

Datex-Ohmeda

S/5™ CPU Board, B-CPU5 (Rev. 00)

S/5™ CPU Board, B-CPU4 (Rev. 01)

Software Cards

Technical Reference Manual

All specifications are subject to change without notice.

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CPU Boards and Software Cards

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INTRODUCTION

This section provides information for the maintenance and service of the following products:

- CPU board, B-CPU5
- CPU board, B-CPU4
- Software Cards, U-xxxxxx/L-xxxxxxS/S-xxxxS

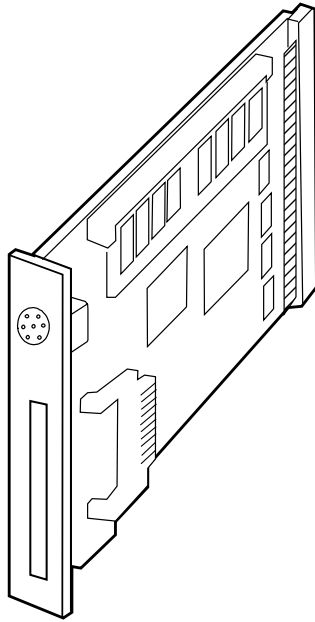


Figure 1 **B-CPU5 / B-CPU4**

1 SPECIFICATIONS

1.1 Electrical requirements

Interruptibility	Data memory and alarm settings are saved during power failures up to 15 minutes
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1.2 Environmental requirements

Operating temperature	10...35 °C / 50...95 °F
Storage temperature	-10...+50 °C / 14...122 °F
Atmospheric pressure	660...1060 hPa (660...1060 mbar)
Humidity	10...90 % non-condensing

2 FUNCTIONAL DESCRIPTION

2.1 CPU board, B-CPU5/B-CPU4

The CPU board takes care of the central processing.

The main features of the CPU board are:

- AMD 486DX4 or 486DX5 processor
- Internal clock frequency 75 MHz
- 32 MB DRAM / 16MB DRAM (B-CPU4)
- 64 MB program flash memory / 32MB (B-CPU4)
- 8 kB static RAM with real time clock
- 32 kB EEPROM memory
- 2 + 2 channels UART:
 - 3 serial channels with signals in AC-logic level
 - 1 serial channel signals in RS232-level
- Programmable alarm sound generator
- PC-card slot for software updates

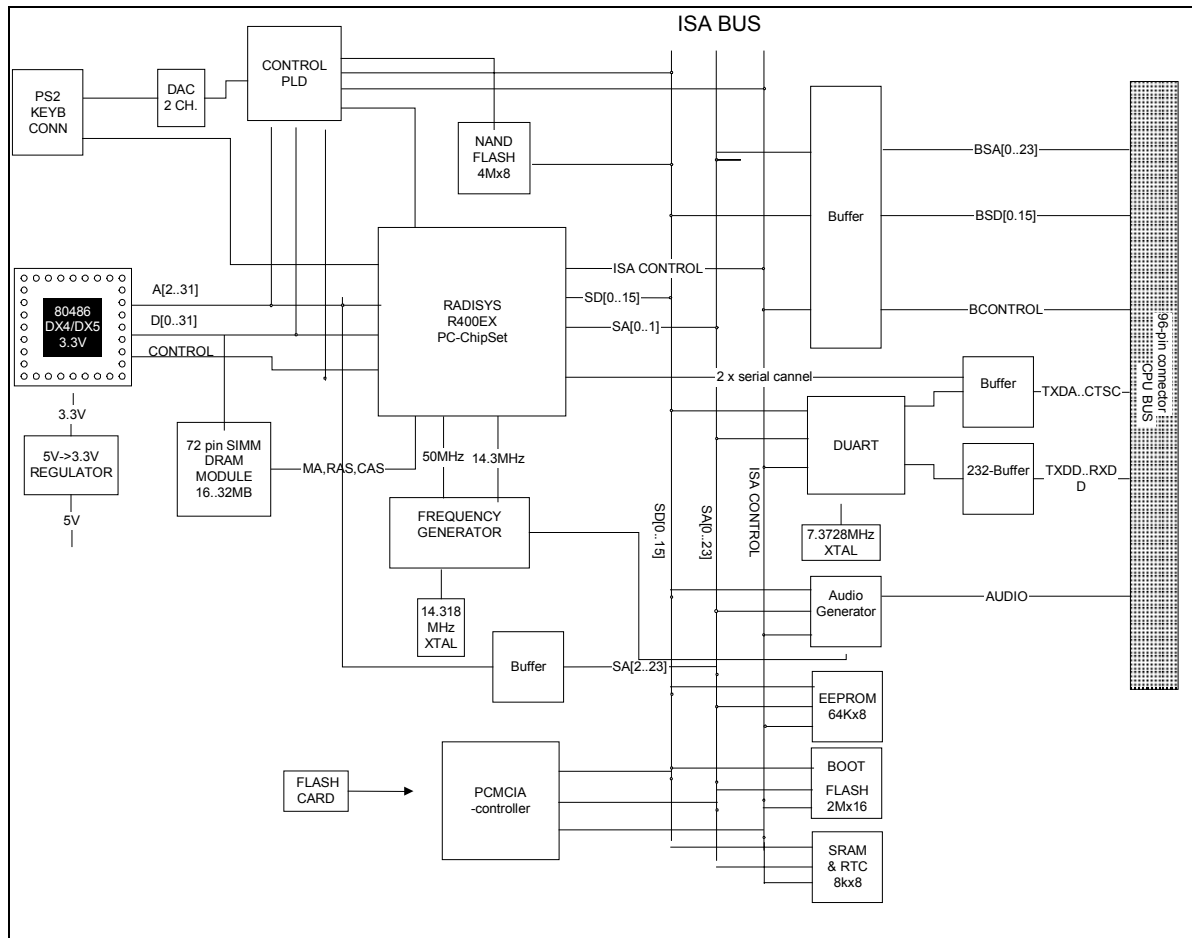


Figure 2 CPU board block diagram, B-CPU5/B-CPU4

The CPU board, B-CPU5/B-CPU4 is made with PC-technology components. Radisys chipset and PLD handle all timings and signaling for ISA type CPU bus.

The B-CPU5/B-CPU4 contains an onboard flash memory where software is downloaded from a software card.

Powerfail or standby

When the monitor is turned to standby or the mains voltage fails, NMI-interrupt is generated by the power control logic. The interrupt signal in the CPU means that all supply voltages except +5V for the CPU board will be switched off shortly. NMI interrupt service program then saves all necessary parameters in the static RAM before supply voltages fail.

When hardware detects HALT command generated from power down; all the outputs to the CPU motherboard are left floating in high impedance state. Only DRAM refreshing cycle continues to occur. The halt state will continue until a RESET pulse from the power control logic circuit is received.

Watchdog functions

There are certain watchdog functions to ensure the monitor's performance. The UPI4(NET) board and the primary display controller board interrupt the CPU board continuously in order to state that they function properly. The CPU board refreshes the watchdog timer in the power supply unit in order to prevent reset pulse. If the primary display controller board or the CPU board stops the refreshment, the monitor will be reset in order to prevent false information to be displayed on the screen. If the UPI4(NET) board stops the refreshment, the board will be reset internally.

SRAM M48T18

Lithium battery back-up 8 kB static RAM with a real-time clock.



CAUTION

The IC contains a lithium battery. Discard the battery according to local regulations.

2.2 Software Cards, U-xxxxxx/L-xxxxxxS/S-xxxxS

Upgrade software, U-xxxxxx and Service software, L-xxxxxxS/S-xxxxS are delivered on an 8 MB/4 MB PCMCIA flash memory card.

The upgrade software has been developed for monitor software upgrades. The upgrade software can be downloaded onto a monitor that is equipped with the B-CPU5/B-CPU4.

The service software has been developed to replace the original monitor software in case of a B-CPU5/B-CPU4 failure. The service software is downloaded onto a replacement empty B-CPU5/B-CPU4. See section 3.3.1 [“Downloading/replacing software on CPU Board, B-CPU.”](#)

There is service software available of each S/5 monitor software version. The functionality of the service software is equal to the functionality of the corresponding original S/5 monitor software.

The Service software, L-xxxxxxS is license software. The license agreement that is delivered with the software should be archived in a secure location. Relevant license number may have to be referred when contacting Datex-Ohmeda for service/support. The licence number is needed also for possible software upgrades.

CAUTION

The software card is not write-protected. For safety reasons do not use software cards in any other purposes, or on any other platforms than they are designed for.

2.3 Connectors and signals

2.3.1 Internal connectors

CPU board - CPU mother board

	A	B	C
1	+15 V	AGND	DGND
2	-15 V	BALE	DGND
3	SA0	SA1	DGND
4	SA2	SA3	RESET_RS485
5	SA4	SA5	-RESET_RS485
6	SA6	SA7	DATA_RS485
7	SA8	SA9	-DATA_RS485
8	SA10	SA11	TXDD_RS232
9	SA12	SA13	RXDD_RS232
10	SA14	SA15	PWM_ECG
11	SA16	SA17	BIT1IN
12	SA18	SA19	TXDC
13	SA20	SA21	RXDC
14	SA22	SA23	RTSC
15	-SMEMR	-SMEMW	CTSC
16	-SIOR	-SIOW	TXDB
17	CLK	-RESET	RXDB
18	-IOCHRDY	IRQ10	RTSB
19	N/C_1	IRQ11	CTSB
20	N/C_2	IRQ12	TXDA
21	-SBHE	IRQ15	RXDA
22	SD0	SD1	RTSA
23	SD2	SD3	CTSA
24	SD4	SD5	AUDIO_OUT
25	SD6	SD7	+5 V
26	SD8	SD9	+5 V
27	SD10	SD11	+5 V
28	SD12	SD13	+5 V
29	SD14	SD15	ON/STBY
30	+15 VD	-RESET_CPU	+5 V_CPU
31	+15 VD	+32 VD	REFRESH_WD
32	GNDD	GNDD	POWER_FAIL

3 SERVICE PROCEDURES

3.1 General service information

The field service of the B-CPU5/B-CPU4 is limited to replacing the actual CPU board, the SRAM/Timekeeper battery, or mechanical parts. Faulty CPU boards and used service software cards can be returned to Datex-Ohmeda for repair/exchange.

Datex-Ohmeda is always available for service advice. Please provide the unit serial number, full type designation and a detailed description of the fault.


CAUTION Only trained personnel with appropriate equipment should perform the tests and repair outlined in this section. Unauthorized service may void warranty of the unit.

3.2 Service check

These instructions include complete procedures for a service check. The service check is recommended to be performed after any service repair. However, the service check procedures can also be used for determining possible failures.

The procedures should be performed in ascending order.

The instructions include a check form ([Appendix A](#)) which should be filled in when performing the procedures.

The mark  in the instructions means that the check form should be signed after performing the procedure.

The procedures are designed for monitors that contain the S/5 monitor software, L-xxx01(A). However, most of the procedures also apply to monitors that contain some other monitor software revision / type.

3.2.1 Recommended tools

Tool	Order No.	Notes
Command Bar / Command Board		
M-REC		
M-NE(12)STPR/M-ESTPR/M-ESTP		
Screwdriver		

General

Make sure that no cables or modules are connected to the Central Unit, F-CU8. Lift off the video display with its stand, if placed on the Central Unit.

CPU board

1. Check that the CPU board rear panel is clean and intact. Check that both CPU and software device plates are intact.



2. Check that the grounding plate under the CPU board rear panel is attached properly and is not bent.



3. The SRAM/Timekeeper battery on the CPU board is recommend to be replaced after every 8 years. Replace the battery, if necessary.

NOTE: The Factory Reset must be performed, if the SRAM/Timekeeper battery is replaced.



General

4. Check that all the rear side PC boards are secured to the Central Unit with two screws.



5. Install the video display together with the Command Bar/Ccommand Board, the M-NE(12)STPR/M-ESTPR/M-ESTP and the M-REC. Connect the power cord and turn the monitor on.

Check that the fan is running.



6. Check that the monitor starts up properly, i.e. the alarm LEDs on the Command Bar/Command Board turn blank, the start-up sound is heard from the loudspeaker and the normal monitoring screen appears. No error messages should appear onto the screen.



7. Check that the connected modules are recognized, i.e. the needed parameter information is shown on the screen and the M-REC records two lines of start-up information. If some parameter information is missing, check the screen configuration from the MONITOR SETUP -menu.



8. Check that the clock on the screen shows correct time. Adjust the time, if necessary.

Monitor Setup - Time And Date

NOTE: If the clock shows time 0:00 continuously (at successive start-ups), the SRAM/TIMEKEEPER battery should be replaced. The FACTORY RESET must be performed after the battery is replaced.



9. Check the loudspeaker volume settings by setting the alarm sound:

Alarms Setup - Alarm Volume

Test the whole volume scale from 1 to 10 by turning the ComWheel and check that the alarm volume changes correspondingly. The alarm sound should be clear and audible with all the settings.



10. Enter the service menu.

Monitor Setup - Install/Service (password 16-4-34) - **Service** (password 26-23-8)

Take down the information regarding the monitor software.



11. Select SERVICE LOG from the menu. Record the Service Log onto the M-REC by selecting RECORD LOG. Check the content of recording for possible problems, then empty the Service Log by selecting RESET LOG from the menu.



12. Test the Central Unit watchdog circuitry:

Monitor Setup - Install/Service (password 16-4-34) - **Service** (password 26-23-8) - **Set/Test** -

Select the watchdog tests one by one and check that the monitor performs a restart in all other cases except when selecting the **WD by UPI**.

NOTE: When selecting WD BY OVERLOAD, restarting should take place approximately after 15 seconds. With the other tests restarting takes place within a couple of seconds.

If restarting did not take place, try to locate the fault:

Watchdog --> CPU board/Power supply unit

WD by Overload --> CPU board

WD by GSP --> Primary display controller board/CPU board



13. Check that the monitor is capable of storing the trend information and temporary settings in a short (max. 15 minutes) standby.

Turn the monitor to standby and disconnect the power cord. Wait for two minutes, then reconnect the power cord and turn the monitor back on. The monitor should perform a "Warm start" which means the trend information and temporary settings should still be available. If the monitor performed a "Cold start" instead, the battery fuse or the lead acid battery of F-CU8 should be replaced.

NOTE: The B-CPU5/B-CPU4 requires 2 Amps battery fuse (P/N 51063).

The information regarding a start-up is also saved in the Service Log.



14. Perform an electrical safety check and leakage current test.



15. Check that the Central Unit functions normally after the performed electrical safety check.



- Fill in all necessary documents.

3.3 Disassembly and reassembly

NOTE: Switch the monitor to standby and press the service reset -switch at least for five seconds before detaching any PC boards.

1. Remove screws and detach all PC boards and cover plates from the right side of the CPU board.
2. Remove the screws on the CPU board.
3. Detach the CPU board.

Reassembly should be made in reversed order.

NOTE: When reinstalling PC boards, push the boards carefully until they stop before fastening them with screws.

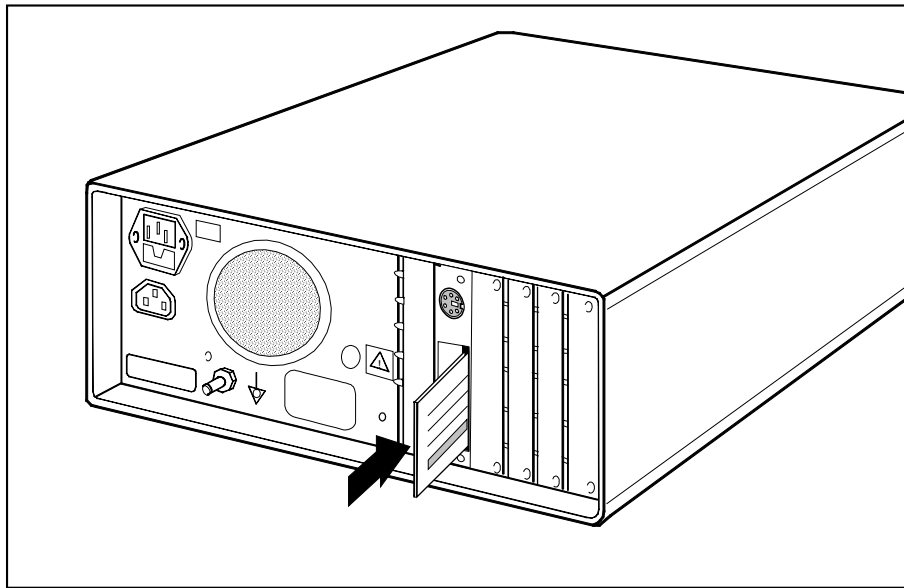
3.3.1 Downloading/replacing software on CPU Board, B-CPU5/B-CPU4

See also *"Replacing CPU Board, B-CPU5/B-CPU4"* on *Part I/System Installation*.

NOTE: All user settings will be lost after downloading/replacing monitor software.

NOTE: During the downloading of monitor software the serial number of the CPU board is written onto the software card and is matched with the downloaded monitor software serial number. If the downloading of monitor software would fail, the same monitor software could be downloaded again only onto the same CPU board, but not onto any other CPU board.

1. Make sure that the monitor is turned to standby. Press and hold the service reset switch on the Central Unit rear panel for at least five seconds, or until an audible tone is generated.
2. Move off the lid for software card on the B-CPU5 / B-CPU4 rear panel.



3. Insert the software card into the card drive slot and firmly press the card in position.
4. Turn the power on.
5. Wait for approximately 80 seconds. After the start up screen appears enter the Service View and make sure that the information regarding monitor software has been updated. Memorize the serial number of new software.
6. Remove the software card and attach the lid.
7. Pick up the software device plate with the serial number of the new software and attach the device plate on the B-CPU5/B-CPU4 rear panel.

NOTE: The license agreement, if delivered with the monitor software, needs to be in accordance with the corresponding monitor software serial number. Make sure you archive the license agreement in a secure location.

8. Perform Factory Reset.
9. Set the time and date.
10. Set the monitor's network communication according to the used network software, if necessary.

Network -service menu:

Network software S-CNET99 -> DRI Level = 1999

Network software S-CNET01 -> DRI Level = 2001

NOTE: If the DRI level is changed, the monitor will restart automatically.

11. Check that there are no error messages on the screen.
12. Restore the original user settings, if necessary.

See the troubleshooting flowchart for software card, if the downloading of new software failed.

NOTE: Right after the monitor software downloading the start-up time is considerably longer.

3.3.2 Performing Factory Reset

NOTE: The Factory Reset is necessary after downloading of monitor software and after replacing the CPU board or SRAM/Timekeeper battery.

NOTE: The Factory Reset will restore all your customized defaults, including language selection, to factory defaults.

1. Press the **Monitor Setup** key.
2. Select **Install/Service** and password (16-4-34).
3. Select **Service** and password (26-23-8).
4. Select **Set/Test** and perform **Factory Reset**.
5. The monitor will perform an automatic restart. After the restart is completed, restart the monitor also manually by the On/Standby -switch.

3.4 Adjustments and calibrations

No calibrations or adjustments are needed on the CPU board, B-CPU5/B-CPU4.

4 TROUBLESHOOTING

4.1 Troubleshooting flowcharts

4.1.1 Monitor

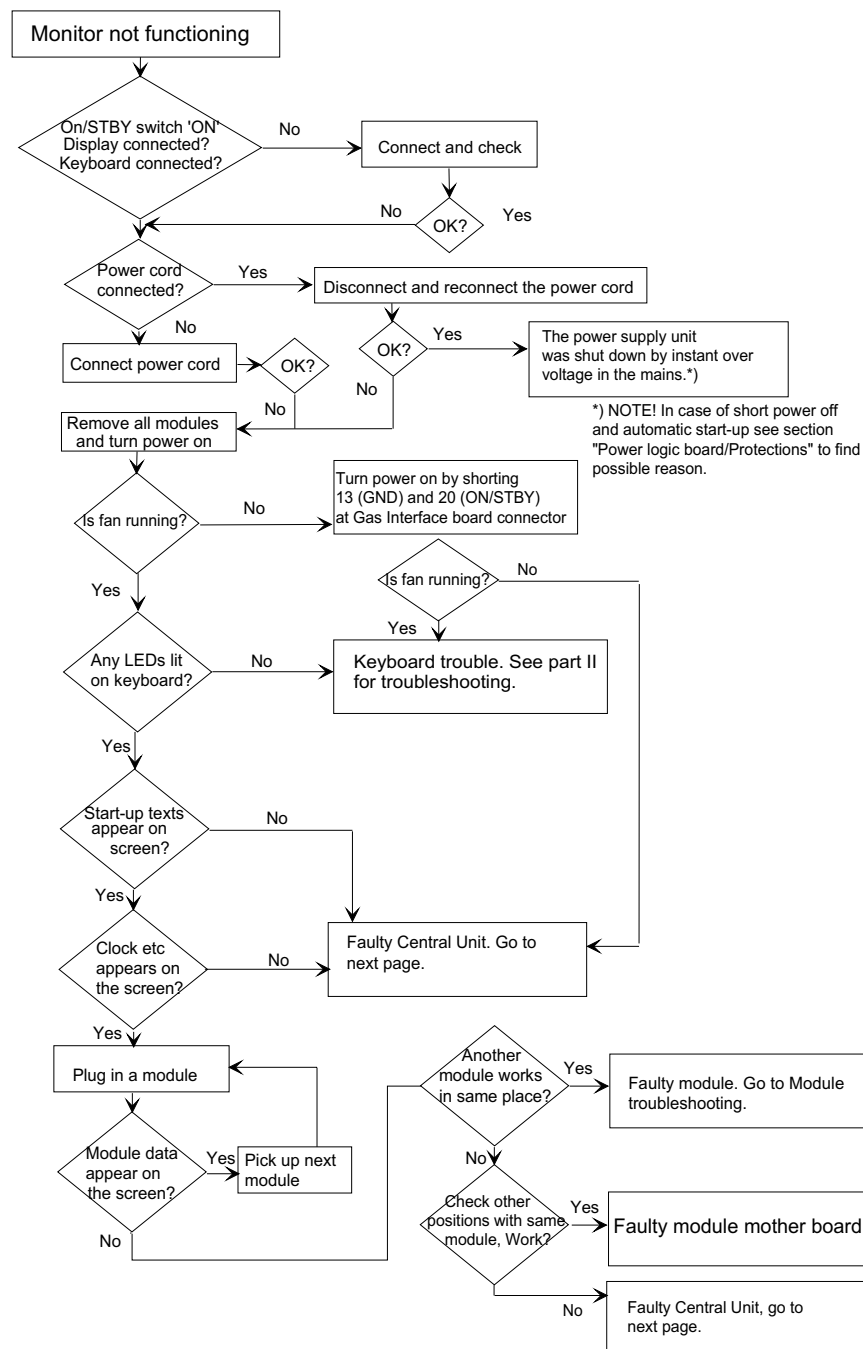


Figure 3 Monitor troubleshooting flowchart

4.1.2 Digital section

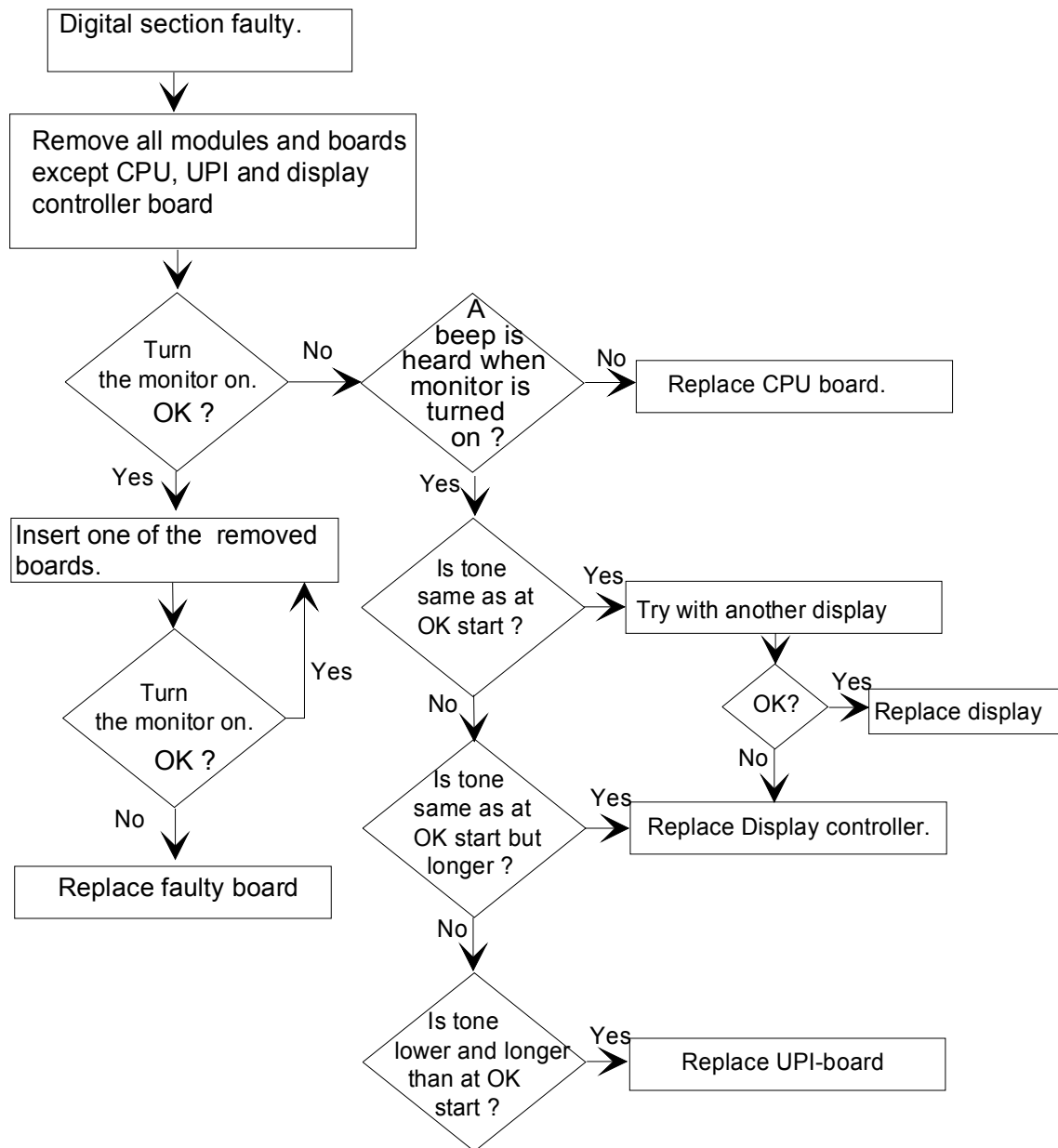


Figure 4 Digital section troubleshooting flowchart

4.1.3 Software Card

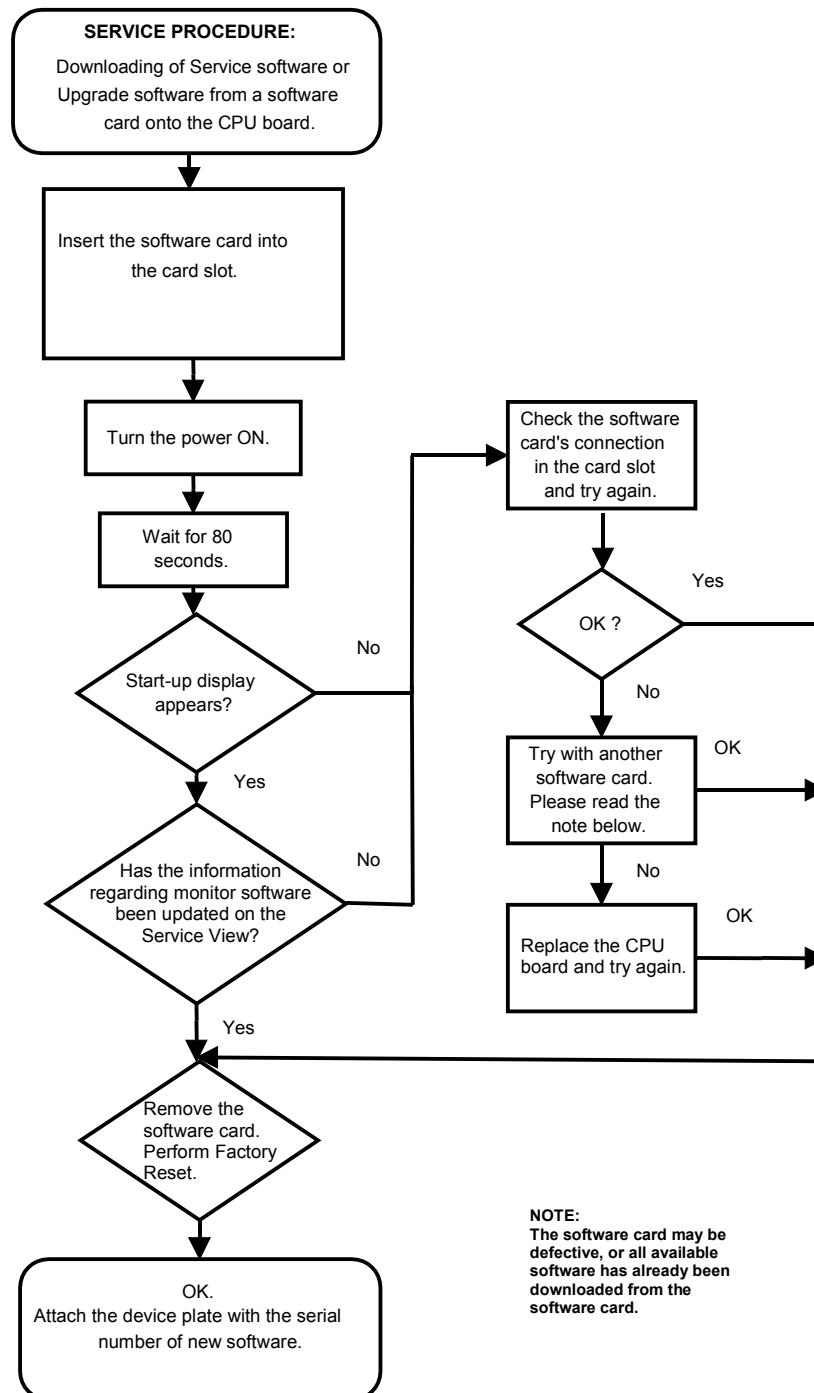


Figure 5 Software Card troubleshooting flowchart

4.2 Error messages

SRAM Error

The SRAM memory is located on the CPU board. The SRAM Error is due to memory malfunction. Restart the monitor. If the problem persists, replace the SRAM/Timekeeper battery. Remember to perform factory reset after the replacement.

EPROM Error

The EPROM Error message is displayed due to problems in the communication between the CPU board and the software flash memory. Replace the CPU board. Remember to perform factory reset after the replacement.

EEPROM Error

The EEPROM memory is located on the CPU board. The EEPROM Error message is displayed due to memory malfunction. Perform factory reset. If the problem persists, replace the CPU board. Remember to perform factory reset after the replacement.

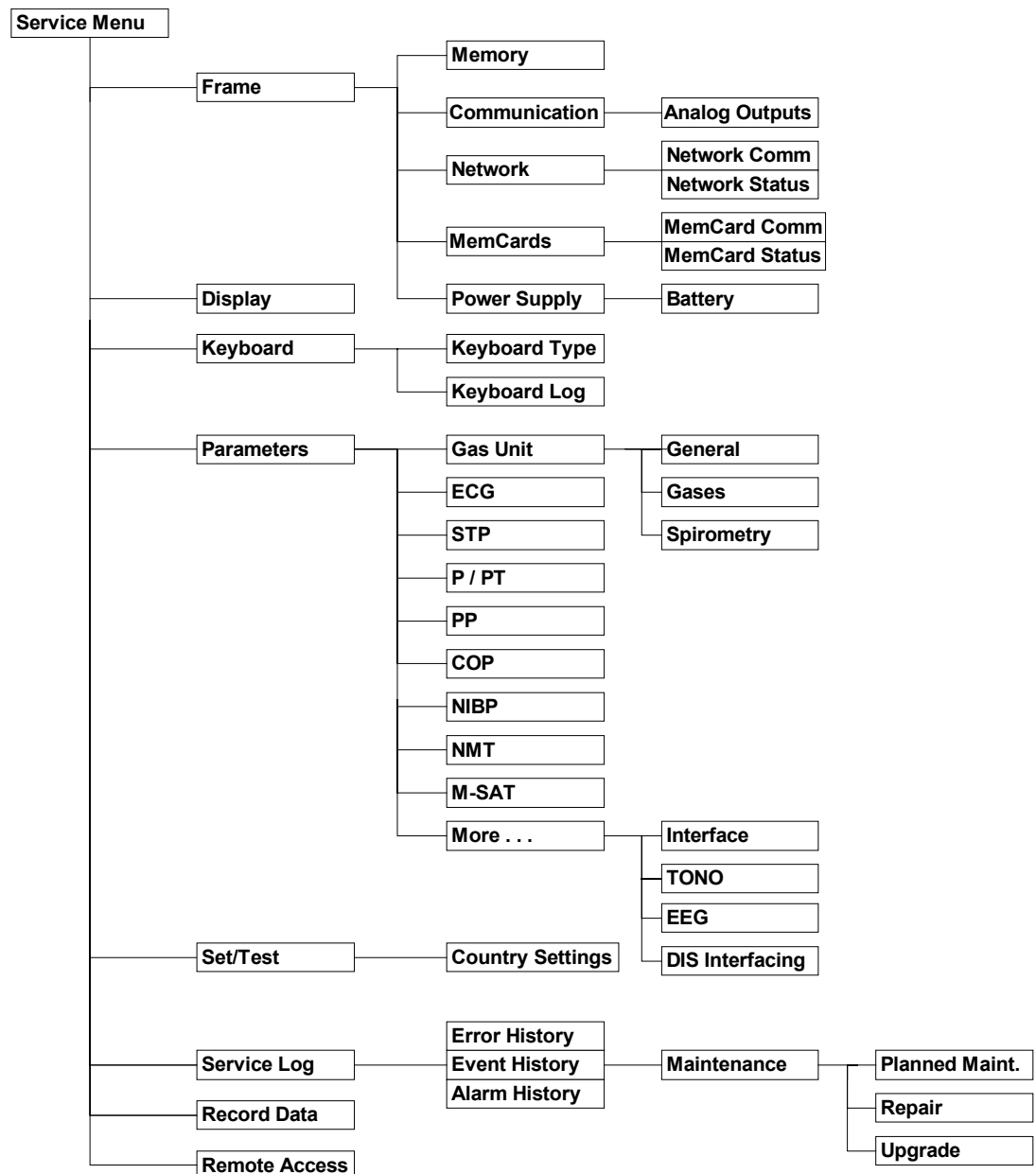
RAM Error

The RAM memory is located on the CPU board. The RAM Error message is displayed due to memory malfunction. Replace the CPU board. Remember to perform factory reset after the replacement.

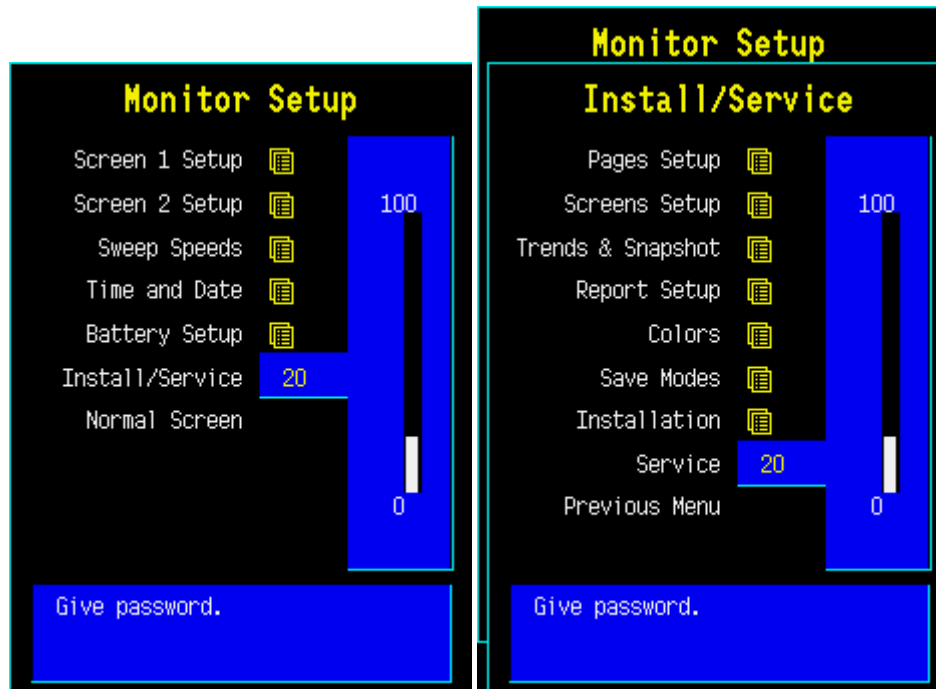
5 SERVICE MENU

The monitor software contains service menus, which can be used in examining the monitor functions and also in troubleshooting in case a fault occurs.

5.1 Service menu structure



5.2 Service



1. Press the **Monitor Setup** key.
2. Select **Install/Service** (password 16-4-34).
3. Select **Service** (password 26-23-8).

5.3 Service menu

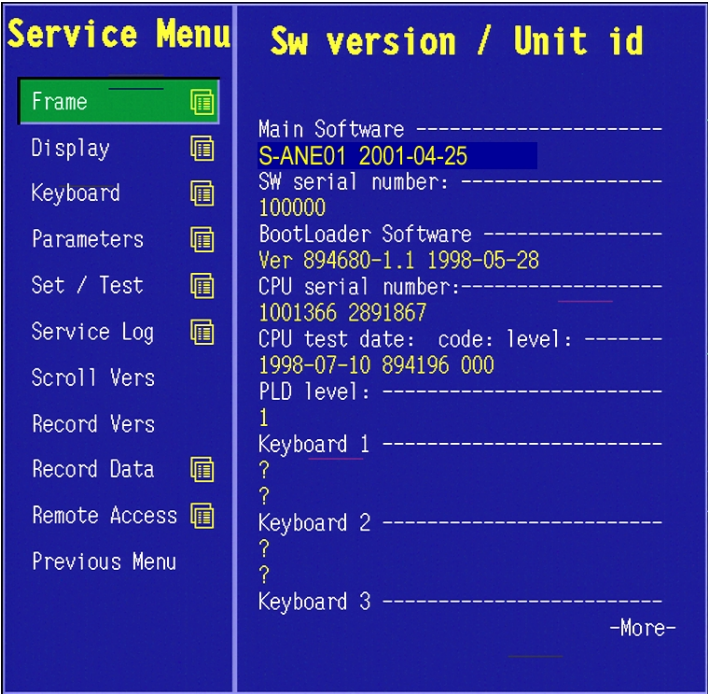
The field on the right shows software versions and their release dates of different parts of the monitor, control numbers of measuring boards and serial numbers of modules (if available).

See descriptions for Service Menu submenus from sections:

- 5.4 **Frame**
- 5.5 **Display**
- 5.6 **Keyboard**
- 5.7 **Parameters**
- 5.8 **Set/Test**
- 5.9 **Service Log**
- 5.10 **Record Data**
- 5.11 **Remote Access**

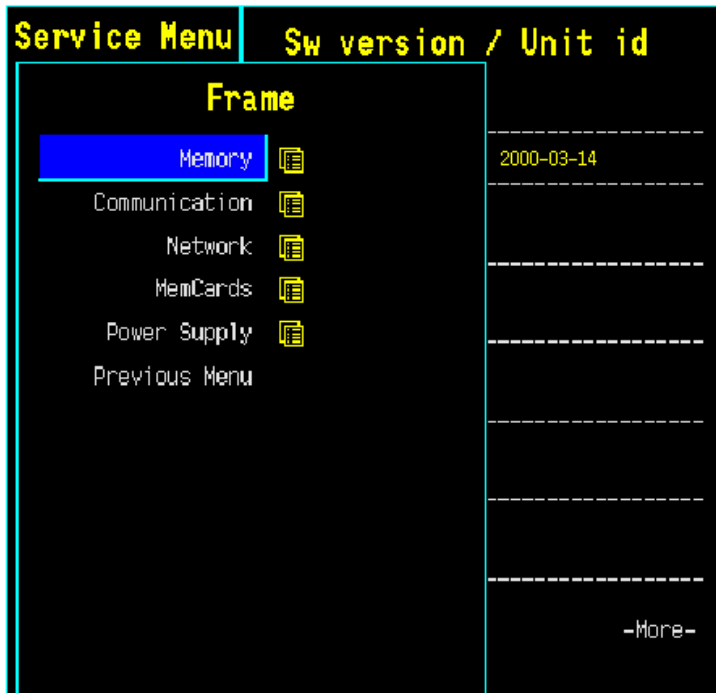
Scroll Vers enables to scroll the field on the right side.
‘-More-’ indicates that there are more lines to be viewed.

Record Vers
By choosing this selection, the software versions and other information are printed onto the device defined in the Record Data menu.



5.4 Frame

The frame menu includes service menus common for the frame.



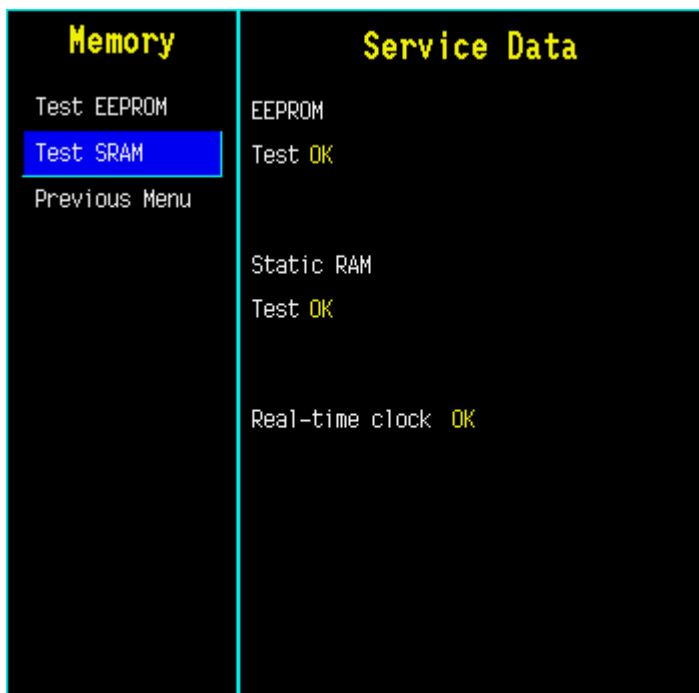
5.4.1 Memory

A service menu to check the status of the memory used in CPU board of the monitor.

Test Memory tests the condition of the EEPROM/Flash memory component of the CPU board. If the result of the test is **Fail**, see section “Error messages.”

Test SRAM tests the Static RAM memory of the CPU board in a similar way as the EEPROM/Flash memory. If the result of the test is **Fail**, see section “Error messages.”

Real time clock test is run at every start up and also during the operation of the monitor. If the result of the test is fail, the battery for SRAM timekeeper should be replaced.



5.4.2 Communication

A service menu for showing information about internal RS-485 and external RS-232 communication.

Module Bus (RS485) view shows information related to the module bus.

UPI ints shows the number how many times the CPU board has sent an interrupt to UPI board. The running number should raise at a frequency of at least 100 Hz. If the numbers don't raise there is trouble with the interrupt line between CPU board and UPI board or with the boards themselves.

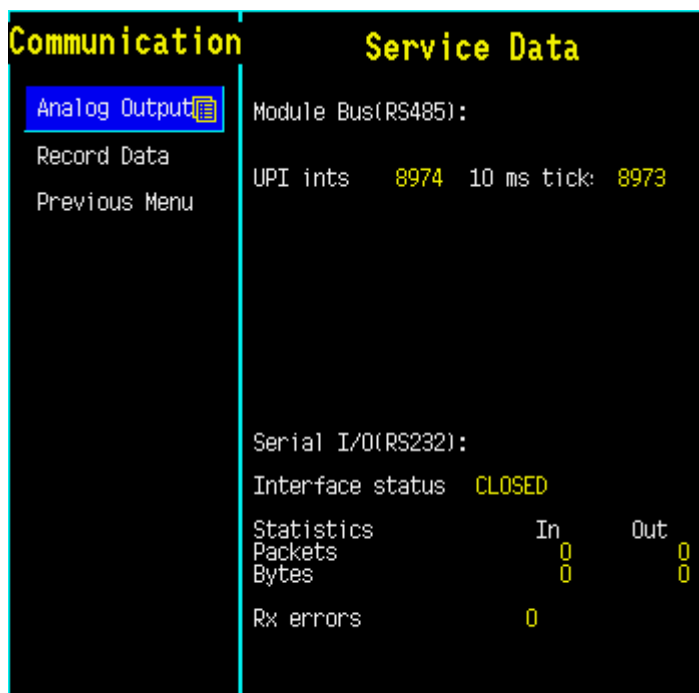
The 10 ms tick shows how many 10 ms intervals the UPI microprocessor has been on after last UPI reset. The UPI microprocessor counts the 10 ms intervals. The number must be running all the time at the frequency of 100 Hz. If the number doesn't rise, the problem is in the UPI board.

Serial I/O (RS-232) view shows information about the communication through the UPI board RS232 serial connector X3.

Interface status shows whether the interface through the connector is **OPENED**, **ACTIVE** or **CLOSED**. Opened indicates that the hardware and software for the interface is running but there is no connection or that there have been errors in using the interface. Active indicates that the interface is operating normally. Closed indicates that the necessary hardware is not present.

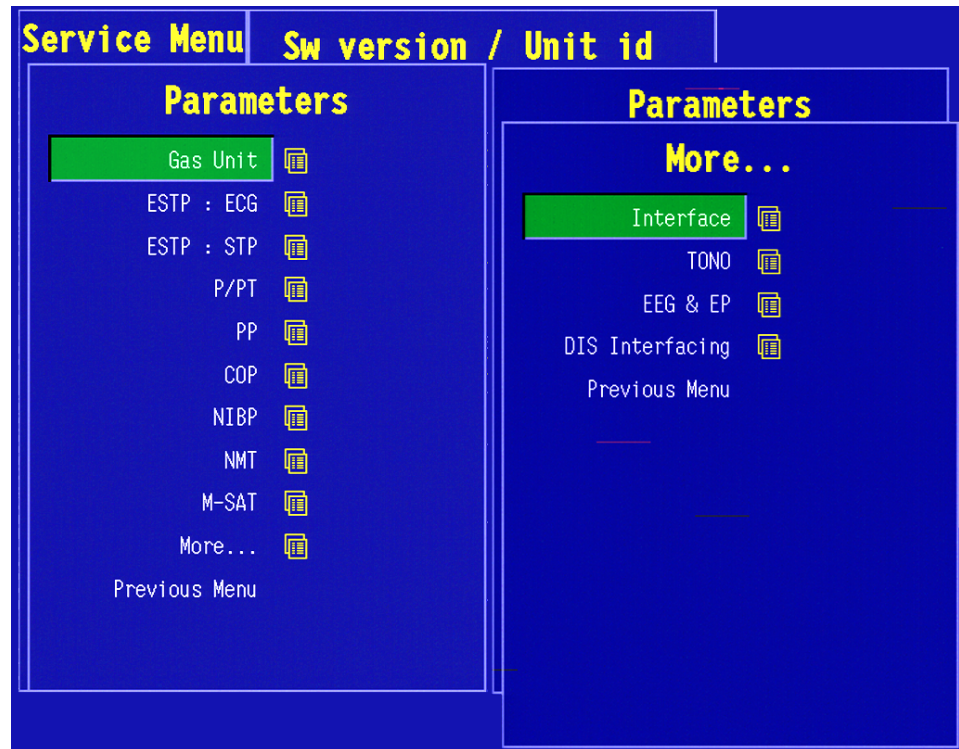
Statistics In/Out show the numbers of received and transmitted data packets and data bytes.

Rx errors show the number of received erroneous data packets.



5.5 Parameters

The parameter menus are explained in each parameter chapter.



5.6 Set/Test

The power supply unit contains a watchdog circuitry, which needs refreshment at every 1.5 seconds. If the refreshment did not occur, the watchdog circuitry will reset the main CPU. In normal operation the main CPU refreshes the watchdog circuitry at every 0.2 seconds. The purpose of the watchdog circuitry is to restart the monitor if there was a serious malfunction. This feature is useful in two cases: when the main CPU is not able to control the monitor, or when the CPU controls the monitor but detects a serious malfunction. Watchdog tests check proper functionality of the watchdog circuitry in various conditions.

Watchdog test ensures directly that the watchdog of the power unit functions properly. Choosing this test prevents the watchdog circuitry from refreshing and shows running seconds with an accuracy of 0.1 seconds.

The test should have the following result when the watchdog circuitry is working properly: The monitor will restart after 1.5 seconds from the start of the test. In malfunction: '>20 s' is displayed, and the test will interrupt. In this case, the fault is in the watchdog circuitry of the power unit.

WD by Overload test ensures the functionality of a feature, where the software controls the monitor, but detects an overload situation in the main CPU.

The test should have the following result when the feature is working properly: The monitor will restart after 15 seconds from the start of the test.

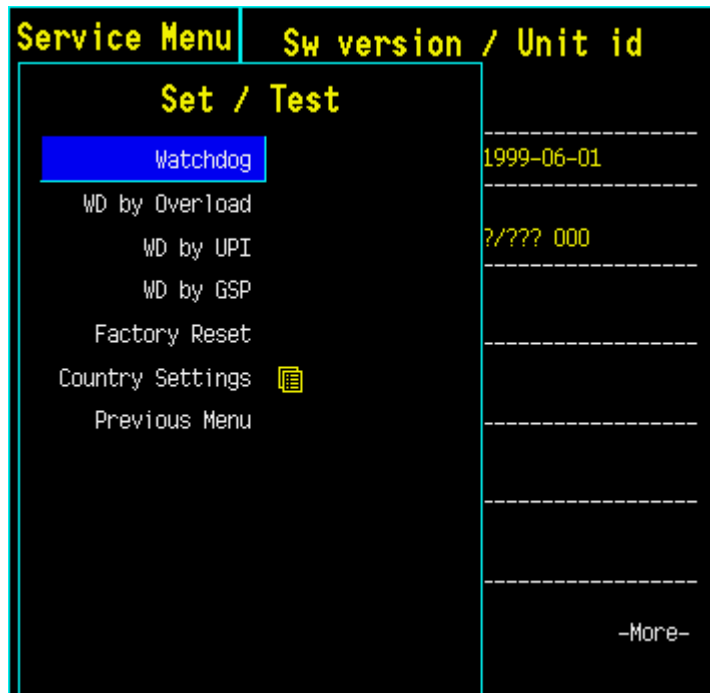
WD by UPI test ensures the functionality of a feature, where the software controls the monitor, but detects a malfunction in the UPI processor and restarts the UPI4(NET) board. The test will prevent the UPI processor from functioning during the test.

The test should have the following result when the feature is working properly: The monitor will restart the UPI4(NET) board without any visual effects.

WD by GSP ensures the functionality of a feature, where the software controls the monitor, but detects a malfunction in GSP processor (located on the primary display controller board) and performs a restart. The test will prevent GSP processor from functioning during the test.

Immediately after the test starts, the screen update stops. The test should have the following result when the feature is working properly: The monitor will restart after 5 seconds from the start of the test.

Factory Reset restore factory default settings and clear data memories. Factory reset should be run if monitor software is replaced or if the SRAM/Timekeeper battery is replaced.



5.6.1 Country Settings

National Reqs

Select software features, which include national requirements.

Power Frequency

Set power frequency (50 Hz/60 Hz). This setting is used to filter out possible power frequency interference from the parameter measurements.

Time format

Set time format of the real time clock (24 h/12 h).



5.7 Service Log

Error, event, alarm and maintenance data is stored in Service Log.

The service log contains information about the occurred monitor errors, events and alarms since the last factory reset or service log reset. The service log is saved in the EEPROM memory of the main CPU board. The user can also store different maintenance events to the maintenance log.

Maintenance menu is for setting and viewing the maintenance information of the monitor

Error History is for selecting the error history view onto the right side of the menu.

Event History is for selecting the event history view onto the right side of the menu.

Alarm History is for selecting the alarm history view onto the right side of the menu.

Scroll Last Er (Ev) is for scrolling the error / event / alarm information on the right side of the menu.

Scroll Counters is for scrolling the error / event / alarm counters on the right side of the menu.

Record Data is for recording the service log information onto the M-REC paper, the laser printer or the memory module depending on the selection in the Record Data service menu.

Reset Log is for clearing up the content of the service log. This function is recommended to be run after a performed maintenance. In Error/Event history view the Reset Log command clears up both error and event log. In Alarm History view the Reset Log command resets only the alarm history log.

Service Log

Maintenance 
 Error History
 Event History
 Alarm History
 Scroll Last Er
 Scroll Counters
 Record Data
 Reset Log
 Previous Menu

5.7.1 Error History

Last errors: The section shows the last monitor errors and the time of their occurrence.

Error counters: The section contains counters for each different (detected) monitor errors. The time of occurrence of the last error is shown beside each counter.


Last log reset: The date and the time of last Error/Event log reset.

Possible errors:

Fast cold start indicates a number of erroneous cold starts with power off time less than 20 seconds. The reason can be either a failing lead acid battery or a software problem that was solved by the hardware watchdog circuitry located in the monitor's power supply unit.

GSP watch-dog time-out indicates an erroneous restart controlled by the main CPU board and caused by the display controller board. The restart is listed as a fast cold start.

UPI watch-dog time-out indicates an erroneous restart controlled by the main CPU board and caused by the UPI or UPINET board. The restart is listed as a fast cold start.

Service Log	Error History
Maintenance 	Last errors:
Error History	
Event History	
Alarm History	
Scroll Last Er	
Scroll Counters	
Record Data	Error counters:
Reset Log	
Previous Menu	
	Last log reset: 1999-Sep-30 08:01:07

5.7.2 Event History

Last events: The section shows the last events and the time of their occurrence.


Event counters: The section contains counters for each different (detected) events. The time of occurrence of the last event is shown beside each counter.

Last log reset: The date and the time of last Error/Event log reset.

Possible events:

Cold start is a start-up with power off time more than 15 minutes. The trend memory is cleared and monitoring starts with the user default settings.

Warm start is a start-up with power off time less than 15 minutes. The trend information and possible temporary settings are still available.


Service Log	Event History
Maintenance 	Last events:
Error History	COP module connected 1999-Oct-19 18:29:53
Event History	COP module disconnected 1999-Oct-19 18:29:48
Alarm History	COP module connected 1999-Oct-19 18:29:13
Scroll Last Ev	-More-
Scroll Countrs	Event counters:
Record Data	Cold start Count 26 last 1999-Oct-19 18:24:22
Reset Log	
Previous Menu	Last log reset: 1999-Oct-19 12:33:34

5.7.3 Alarm History

Last alarms: The section shows the last events and the time of their occurrence.

Alarm counters: The section contains counters for each different (detected) events. The time of occurrence of the last event is shown beside each counter.

Last log reset: The date and the time of last alarm log reset.

Service Log	Alarm History
Maintenance 	Last alarms:
Error History	Asystole 1999-Oct-19 18:28:38
Event History	
Alarm History	Alarm counters:
Scroll Last Al	Asystole Count 1 last 1999-Oct-19 18:28:38
Scroll Countrs	
Record Data	
Reset Log	
Previous Menu	Last log reset: 1999-Oct-19 12:33:34

5.7.4 Maintenance

The Maintenance History Log gives the user a possibility to store the maintenance history of the monitor. The user can store different planned maintenance (PM) events, repairs and upgrades to the maintenance history log.

Running hours: shows how many hours the monitor has been on. This value cannot be reset by user.

since This date and time is set at the factory and it shows the manufacturing date and time. This date and time cannot be reset by user.

since last 1 year PM: shows the running hours since the last 1 year PM storing.

Last events: The section shows the last maintenance events and the time of their occurrence.

Event counters: The section contains counters for each different maintenance events. The time of occurrence of the last event is shown beside each counter.

Maintenance	Maintenance History
Plan. Maint	Running hours: 187
Repair	since 1999-Feb-06 06:28:15
Upgrade	since last 1 Year PM: 0
Remove Last Ev	Last events:
Scroll Last Ev	Upgrade 1999-Sep-30 08:58:32
Scroll Counters	1 Year PM 1999-Sep-30 08:57:57
Record Data	Event counters:
Previous Menu	1 Year PM
	Count 1 last 1999-Sep-30 08:57:57
	Upgrade
	Count 1 last 1999-Sep-30 08:58:32

Planned Maintenance

1 Year PM gives you possibility to store a 1 year PM event to the maintenance history log.

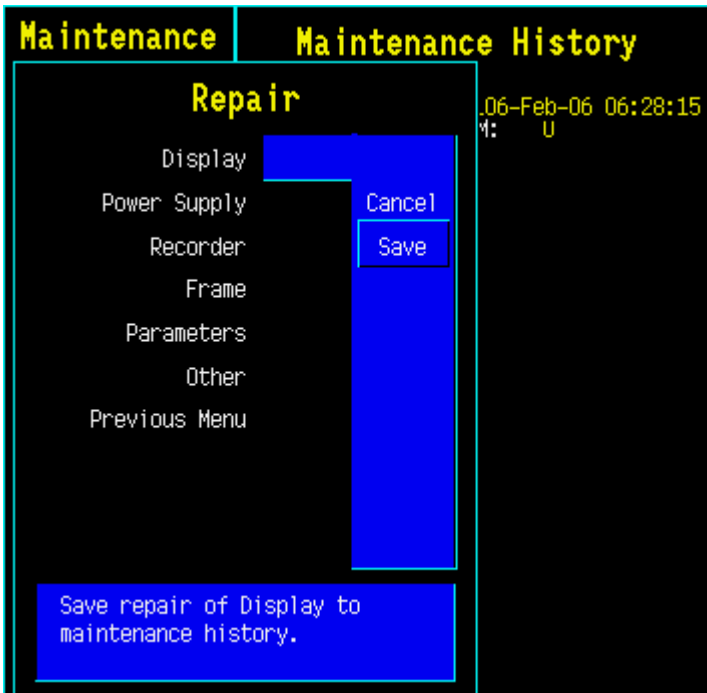
Other PM gives you possibility to store another PM event to the maintenance history log.

Notify on PM if yes is selected, the "Planned maintenance recommended" notification is shown on the message field on the display at the startup of the monitor after one year has passed since the last 1 year PM. To remove this message you can store a new 1 year PM to the maintenance history log. If no is selected, the monitor won't display the "Planned maintenance recommended" notification. Configure this setting according the agreement with the customer.

Maintenance	Maintenance History
Planned Maintenance	
1 Year PM	06-Feb-06 06:28:15
Other PM	PM: 0
Notify on PM No	1999-Sep-30 08:58:32
Previous Menu	1999-Sep-30 08:57:57
	1999-Sep-30 08:57:57
	1999-Sep-30 08:58:32
Save 1 year PM to maintenance history.	

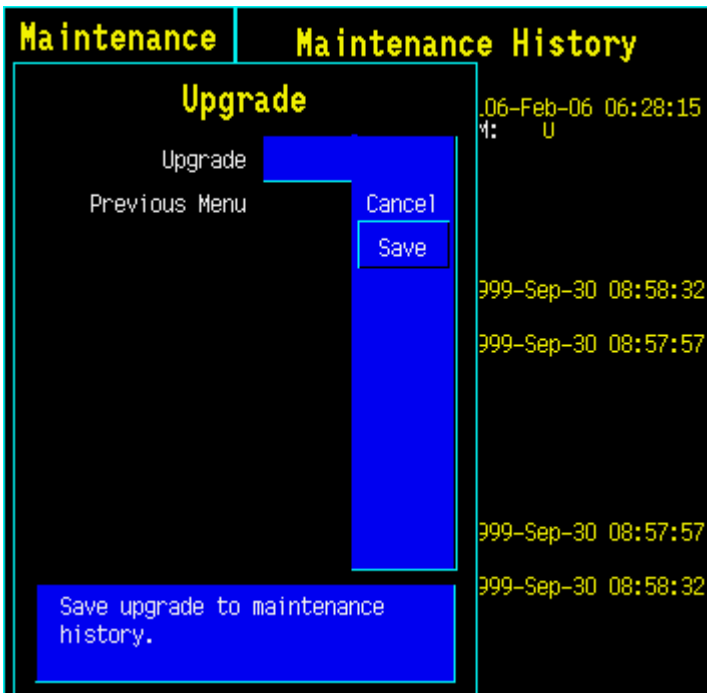
Repair

The repair menu gives the user a possibility to store repair events to the maintenance history log. The different repairs that can be saved are: **Display**, **Power Supply**, **Recorder**, **Frame** (e.g. board in the frame), **Parameters** (e.g. a board in the parameter module) or **Other** (a miscellaneous repair not specified by previous options).



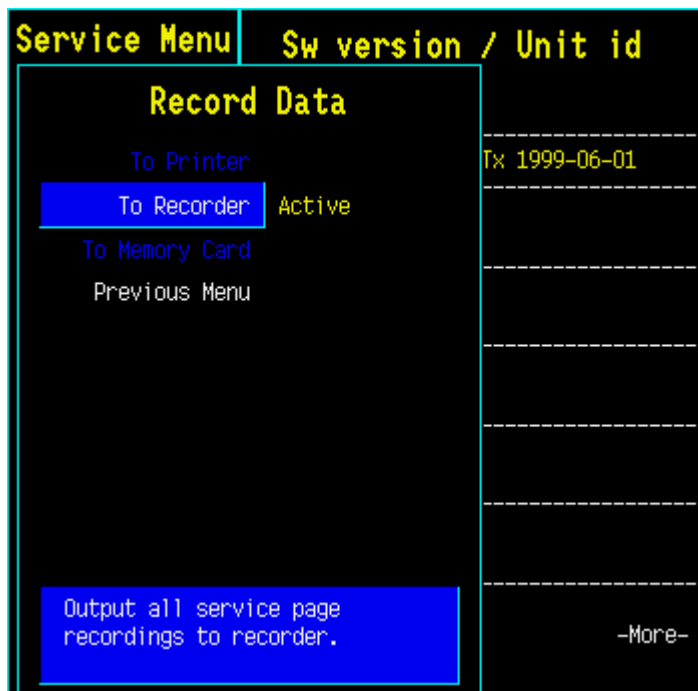
Upgrade

The upgrade menu gives the user a possibility to store the upgrades to the maintenance history log.



5.8 Record Data

In this menu the user can specify where to print from any service menu. The setting goes into the permanent memory of the monitor. Only one option can be chosen at a time. The options where to print are: **To Printer**, **To Recorder** and **To Memory Card**. Only the option **To Recorder** can be selected currently. When any of the front panel keys of the recorder module, M-REC is pressed the output is the recorder module despite of the setting of Record Data menu.



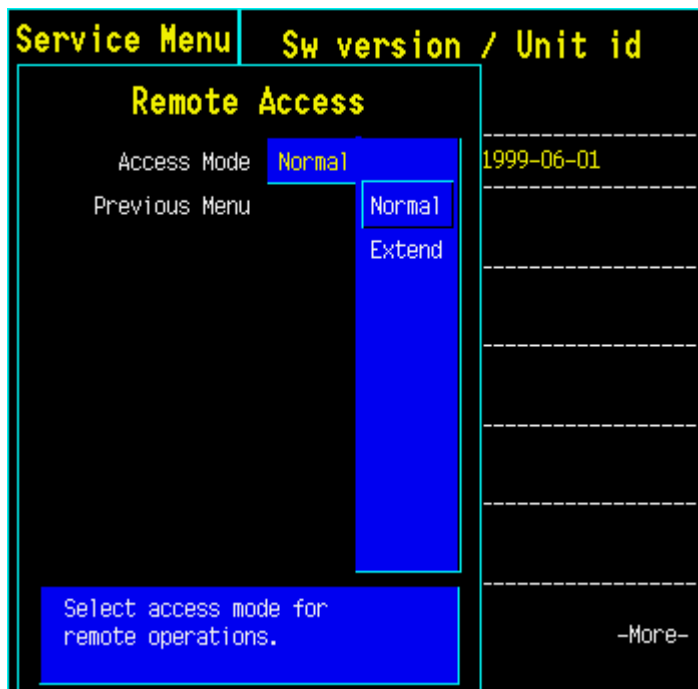
5.9 Remote Access

Remote Access menu is for setting the interface with an external PC that runs the Virtual Support™ software, which is a service diagnostic tool for remote diagnostics purposes.

When the access mode is set to **Normal** (the default), the PC can only read service menu data from the monitor.

With the access mode **Extended** the PC can also activate the monitor's service menu functions.

NOTE: Patient monitoring is not possible when the access mode Extended is selected. The access mode turns back Normal if the monitor is restarted or if the service menu is closed.



6 SPARE PARTS

6.1 Spare parts list

NOTE: Only changed part numbers are listed under later revisions. To find the desired part: check first the list of the revision that corresponds your device. If the part is not listed there, check the previous revision, etc. until you find the right number.

6.2 Products

* this part is recommended for stock

6.2.1 CPU boards and software

Item	Description	Order no.
-	CPU Board	*B-CPU5
-	CPU Board	*B-CPU4
	Service Software	S-ANE98S
	Service Software	S-ICU98S
	Service Software	L-ANE01(A)S
-	Service Software	L-ICU01(A)S

6.2.2 CPU Board, B-CPU5/B-CPU4

Item	Description	Order no.
-	Battery for SRAM/Timekeeper	*197230
-	Lid for back plate	894934
-	Screw	617110

7 EARLIER REVISIONS

This service manual fully supports earlier revisions except,

Item	Manual and document number
Service Menu descriptions related to softwares of level 97/98	Technical Reference Manual 896624 slot 895 704
B-CPU2, B-CPU3	Technical Reference Manual 896624 manual slot 895704

APPENDIX A

SERVICE CHECK FORM

CPU Boards

Customer			
Service	CPU board revision	S/N	
Service engineer		Date	



OK = Test OK



N.A. = Test not applicable



Fail = Test Failed

	OK	N.A.	Fail		OK	N.A.	Fail
1. Device plates	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	2. Grounding plate	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
3. SRAM/Timekeeper battery	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	4. PC board screws	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
5. Fan	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	6. Starting	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
7. Module communication	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	8. Real time clock	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
9. Loudspeaker sound	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	10. Service reset -switch	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
10. Monitor software							
11. Content of service log	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>				

	OK	N.A.	Fail		OK	N.A.	Fail
12. Watchdog circuitry	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	13. Recovering from power loss	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>

14. Electrical safety check	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	15. Functioning after electrical safety check	<input style="width: 30px; height: 20px; border: 1px solid green;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>	<input style="width: 30px; height: 20px; border: 1px solid red;" type="checkbox"/>
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Notes**Used Spare Parts****Signature**

