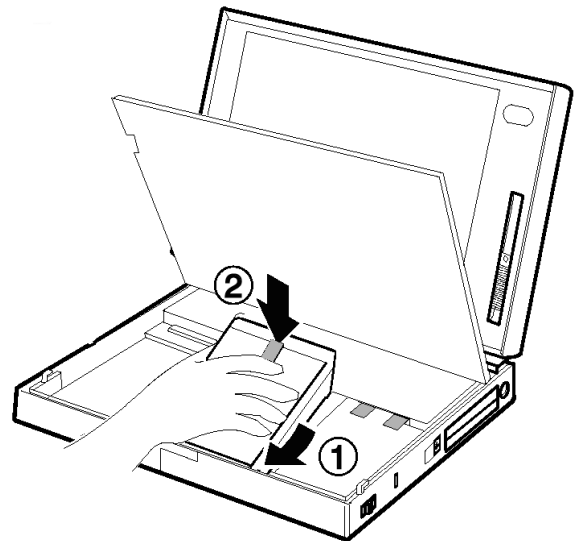
NOTE

1. Replace internal hardware devices when keyboard panel is open (see Sect. 6.3.1)
2. Remove CD-ROM drive (see Sect. 6.3.3.) prior to battery replacement

1. Remove old battery by pulling at blue plastic tape in horizontal (1) and then in vertical (2) direction



2. Install new battery into middle bay (1).
3. Gently press on the battery for contacts (2) to connect



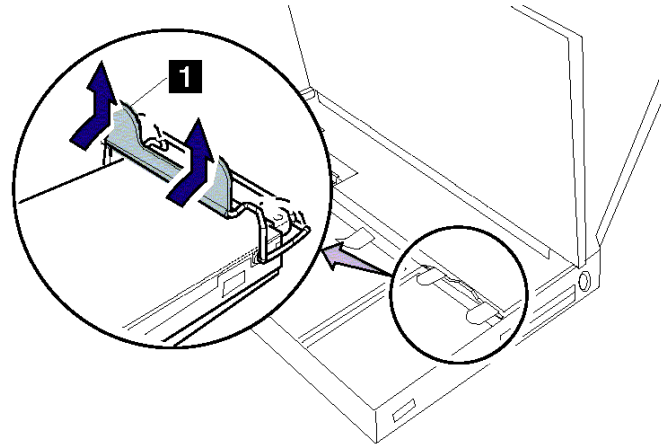
4. Re-install CD-ROM drive if it is required (see Sect. 6.3.4.).
5. Stow removed battery (√**MCC** for storage location).

6.3.6. HARD DRIVE REPLACEMENT

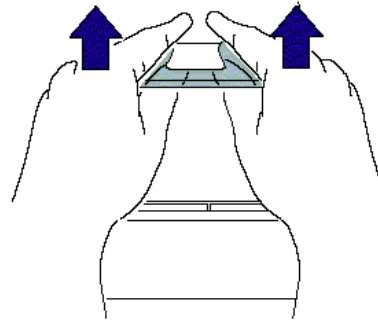
NOTE

Replace internal hardware devices when keyboard panel is open (see Sect. 6.3.1)

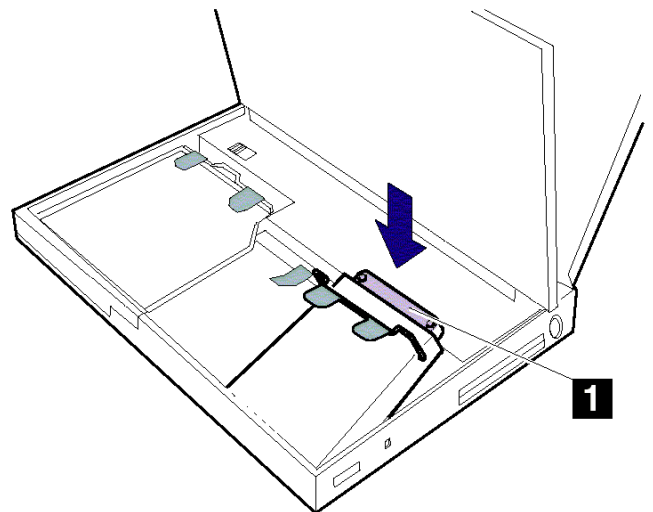
1. Lift up disk handle by blue plastic tape.



2. Remove hard disk drive by its handle pulling it upward with some effort.



3. Install new hard drive (1).
4. Gently press on the hard drive housing for contacts to connect.
5. ✓ hard drive handle is in place and fits snugly.



6. Close keyboard panel.
7. Stow removed hard drive (✓MCC for storage location).

FOR NOTES

7. CREW—RS LAPTOP INTERFACE SUPPORT SOFTWARE PACKAGE

This software package is intended for onboard systems status monitoring and ISS RS Onboard Control Complex (БКУ) control.

7.1. OPERATING SYSTEM ACTIVATION AND LOADING

1. Verify left LED on RS Laptop (any color)

 If left LED

 ИИПУ SM: СУБА, Regul, СУД Control
 LAPTOP 1(2) - ON

- 00:00:00 2. Activate RS Laptop
 Status LEDs

3. Startup boot menu appears:

| | |
|-----------|---------|
| 1. | BIGDOS |
| 2. | EXT_DOS |
| 3. Active | SOLARIS |
| 4. | unused |

NOTE
 If no action is taken within 30 sec, SOLARIS loads by default

4. Choose menu item 3 or Enter to load SOLARIS

- ≤ 00:01:00 5. If message appears:
 'The System is ready'
 "... console login:"
 Input login (see Table)

 'Password:'
 Input password (case-sensitive)

| | CDR | SC2 | SC1 |
|-----------------|------|------|------|
| Login | pcs1 | pcs2 | pcs3 |
| Password | pcs1 | pcs2 | pcs3 |

- ≤ 00:02:00 6. When File Manager window appears:
 Run Start_Script file (by left double-clicking)
7. Monitor automatic boot-up sequence until HOME PAGE is displayed

7.2. RS LAPTOP SHUTDOWN OR RESTART

1. Press **Alt-X** from any interface display
(exit from Interface)
or
press **F10** (menu) ⇒ **File** ⇒ **Alt-X-Exit**
2. Right-click on blue area in window
Select **Exit**
When message appears:
 '**The System is ready**'
 '**... console login:**'
Type **POWEROFF**
3. After message '**Press any key**':
 switch off power
or
 press any key to restart

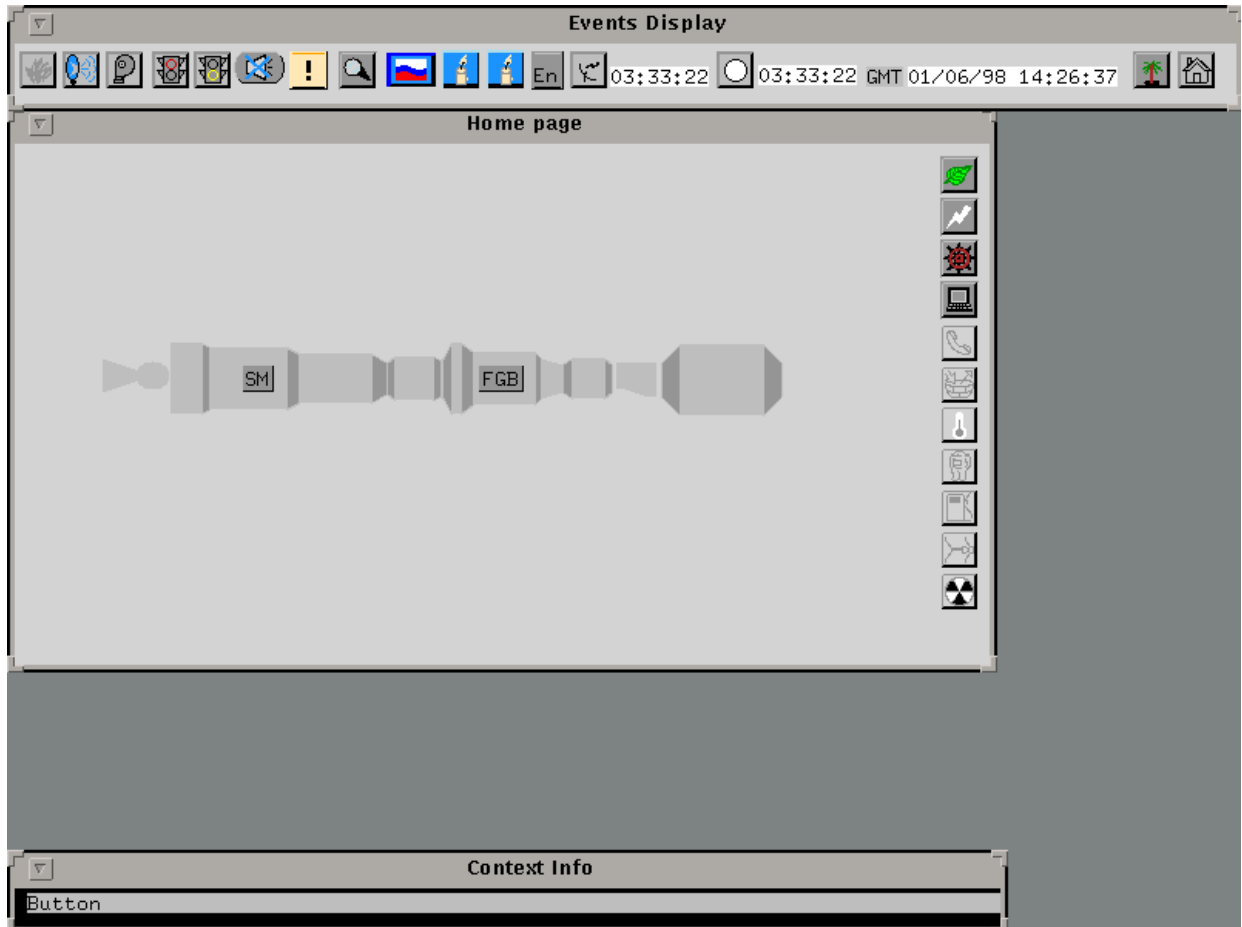
7.3. SCREEN STARTUP CONFIGURATION

When boot is complete, the screen, consisting of three displays, opens:

Events Display (Events)

Home page (Startup display)

Context Info (Context-sensitive HELP)



During operation, several displays can be simultaneously opened on the screen.

NOTE

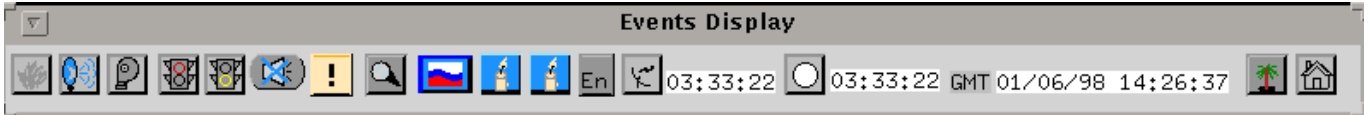
After F12 key is pressed, all currently open displays will be closed and startup display appears.

7.4. EVENTS DISPLAY

Events Display contains the most important information for the crew.

NOTE

1. **Events Display** cannot be closed or minimized.
2. On the screen, **Events Display** always stays on top of other displays and cannot hidden behind any other display.








The display has four groups of icons:
 The first group consists of emergency-caution-advisory type events.

| Icon | Event | Activation | Response to selection |
|------|--------------------|------------|--|
| | Fire | | Automatically brings up Emergency log |
| | Leak | | |
| | Toxic atmosphere | | |
| | Warning | | Brings up Warning Log |
| | Caution | | Brings up Caution Log |
| | Sound mute | | Mutes audio in [CTTC] |
| | Advisory | | Brings up Advisory Log |
| | View BBC event log | | Brings up BBC event log |



The second group contains current RS and ISS modes (to the right of)

| Icon | Event | Activation | Response to selection |
|------|---------------|------------|--------------------------------|
| | Survival mode | | Brings up mode control display |
| | EVA mode | | |
| | Standard mode | | |

The third group is a reference group

| Icon | Event | Activation | Response to selection |
|------|---|--|-----------------------|
| | Current display language is English. |  | Switch to Russian. |
| | Current display language is Russian. |  | Switch to English. |
| | In AOS, time left until LOS is ... |  03:30:42 | |
| | In LOS, time left until AOS is ... | | |
| | Orbital day, time left until orbital night is ... |  03:30:42 | |
| | Orbital night, time left until orbital day is ... |  07:55:49 | |
| | Date and time in GMT | GMT 01/06/98 14:29:17 | — |

The fourth group contains shortcut navigation buttons

| Icon | Event | Activation | Response to selection |
|------|-----------------------------|---|-----------------------------------|
| | Go to Home Page in one step |  | Brings up Home Page display |
| | |  | Brings up Navigation Tree display |

7.5. EVENT LOG USAGE

7.5.1. GENERAL PRINCIPLES OF OPERATION

Event logs are intended to display list of events, originating in the systems. Each new event automatically appears at the bottom of the list:

X sign marks the start of event or √ sign marks the end of event;
 module where event has occurred;
 system where the event had originated;
 event description;
 date and time of event start and end.

Possible actions with list:

manual scrolling in window;
 delete selected event (Delete button);
 delete all list (Delete All button);
 bring up window with event details (Details button);
 view file with full-screen Event Log (Log File button).




NOTE

When Log is brought up again, all previously made changes are lost.

7.5.2. EMERGENCY LOG

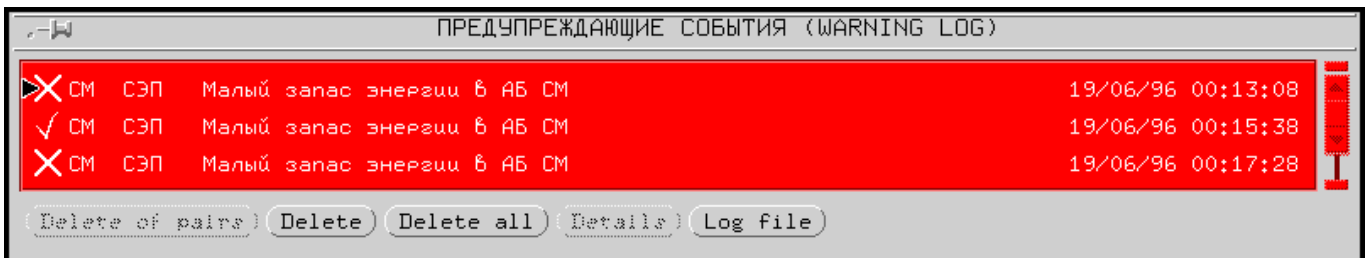
Emergency Log appears automatically under event window when Emergency class signal is generated.



Emergency Log can be brought up by selecting one of the following icons    in the Event window.

7.5.3. WARNING LOG

Warning Log is brought up by selecting  in the Event window.

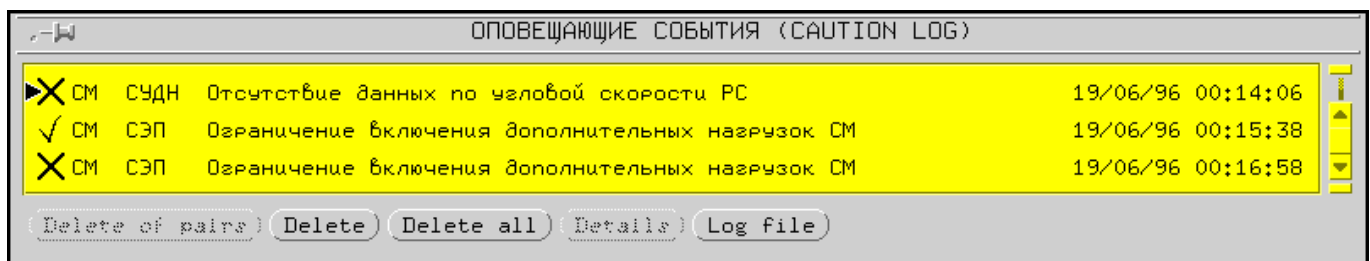



When there are no Warning class signals, icon looks like  and Log is empty.


When Warning class signal appears, icon turns to  (and is accompanied by intermittent sound). Corresponding event message appears at the bottom of the Log window.

7.5.4. CAUTION LOG


Caution Log is brought up by selecting  in the Event window.

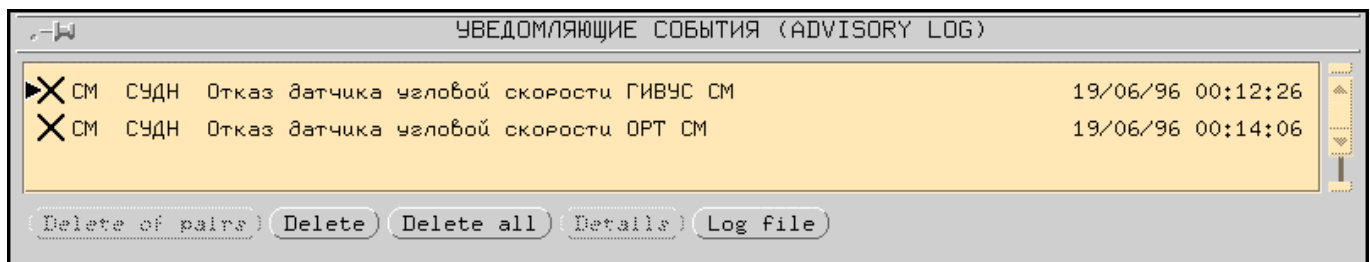



When there are no Caution class signals, icon looks like  and Log is empty.


When Caution class signal appears, icon turns to  (and is accompanied by continuous sound). Corresponding event message appears at the bottom of the Log window.

7.5.5. ADVISORY LOG


Advisory Log is brought up by selecting  in the Event window.

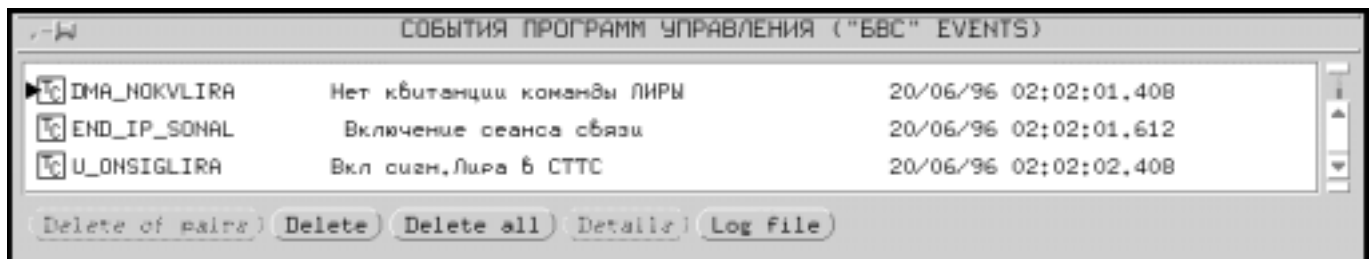


When there are no Caution class signals, icon looks like  and Log is empty.

When Caution class signal appears, icon turns to  (and is accompanied by continuous sound). Corresponding event message appears at the bottom of the Log window.

7.5.6. BBC EVENT LOG


BBC Event Log ("BBC" EVENTS) is brought up by selecting  in the Event window.




BBC Event Log is not an emergency log. Information in the BBC Event Log is for reference purposes only. Log also displays command execution confirmations.

7.6. HOME PAGE WINDOW

Home page is the startup display for modules or systems selection.

 - transition to FGB control

 - transition to SM control

NOTE

One-step return to **Home page** from any display is done by selecting  on the **Events Display**.

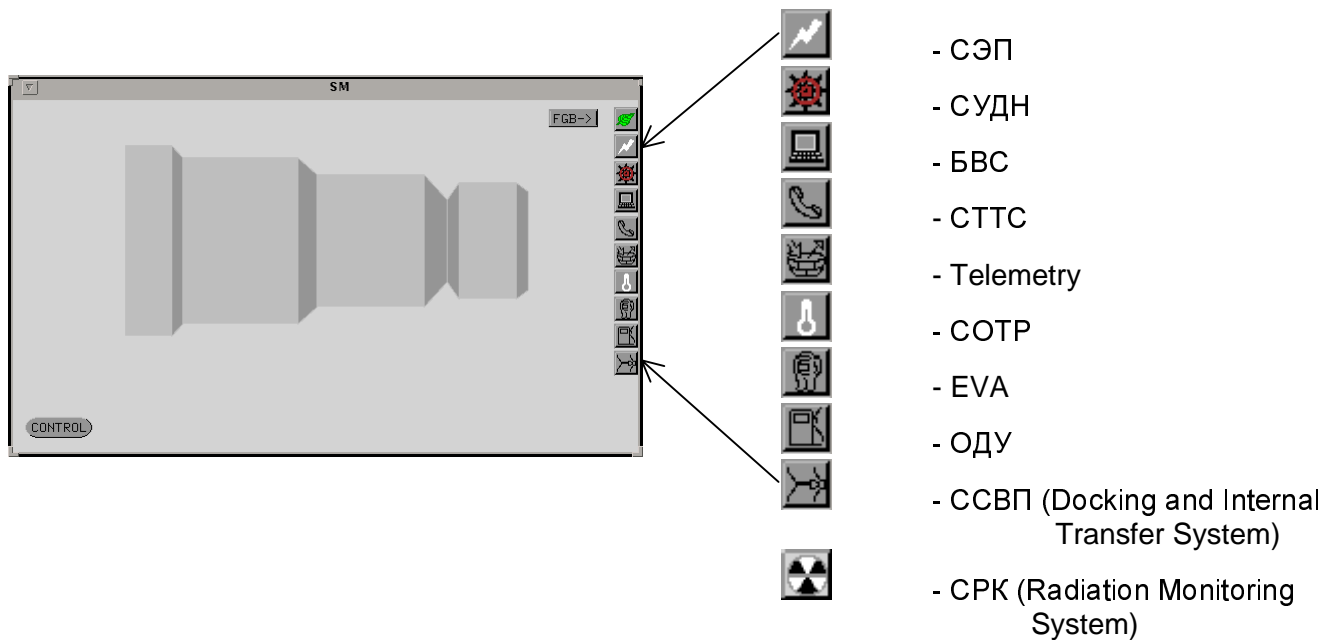
Transition to system displays is done by selecting corresponding icon on the right vertical toolbar.

7.7. RS LAPTOP FUNCTIONAL NAVIGATION

7.7.1. ICONS

For quick retrieval of system displays, use system icons that are located on a vertical toolbar on the right side of display.

Icons depict the following ISS systems:



When selected, system icon button brings up menus to view functional displays of a specific system.

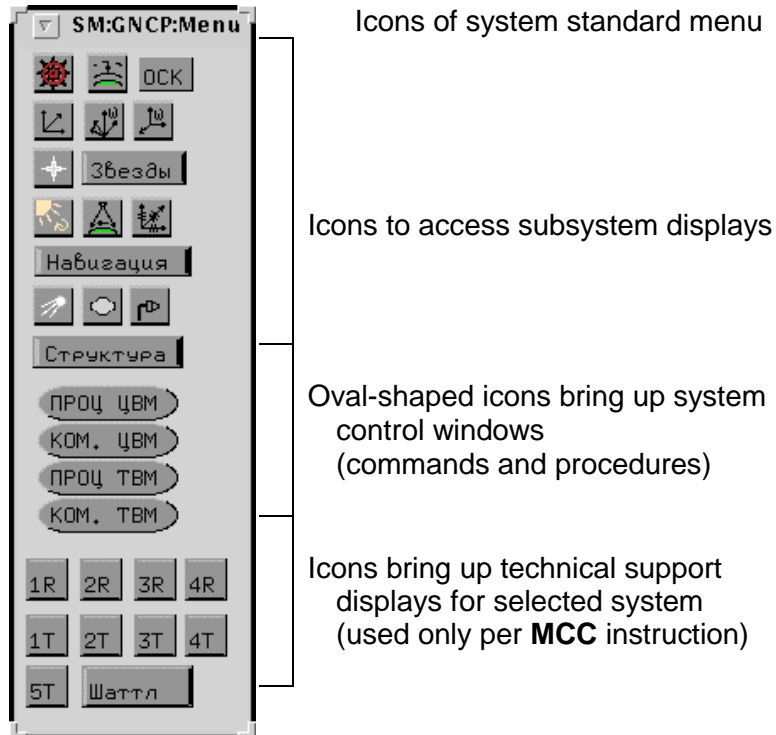
For example:

For operation with СУДН:

RS Laptop Home page: SM

sel 

Menu appears:




7.7.2. DISPLAY NAVIGATION

Vertical navigation is a transition to a more detailed system level, subsystem displays and reverse actions.

Horizontal navigation is a transition to other module displays of the same detail level (of the same systems) if there are navigation shortcut buttons.

7.8. DISPLAYS STRUCTURE (NAVIGATION TREE)

General structure of displays can be seen on Navigation Tree display.

Open **Navigation Tree**: sel  on the **Events Display**

System-subsystem hierarchy is represented by row of icons.

To bring up any required display, corresponding icon should be selected.




If necessary, display may be scrolled up and down within window.

7.9. DISPLAY OPERATION BASICS

All actions to change window properties (such as resize, move, etc.) are already implemented in the operating system as standard actions.

Display buttons and "hot" keys are used to control displays.

NOTE

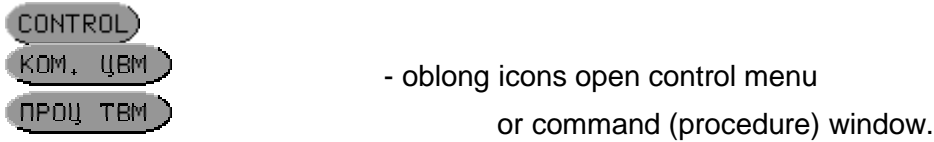
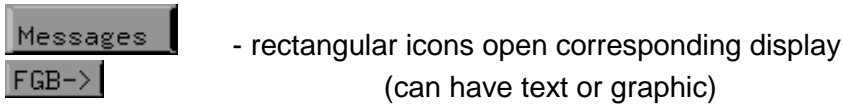
Display windows cannot be closed by standard Solaris method of clicking  icon (in the top left corner of display window). The displays can only be closed by pressing **Esc** key.

7.9.1. HOT KEYS

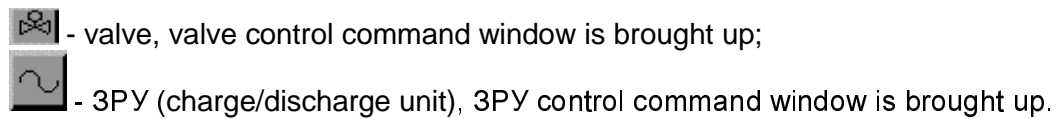
| Functions | Buttons |
|---|------------------------------|
| Closes window | Esc |
| | Alt+F4 |
| Sequentially selects element within Control window. | Tab |
| Drags object across display (large increments) | Shift + drag using mouse |
| Drags object across display (small increments) | Caps Lock + drag using mouse |
| Copies selected object | Alt + D |
| Moves selected object | Ctrl + D |
| Resizes selected object | Ctrl + stretch using mouse |
| Enlarges display contents: | |
| Horizontally | Shift + X |
| Vertically | Shift + Y |
| Proportionally | Shift + Z |
| Decreases display contents: | |
| Horizontally | X |
| Vertically | Y |
| Proportionally | Z |
| Switches between text and graphics modes | Ctrl + G |
| Switches between languages En/Ru | Ctrl + L |
| Sorts/filters active field list | Ctrl + S |
| Sorts field order | Alt + S |
| Closes application | Alt + X |

7.9.2. ICON TYPES

Icons are divided into two main types different in shape:



Some rectangular icons, however, will open commands (procedures), also:



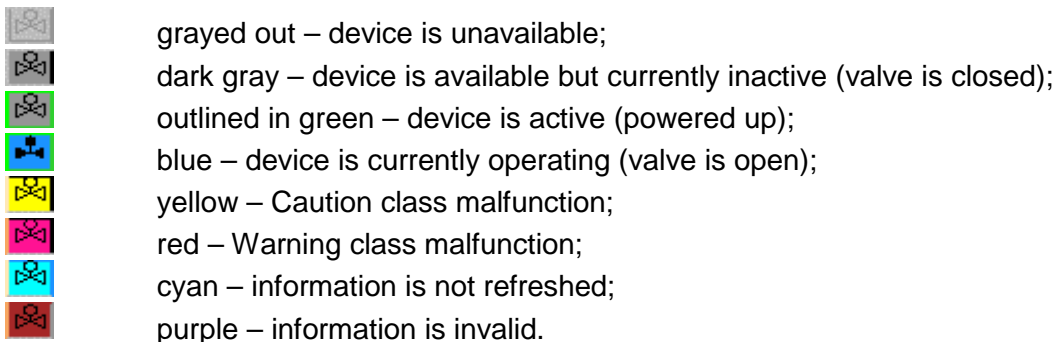
7.9.3. MENU

Pressing «F10» activates action menu for current window.
«Hot» key corresponding to selected action is highlighted in the Help window

7.9.4. COLORS

Standard color scheme is used for all displays.
On systems graphical and textual displays, diagram elements (units, devices, etc.) and textual parameters can have colors with following meanings:

for graphical objects:



for textual parameters:

ОРТ в горячем резерве ГИВУС
ГИВУС в горячем резерве ОРТ

gray – parameter is not generated (NO);
black – parameter is generated (YES);

Авария 1-го комплекта Курса

yellow background – Caution class emergency;

Авария 2-го комплекта Курса

red background – Warning class emergency;

Готовность 1-го компл. Курса

green background – preliminary readiness;

Готовность 2-го компл. Курса

blue background – final readiness;

Готовность РСУ

cyan – information is not refreshed;

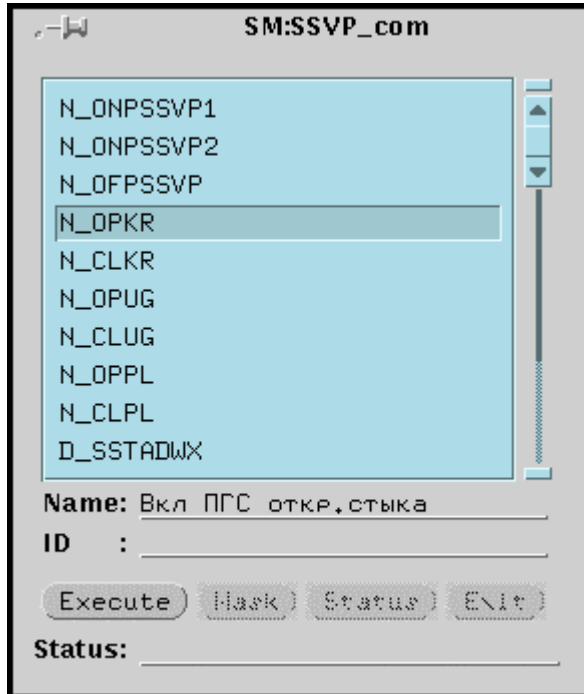
Готовность РСУ

purple – information is invalid.

7.10. DIRECT COMMAND OUTPUT

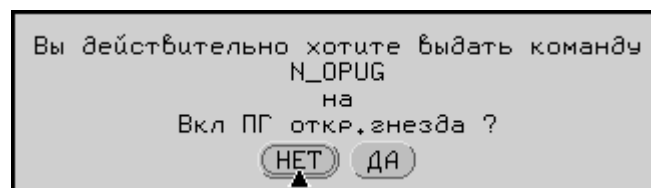
When selecting **КОМ. ЦВМ** or **КОМ. ТВМ** from system menu window, a ЦВМ or ТВМ command window corresponding to the system is brought up.

List of commands contains all commands available to selected object (system).



For command output:

1. Enter ID into **ID** field.
(auto scrolls to the closest matching ID in the list).
or
select ID with mouse click from the list.
2. ✓ command name is in the **Name** field.
3. sel **Execute** to execute command.
Command execution confirmation window appears.

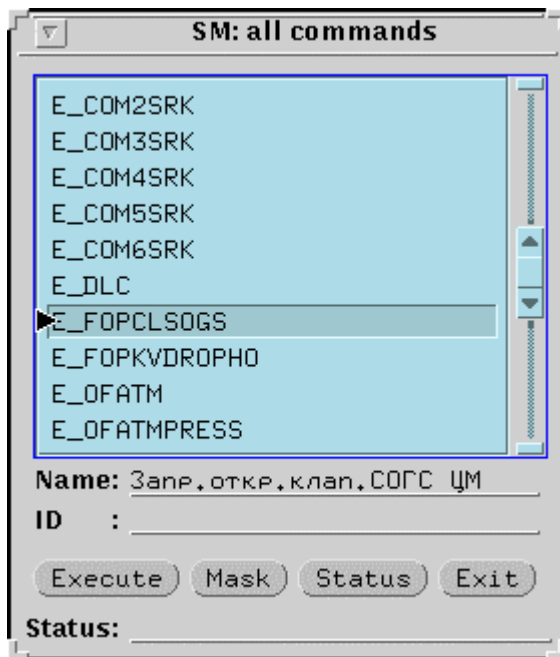


4. sel **ДА** (yes) to execute command or **НЕТ** (no) to cancel.

Generally, the command output looks like:

```
RS Laptop      cmd  E_FOPCLSOGS
                ✓ Запр. откр. клап. СОГС ЦМ
Execute
```

When opening command window from the module Home Page, all commands for this module become available:



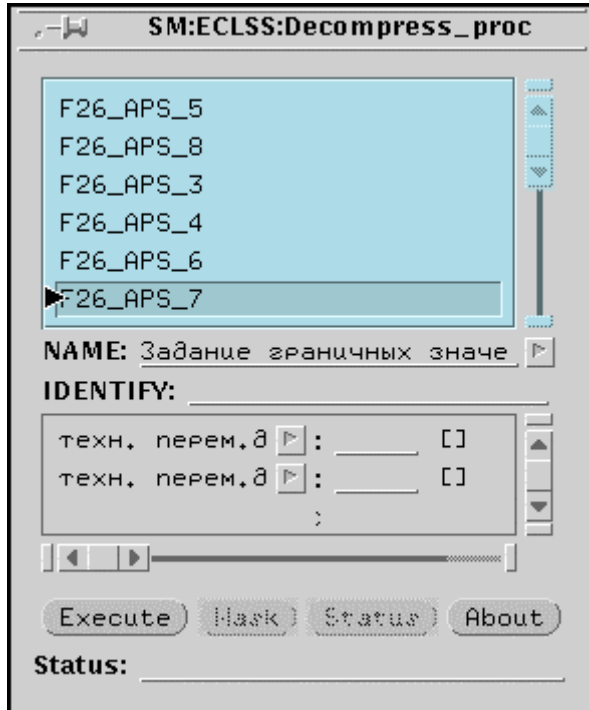
To monitor command execution:

1. sel Status
2. Open required functional system display to check required parameter change

7.11. COMMAND PROCEDURE ACTIVATION

When selecting **ПРОЦ ЦВМ** or **ПРОЦ ТВМ** from system menu, procedure window ЦВМ or [TBM] corresponding to system is brought up.

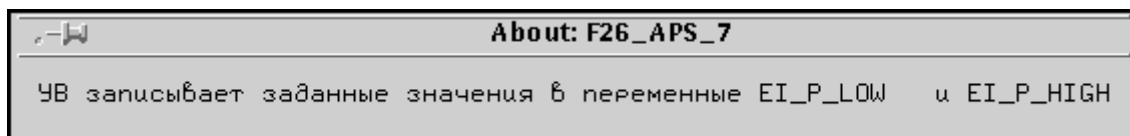
List of commands contains all procedures available for the selected object (system).



To run procedure:

1. Enter ID into **IDENTIFY** field.
(when entering symbols, there is auto scroll to the closest matching ID in the list).
or
select ID by mouse click from the list.
2. ✓ command name is in **Name** field.

If more detailed information on procedure is required, press **About** button.



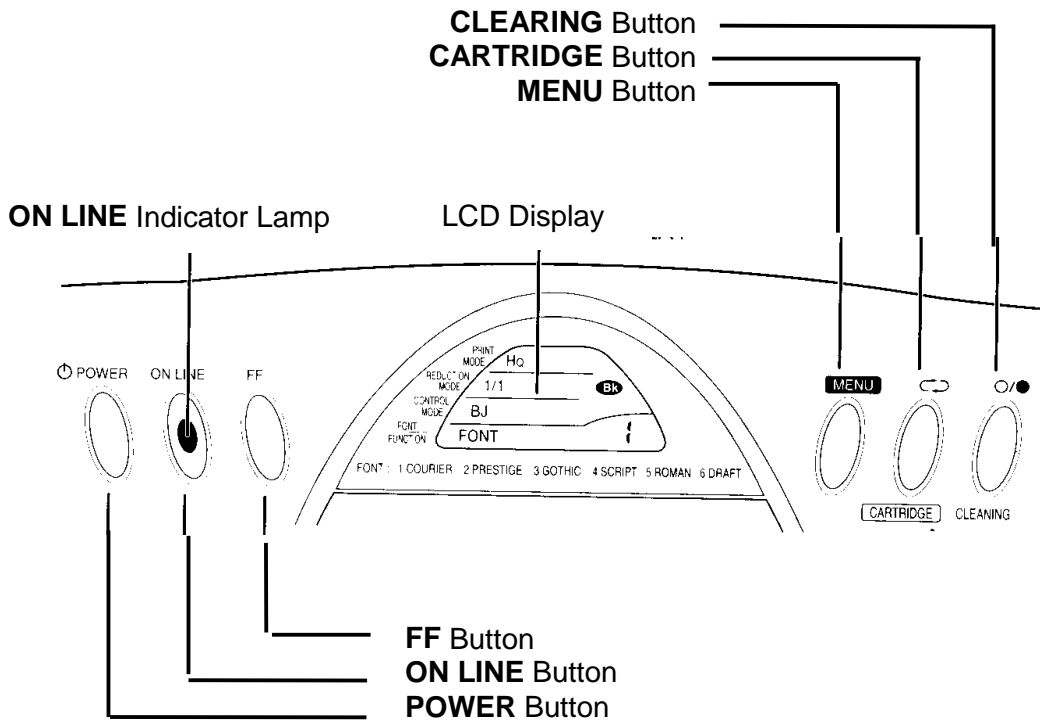
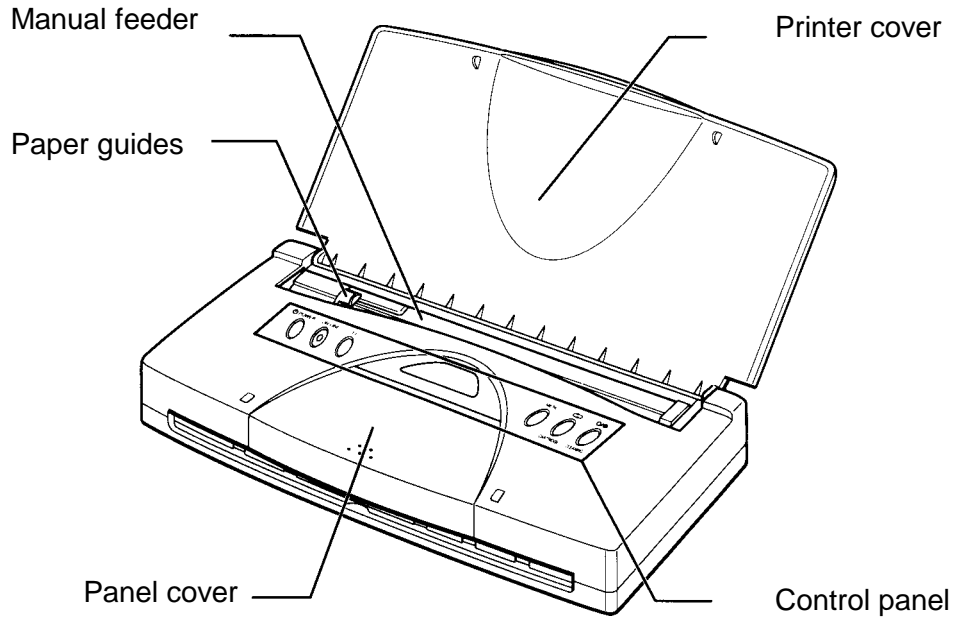
3. Enter parameters required to run the procedure.
4. sel **Execute** to execute command.
Command execution confirmation window appears.

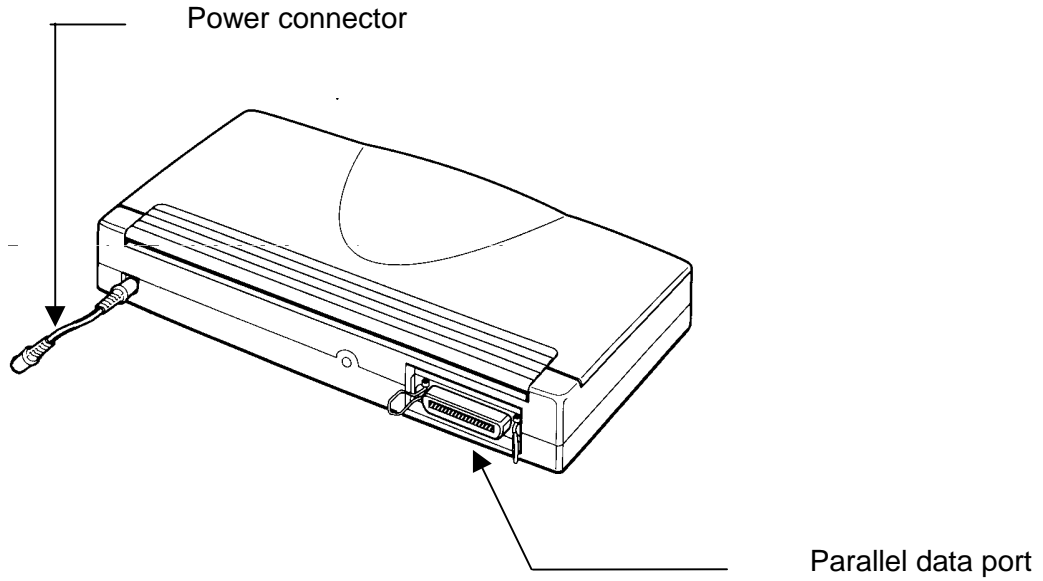
Generally, the procedure to be initiated looks like:

```
RS Laptop      proc F26_APS_7
                √ Задание граничных значений давления
                param1 640
                param2 780
                Execute
```

8. PRINTER OPERATION

8.1. PRINTER CONTROLS





8.2. PRINTER POWERUP AND INITIAL SETUP

- 1. pb POWER → Press

- LED **ON LINE** (manual feed tray)

LCD shows the current setup

If LED **ON LINE**, LCD is blank

ИНПУ SM: СУБА, Regul, СУД Control

√ PRINTER PWR -ON

NOTE

If there is no cartridge installed, the holder is placed at the center for 5 min for installation.

- 2. ...
- 3. Paper installation
- ...
 - 4. Note on number of sheets

8.3. TEST PRINT FROM SOLARIS

1. Go to Console window
2. At the command prompt in Console window, type:
 `banner "TEST OK" | /usr/ucb/lpr`
3. Verify TEST OK message prints on the sheet of paper inserted in tray