Appendix-6:
Example of Medical Equipment Registration Form

ក្រសួងសុខាភិបាល

មជ្ឈមណ្ឌលជាតិគាំពារមាតានិងទារក

Registration Sheet for Medical Equipment

តារាងចុះបញ្ជីឧបករណ៍ពេទ្យ

លេខសៀរ *Ser. No.:*

លេខអត្តសញ្ញាណឧបករណ៍ **EQUIPMENT ID**

ពណ៌នាអំពីឧបករណ៍ EQUIPMENT DESCRIPTION		
រោងចក្រផលិត MANUFACTURER:	ម៉ូដែល MODEL:	
លេខសៀរ SERIAL NO.:	លេខអត្តសញ្ញាណ ID NO.:	
ប្រភេទ TYPE:	ថ្នាក់ CLASS:	
សាល WARD ទីតាំង LOCATION		ក្រុមពេទ្យទទួលបន្ទុក DR. IN-CHARGE:
ឧបករណ៍ជំរើស OPTIONAL EQUIPMENT: ពណ៌នា DESCRIPTION:		លេខសៀរ SERIAL NO.

ស្ថានភាពឧបករណ៍ EQUIPMENT STATUS

តំលៃ PRICE:	ផ្តល់ផ្តង់ដោយ PROVIDED BY:
កាលបរិច្ឆេទផ្តល់ផ្តង់ DELIVERY DATE:	កាលបរិច្ឆេទតំលើង INSTALLATION DATE:
រយៈពេលធានាការពារ WARRANTY PERIOD ចាប់ពី FROM រហូតដល់ TO	
ស្ថានភាព CONDITION: មតិយោបល់ COMMENTS:	
ការប្រើប្រាស់ UTILIZATION: មតិយោបល់ COMMENTS:	
ភ្នាក់ងារក្នុងស្រុក រឺ រោងចក្រផលិត LOCAL AGENCY or MANUFACTURER ឈ្មោះ NAME: អាស័យដ្ឋាន ADDRESS: ឈ្មោះអ្នកទំនាក់ទំនង CONTACT PERSON: លេខទូរស័ព្ទ-ទូរសារ TEL/FAX: ទូរសារអេឡិចត្រូនិច e-mail:	

កំណត់សំគាល់ REMARKS:		
ចងក្រងដោយ COMPILED BY:	ឯកភាពដោយ APPROVED BY:	កាលបរិច្ឆេទ DATE:

11

Appendix-7:
Example of Medical Equipment Inventory List (Report format by Database)

LIST OF MEDICAL EQUIPMENT
NATIONAL MATERNAL AND CHILD HEALTH CENTRE

ID NO.	NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NO.	INSTALLATION	STATUS	PRICE (U$)	EXPECTED LIFE-SPAN	REMARKS
Gynecology	***SECTION CODE NO. 01***								
	Nursing Station								
G96-035-010	Ice Cube Making Machine	SANYO	SIM-S51	--	03/1997	C NW	*3,183*	8	09.12.99, repaired.
G96-034-010	Medical Refrigerator	SANYO	MPR-161	60906080	03/1997	A GC	*742*	15	
	Storeroom								
G93-006-010	Suction Unit	ASAHI	101N	Y547	1993	B GC	*1,333*	15	03.11.00, repaired
	Treatment-212								
G96-005-010	Examination Light Stand	DAIKYO	270	--	03/1997	A GC	*842*	15	19.06.98, repaired
G96-003-010	Gynecological Examination Table	NAKAMURA	GE-3100	--	03/1997	A GC	*6,175*	12	
G96-004-070	Gynecological Examination Table	NAKAMURA	GU-300	--	03/1997	A GC	*2,767*	12	
G93-004-010	Vacuum Extractor	ASAHI	103	5472	1993	A GC	*3,333*	15	
Operation Theatre	***SECTION CODE NO. 02***								
	Washroom Passage								
G96-029-010	Scrub Station	TOYODA	TSS-1506P	1455	03/1997	A GC	*20,075*	15	18.05.00, replaced all UV lamps..
G96-029-020	Scrub Station	TOYODA		1454	03/1997	A GC	*20,075*	15	07.02.02, replaced fluorescent lamps
	ICU								
T96-025-020	Doppler Fetus Detector	TOITU	FD-300	821N44	--	A GC	*776*	10	
T01-004-010	Infusion Pump	TOP	TOP-3300	--	20/01/01	A GC	*3,333*	12	Accompanied equipment
G96-009-010	Patient Monitor	FUKUDA	DS-2120	28072123	03/1997	A GC	*10,050*	10	20.02.00, repaired by the manufacturer
G96-001-020	Patient Monitor	FUKUDA	DS-2120	28072124	03/1997	A GC	*10,050*	10	20.02.00, repaired by the manufacturer
T01-005-010	Syringe Pump	TOP	TOP-5300	OWN3555	20/01/01	A GC	*2,400*	12	Accompanied equipment
	Nursing Station								
G96-033-010	Blood Bank Refrigerator	SANYO	MPR-106D	--	03/1997	B GC	*2,300*	15	
G96-034-020	Medical Refrigerator	SANYO	MPR-161	60906083	03/1997	A GC	*742*	15	

STATUS: A; Fully utilized, B; Partly utilized, C; Not utilized, D; Decommissioning
GC; Good condition, WC; Working condition, NW; Not working, DM; Decommissioning

Appendix-8:
Example of Medical Equipment Service History

(Report format by Database)

SERVICE HISTORY

NAME OF EQUIPMENT: High Pressure Steam Sterilizer **ID No. :** G96-031-010

MANUFACTURER/ MODEL: UDONO / KRECA-559V/ **Serial No.:** 70550

LOCATION: CSSD

No.	ACC No.	*CAT	DATE STARTED DATE COMPLETED	NATURE OF DEFECTS	SERVICE CARRIED OUT	SERVICE COST (US$)
1	002	C	01.02.98 17.02.98	Water leakage	Replaced water housings.	500
2	021	A	08.09.98 08.09.98	Maintenance required	Changed water filters.	104.29
3	030	A	21.10.98 21.10.98	Maintenance required	Overhauled the water circuits.	141
4	031	A	10.11.98 10.11.98	Maintenance required	Changed the water filters.	62.81
5	035	C	21.12.98 21.12.98	Low water pressure at the secondary filter	Changed the primary filter.	41.48
6	044	C	05.04.99 05.04.99	No power coming on	Changed water filters, 20u and 5u.	104.29
7	047	C	21.04.99 21.04.99	Air leakage from the door	Changed the door gasket.	346.66
8	082	A	01.09.99 01.09.99	Maintenance required	Changed the water filters.	544.29
9	088	C	04.10.99 04.10.99	Water leakage from filter housing	Replaced the filter housing by old one (old one but still can be used.)	104.29
10	092	C	12.10.99 12.10.99	Water backflow	Replaced the back-flow stop valve.	69.56
11	100	C	12.11.99 12.11.99	Water backflow (12.10.99, repaired on the same point)	Replaced the back-flow stop valve.	69.56
12	101	B	06.12.99 06.12.99	Water backflow (25.11.99, same fault)	Replaced the water supply valve and the water filter housing.	289.56

* CAT: SERVICE CATEGORY

A: Maintenance, B: Urgent inspection, C Repair, D: Installation

Continued SERVICE HISTORY

No.	ACC No.	*CAT	DATE STARTED DATE COMPLETED	NATURE OF DEFECTS	SERVICE CARRIED OUT	SERVICE COST (US$)
13	134	C	15.03.00 15.03.00	The door not fixed well	Repaired the door.	0
14	155	A	23.05.00 23.05.00	Maintenance required	Replaced the water filters and water inlet strainer.	104.29
15	160	C	06.06.00 06.06.00	Water filter housing broken	Replaced the water filter housing with a new one, and cleaned up the water strainer.	220
16	169	C	21.07.00 21.07.00	Water leakage from the water gauge glass	Replaced the water gauge glass and checked up inside of the boiler.	78.89
17	195	C	09.10.00 09.10.00	Water leakage from water gauge glass	Put old O-rings. Replaced the water filters and cleaned up the strainer.	104.29
18	199	C	24.10.00 24.10.00	Water filter housing cracked	Replaced the water filter housing by new one.	88
19	225	A	16.02.01 16.02.01	Maintenance required	Replaced the water filters.	104.29
20	239	A	02.05.01 02.05.01	Maintenance required	Replaced both 5u and 20u filters	104.29
21	263	B	21.09.01 21.09.01	Water housing came off.	Replaced the water filters and water housings.	104.29
22	294	A	26.12.01 26.12.01	Water circuit clogged.	Replaced the water filters, 50u, 20u.	104.29
23	304	A	08.02.02 08.02.02	Water leakage from the water level glass.	Replaced the water filter glass by new one.	23.33
24	305	A	11.03.02 11.03.02	Door gasket is deteriorated.	Replaced the door gasket by new one.	133.33
25	322	A	17.05.02 19.05.02	Steam cannot be generated. Maintenance is required.	Overhauled the equipment. Replaced faulty and old components.	910.00
26	344	A	25.09.02 25.09.02	Water does not flow and water leaking from the water housing	Repaired the water leakage.	81.56
27	351	A	22.11.02 26.11.02	Water leaking from the cap of the water housing. Steam and water leaking from the door.	Replace the door gasket, cap of water housing and water filters.	246.47

Total: 4,239.78 US$

∗ CAT: SERVICE CATEGORY

A: Maintenance, B: Urgent inspection, C Repair, D: Installation

Appendix-9:
Example of Statistics of Medical Equipment Utilisation Rates

MEDICAL EQUIPMENT UTILIZATION RATES IN NMCHC

As of December 2002

Ward	Number of Equipment	Fully Utilized	Partly Utilized	Unutilized Equipment		Utilization Rate	
				Defect*	Others**	Cost Basis (Total amount)	Qty. Basis
CSSD	6	4	0	0	2	91% ($ 136,275)	57%
DELIVERY	26	24	0	1	1	98% ($ 163,579)	92%
DENTAL	2	2	0	0	0	100% ($ 25,616)	100%
EMERGENCY	5	5	0	0	0	100% ($ 12,193)	100%
GYNECOLOGY	7	5	2	0	0	100% ($ 18,375)	100%
LABORATORY	25	23	0	0	2	73% ($ 93,441)	92%
MATERNITY (West/East ward)	19	17	2	0	0	100% ($ 67,982)	100%
NCU	23	15	4	0	4	94% ($ 79,669)	83%
OPD	25	22	2	1	0	94% ($ 46,594)	96%
OT, ICU,RECOVERY	26	22	1	0	3	92% ($ 268,623)	88%
PHARMACY	2	2	0	0	0	100% ($ 1,242)	100%
ECG, X-RAY, ECHO	9	8	0	1	0	75% ($ 164,283)	89%
VACCINATION	2	2	0	0	0	100% ($ 1,484)	100%
OTHER DEPT.	8	3	3	0	2	94% ($ 27,018)	75%
					Grand total	***$ 1,106,329***	
					Not utilized	***$ 114,205***	
TOTAL	185	154	14	3	14	90%	91%
GRANT AID, 1993	36	29	3	0	4	87% ($ 108,978)	89%
GRANT AID, 1996	90	81	4	1	4	91% ($ 793,959)	95%
JICA TC	51	40	5	1	5	88% ($ 197,190)	88%
NMCHC/MoH	2	2	0	0	0	100% ($ 356)	100%
OTHERS	6	4	0	1	1	67% ($ 10,357)	67%

* Defect: Equipment itself has broken down

** Others: Due to lack of accessories or to technical problem for use

Appendix-10:
Example of Spare Parts Inventory

(Report format by Database)

National MCH Centre

Spare Parts Inventory

NAME OF SPARE PARTS	CODE NO.	ACTION DATE	ACC NO.	IN	OUT	BALANCE	UNIT PRICE (US$)	AMOUNT (US$)
DAIKYO 270								
Halogen Lamp	G96-005-01					**54**		
		03.1997		54			54.07	2,920.00
Caster	G96-005-02					**7**		
		03.1997		7			8.00	56.00
Fetal Actocardiograph								
TOITU MT-332								
Doppler Transducer	G96-007-01					**4**		
		03.1997		8			663.70	5,309.83
		09.09.99	085		1		663.70	663.70
		14.10.99	095		1		663.70	663.70
		10.05.00	152		1		663.70	663.70
		15.05.02		2			663.70	1,327.40
		21.10.02	346-348		3		663.70	1,991.10
External UC Transducer	G96-007-02					**5**		
		03.1997		8			663.70	5,309.83
		15.02.99	039		1		663.70	663.70
		14.10.99	094, 095		2		663.70	1,327.40
		10.05.00	152		1		663.70	663.70
		02.01.01	211		1		663.70	663.70
		15.05.02		2			663.70	1,327.40
Marker	G96-007-03					**4**		
		03.1997		4			135.19	540.74
Recording Pen (FHR)	G96-007-04					**7**		
		03.1997		4			130.37	521.48
		14.10.99	094		1		130.37	130.37
		26.08.01	341		1		130.37	130.37
		15.05.02		5			130.37	651.85
Recording Pen (UC)	G96-007-05					**8**		
		03.1997		4			130.37	521.48
		10.10.99	094		1		130.37	130.37
		15.05.02		5			130.37	651.85
Power Switch	G96-007-06					**0**		
		15,05.98		1			13.00	13.00
		28.08.98	017		1		13.00	13.00
General X-ray Apparatus								
ACOMA KXR6-150								

04/12/02

Appendix-11:
Outline of Database

1. Structure of Database

Figure 1 shows the structure of this database. In fact, this database collectively manages inventory control or management which records and monitors technical service, equipment utilisation, equipment and spare parts inventory and information of manufacturers/agencies based on the life cycle management of medical equipment.

The database is divided into three files according to function: master file, data file and memory file. The master file displays all the information of individual equipment such as ID, optional equipment, spare parts, service records and manufacturers/agencies as shown in paragraph 2.2.1 on one screen. This information is from data files. The data from attached equipment to manufacturer/agency according to the title is entered, and the data file displays data on the screen. The memory file stores the data of the stock, delivery, and inventory result that is entered to the spare part data file.

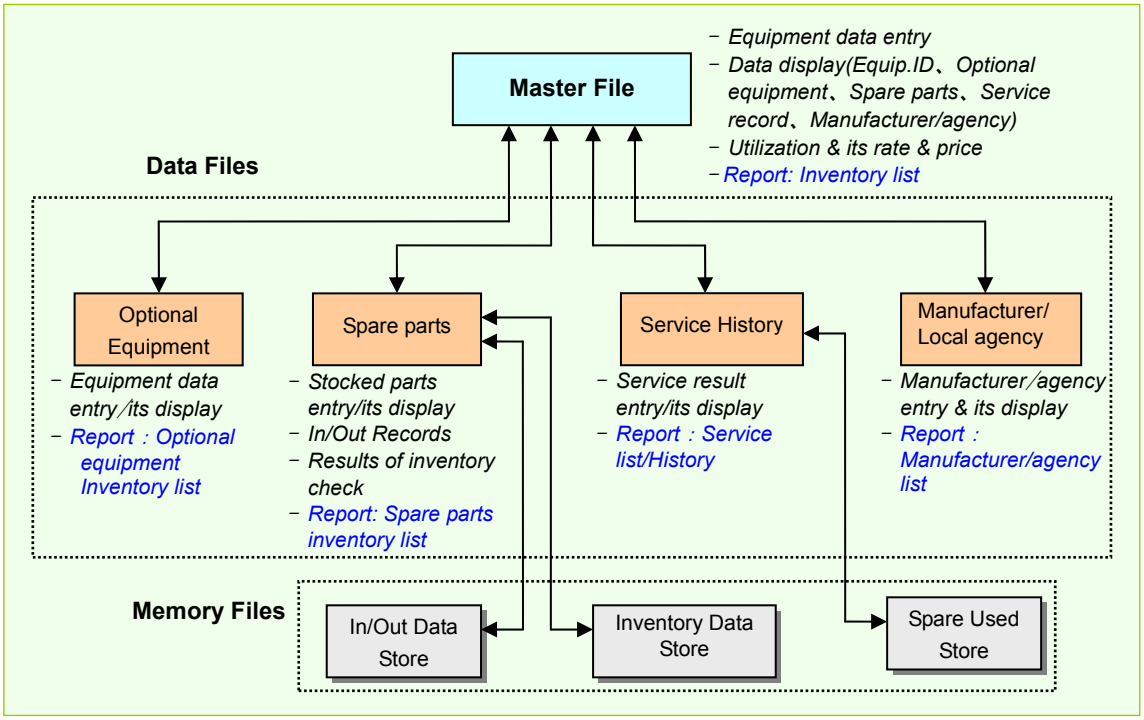

Figure 1 Structure of the database

2. Open the Title

When an icon on the desktop is clicked, the title illustrated in Figure 2 will appear. This title has to open the files (OPTIONAL EQUIPMENT, SPARE PARTS, SERVICE RECORD and MANUFACTURER/LOCAL AGENCIES), HELP and EXIT.

3. Master File

- When the MASTER FILE as shown in Figure 2 is clicked, the MASTER FILE format shown in Figure 3 will appear. The master file is composed of two parts; the upper shows ID of equipment, and the lower shows related information, i.e. optional equipment, spare parts, service history and equipment manufacturer/agency. When INDEXes are clicked, corresponding information will be displayed. The lower part in Figure 3 also shows the management situation of the equipment UTILIZATION RATES that includes the equipment provided by all donors.
- Operation buttons have functions of NEW (data entry), DUP (Data duplication), DELETE (data deletion), LIST（list format display）, FIND（data retrieval）, RESET（retrieval return）, REPORT (report printing), HELP（function/handling help） and CLOSE (file closing).

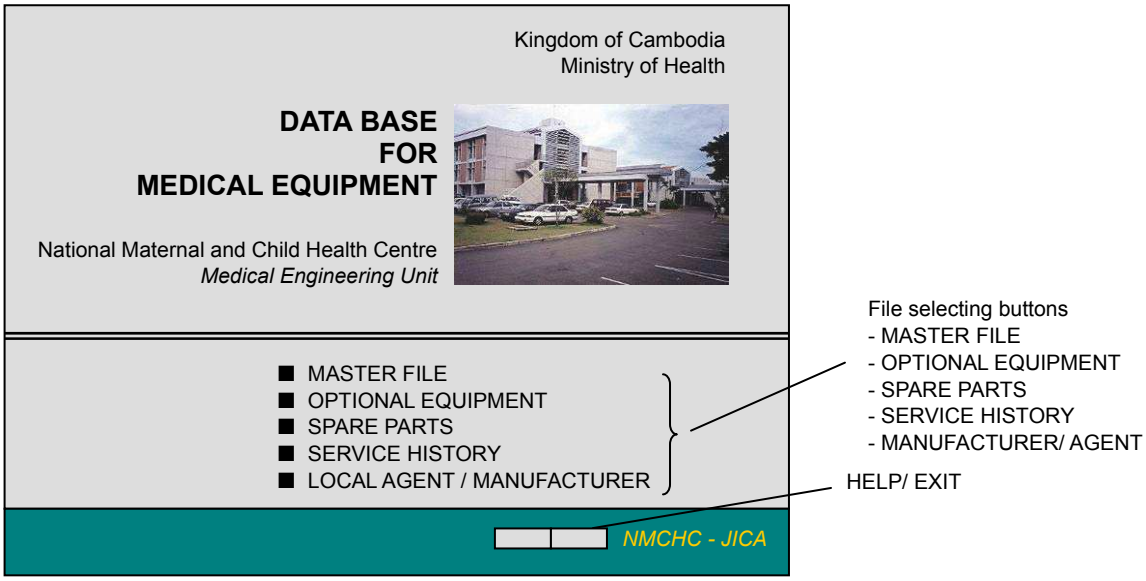

Figure 2 Title of the database

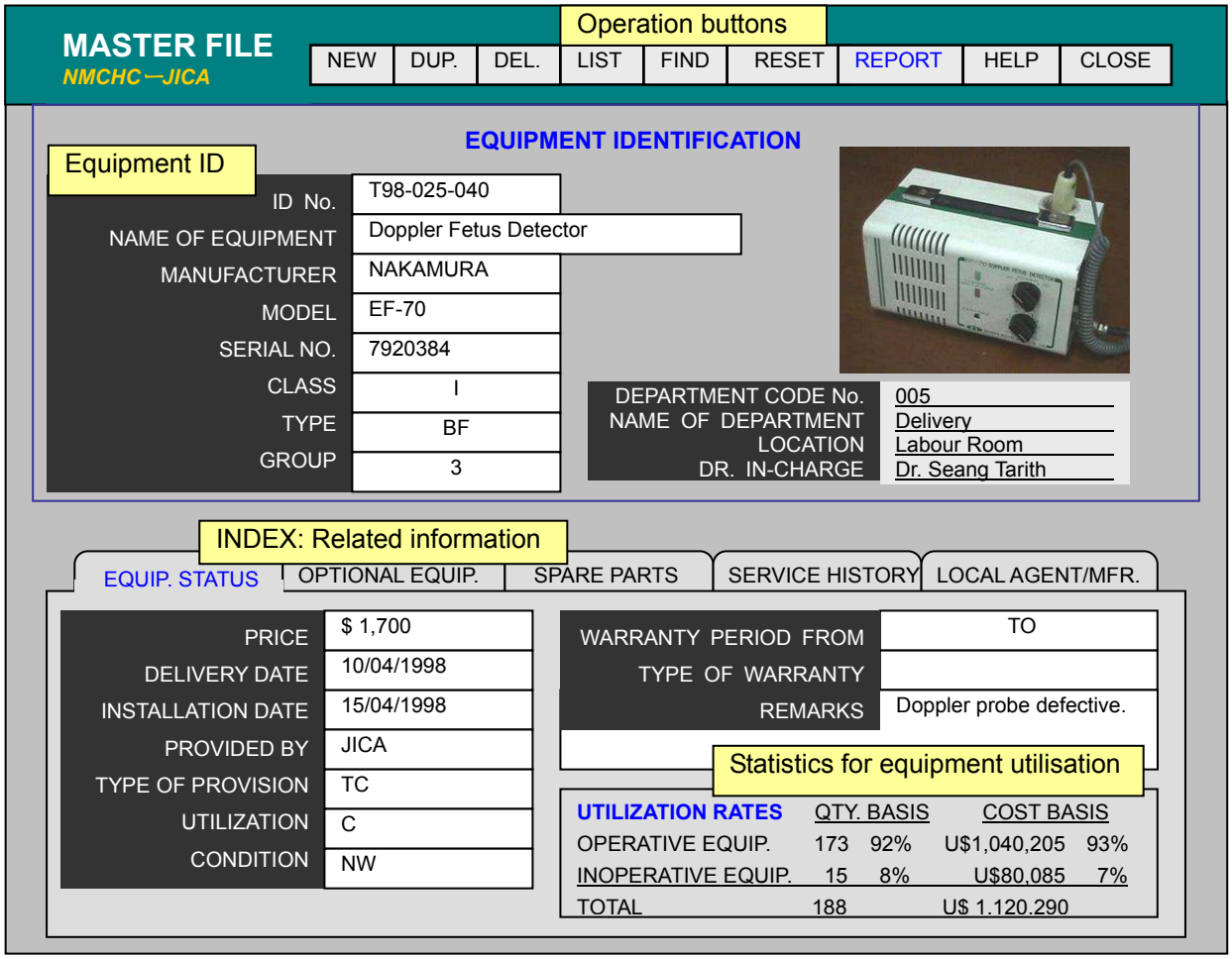

Figure 3 Master file format (data entry and display)

- When the LIST is clicked, the master file format is moved to list format as shown in Figure 4. The list format makes it easy find of individual items of equipment. When an ID No. is selected the list format returns to the master file, and the concerned equipment will be indicated.
- When REPORT is clicked, an Equipment Inventory List (Appendix-7) can be made.

INVENTORY LIST | NEW | DEL. | FORM | FIND | RESET | REPORT | HELP | CLOSE

LOCATION	ID No.	NAME OF EQUIPMENT	MFR.	MODEL	SERIAL NO.	INST.	STA
Operation T	G96-029-010	Scrub Station	TOYODA	TSS-1506P	1455	03/1997	A GC
Operation T	G96-029-020	Scrub Station	TOYODA	TSS-1506P	1454	03/1997	A GC
Gynecology	G93-006-010	Suction Unit	ASAHI	101N	Y547	1993	A GC
Gynecology	G93-004-010	Vacuum Extractor	ASAHI	103	5472	1993	A GC
Operation T	T96-025-020	Doppler Fetus Detector	TOITU	FD-300	821N44	1999	A GC
Operation T	T01-004-010	Infusion Pump	TOP	TOP-3300	--	20/01/01	B GC
Operation T	G96-009-010	Patient Monitor	FUKUDA	DS-2120	28072123	03/1997	A GC
Operation T	G96-001-020	Patient Monitor	FUKUDA	DS-2120	28072124	03/1997	A GC

Figure 4 Part of list format

4. Optional Equipment File

- When the index button of OPTIONAL EQUIPMENT in the MASTER FILE is clicked, a list of optional equipment related to the main equipment shown in the upper row will be displayed. When a code No. of the optional equipment is clicked it moves to the optional equipment file, and its details will be displayed.
- When INDEX is double-clicked, one moves directly to the optional equipment file.

5. Spare Parts File

- When the SPARE PARTS index in the master file is clicked, a list of stocked spare parts related to the equipment shown in the upper row will be displayed.
- When CODE NO. is clicked, it moves to the spare parts file, and the details will be displayed (Figure 4). The upper section shows the specifications of spare parts in detail, and the lower section shows the stock and pickup/delivery of spare parts in detail. INVENTORY shows the result of the inventory, and BIN shows details of the pickup/delivery situation. The function of the operation buttons is similar to that of the master file.

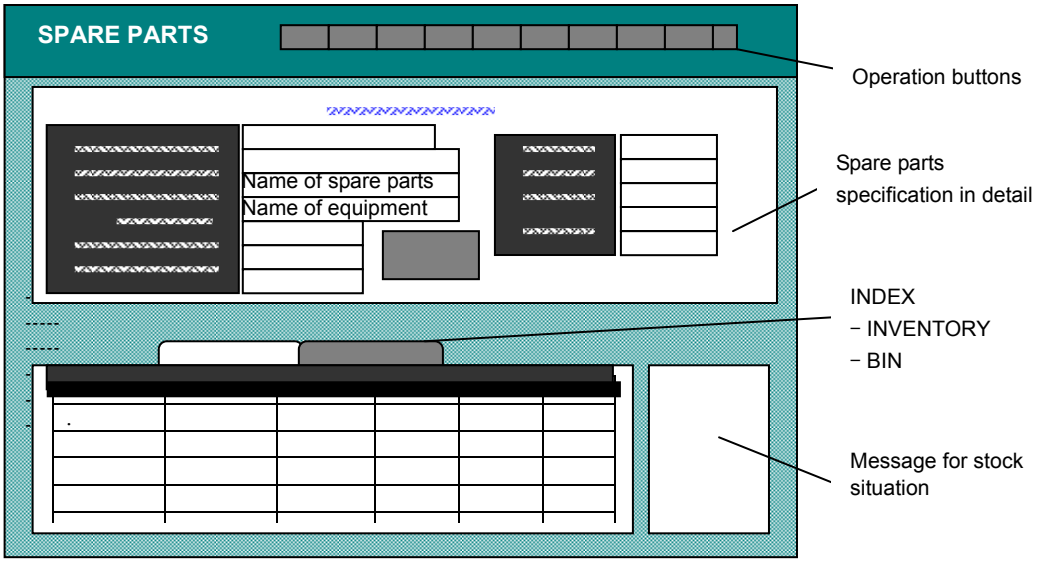

Figure 5 Spare parts format (data entry and display

- The report of the repair of the entire equipment parts stock list or the equipment individual repair parts stock list can be made by clicking REPORT.
- When the index BIN is clicked, one moves to in/out store file, and then a report of spare parts pickup/delivery (Appendix-10) can be made by clicking REPORT.
- Register new parts by clicking the data input of NEW.

6. Service History File

- When the SERVICE HISTORY index in the master file is clicked, a service history related to the equipment shown in the upper row will be displayed.
- When the ACC No. of the service history is clicked, one moves to the service record/history, and the details will be displayed (Figure 5). The upper row shows the same information as equipment ID of the master file, the lower section shows the content of service in detail.
- Page one of the lower section shows the status of the equipment, the content of service carried out and spare parts used, and page 2 shows the service cost and its statistics.
- A list of services is displayed by clicking LIST. It returns to former format for the LIST. ACC. NO. click.
- When the REPORT button is clicked, it goes into report mode, and two kinds of reports of the entire service report and the equipment service history (Appendix-8) can be made.

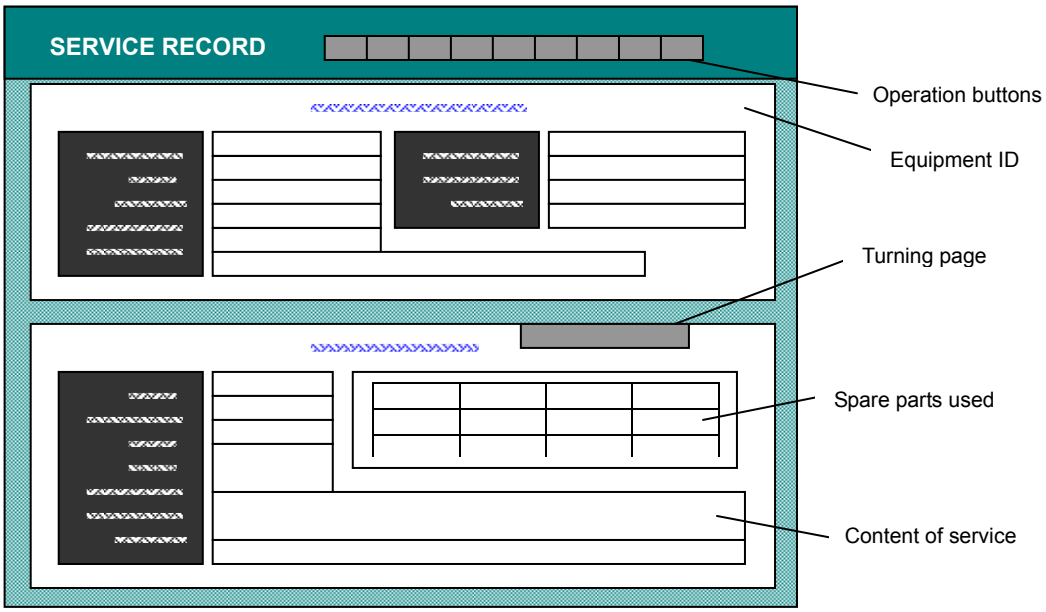

Figure 6 Service record/history format (data entry and display)

When the equipment manufacturer/agency index on the master file is clicked, the details are obtained. Everything can be controlled with the button though this database has various functions besides those listed above. This is a database where all the files are connected as a relational database, therefore, all necessary data can be accessed from every file.

Appendix-12:
Evaluation Sheet for ME Section

(Evaluation of ME section in a hospital with regard to three cycle management)

Criteria— A: possible to do smoothly by C/Ps themselves, B: possible to do mostly by C/Ps themselves, C: possible to with an expert's assistance, D: possible to improve with an expert's guidance, E: Capabilities to improve remain rather weak

Category	Description	Evaluation				
		A	B	C	D	E
1. Survey and registration of medical equipment	1.1 Carrying out survey			○		
	1.2 Design and maintain database				○	
	1.3 Identification and registration of existing equipment		○			
	1.4 Definition of ID No.			○		
2. In-house maintenance policy making	2.1 Survey for maintenance policy making				○	
	2.2 Implementation of maintenance policy				○	
3. Consultation for equipment that will be newly procured	3.1 Technical evaluation of specification and performance				○	
	3.2 Estimate of running cost				○	
	3.3 Maintenance policy making of incoming equipment				○	
4. Regulations, Guidelines, and technical manuals based on International Standard[Note)]	4.1 Maintenance regulation making				○	
	4.2 Regulations for the maintenance and safety management					○
	4.3 Technical standard making (Translation/Summary)					○
	4.4 Service/operating manual making (Translation/Summary)					○
5. Maintenance/Inspection schedule	5.1 Making a maintenance/inspection schedule for individual equipment			○		
	5.2 Manpower calculation				○	
	5.3 Estimation of necessary spare parts, materials and maintenance costs				○	
6. New equipment acceptance testing	6.1 Carrying out an acceptance test			○		
	6.2 Making a report on acceptance test in conformity with manufacturer's test certificate			○		
	6.3 Attendance to equipment installation by manufacturer/local agency		○			
7. Training/Education	7.1 Safe use of equipment		○			
	7.2 User's maintenance		○			
	7.3 Coordination of in-service/overseas training			○		
8. Routine technical service	8.1 Regular inspection		○			
	8.2 Urgent inspection		○			
	8.3 Basic repair		○			
	8.4 Safety/performance examination				○	
	8.5 Issuing a technical service report		○			
	8.6 Infection prevention			○		

Continued Table

Category	Description	Evaluation				
		A	B	C	D	E
9. Collaboration service	9.1 Attendance to AMC			○		
	9.2 Attendance to technical services of manufacturer or local agency			○		
	9.3 Assistance to user's maintenance		○			
10. Management of workshop	10.1 Maintenance/inspection of measuring instruments and tools		○			
	10.2 Management of library and technical references				○	
	10.3 Property management and its report			○		
11. Spare parts management	11.1 Registration of spare parts			○		
	11.2 Inventory check			○		
	11.3 Management of stock control			○		
	11.4 Estimation/Prediction of necessary spare parts and future budget				○	
12.. Negotiation/ communication with manufacturers/local agencies	12.1 Question and inquiry in technology				○	
	12.2 Technical exchange and feedback					○
13. Management of report and documentation	13.1 Survey report			○		
	13.2 Manufacturer's test cetificate				○	
	13.3 Acceptance test report			○		
	13.4 Service report		○			
	13.5 Database document			○		
14. Submitting regular reports	14.1 Equipment utilization in each ward			○		
	14.2 Spare parts consumption report			○		
	14.3 Inventory report			○		
	14.4 Annual report				○	
15. Analysis of equipment management aspects	15.1 Monitoring for equipment utilization			○		
	15.2 Monitoring for equipment utilization rates			○		
	15.3 Evaluation for safety/performance of individual equipment				○	
	15.4 Analysis for maintenance method based on the service history				○	
	15.5 Reliability prediction based on MTBF/MTTR, etc.					○
16. Attendance to decommissioning	16.1 Evaluation of decommissioning from technical viewpoint				○	
	16.2 Making a decommissioning report from technical viewpoint				○	

Note): Basic manuals were already prepared by the expert from a donor, but capabilities to make revised and renewed versions remain rather weak.