



SA9900

TRAINING MANUAL

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1. GENERAL INFORMATION

Technical Specifications

1. Fine Digital Beamforming System
2. All Digital Signal Processing
 - Mid signal processing ASIC – MGA015
 - Color Doppler Processing ASIC – MGA016
 - Multi Beam ability Beamforming ASIC - MCB014
 - TX Pulser ASIC – MFC019
3. 512 channel system with synthetic
4. Cine memory : 256 Frames
5. Loop memory : 2048 Lines
6. Multi Languages-English, German, Spanish, Italian, French
7. Edge Enhancement : 10 steps (0 ~ 9)
8. Dynamic Range control : 50dB ~ 110 dB, step 1 dB

1. GENERAL INFORMATION

PROBE LIST

1. Curved Array : 99C3-7IM, 99C2-5EL, 99EC4-9ES, 99EC4-9/10ED, 99C4-9/10ED, 99C2-5ET
2. Linear Array : 99L5-12IM, 99L4-7EV, 99L5-9ER
3. Single Element Pencil : 2.0 CW, 4.0 CW
4. Intra Operative : LI5-9EV, CL4-8EV
5. Phased Array : 99P2-3AC, 99P2-5AC, 99P3-7AC
6. TEE : MPT4-7*
7. Volume : VAW3-5, VDW5-8B, VAW4-7, VNA 6-12

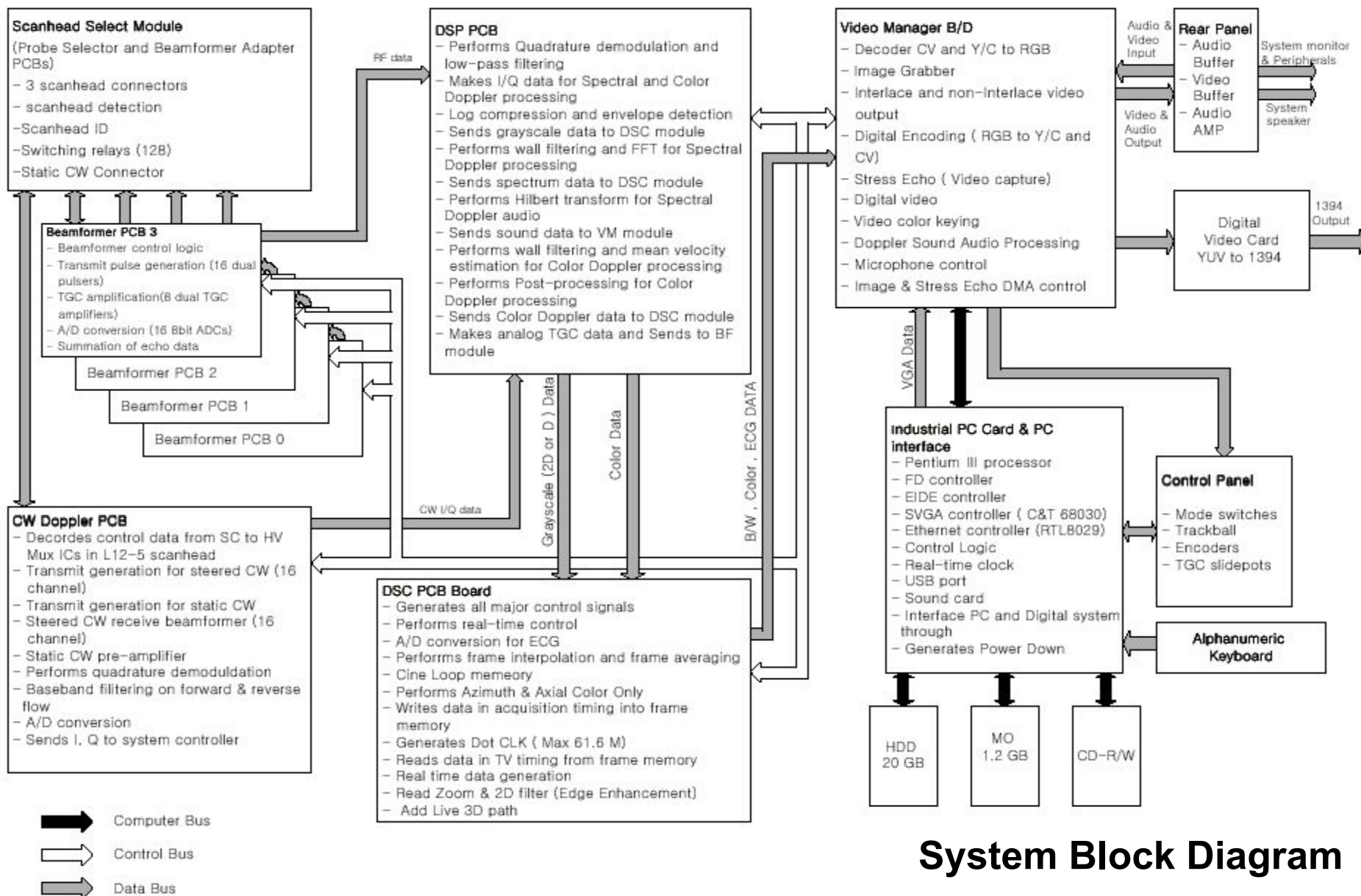
* MPT4-7 is not supplied.

1. GENERAL INFORMATION

Ultrasound workstation

1. Pentium III 700MHz
2. Hard drive: 80GBytes
3. RAM size: max.512MBytes
4. Windows 2000 Professional
5. 1.3 GBytes magneto-optical disc drive
6. CD-RW

1. GENERAL INFORMATION

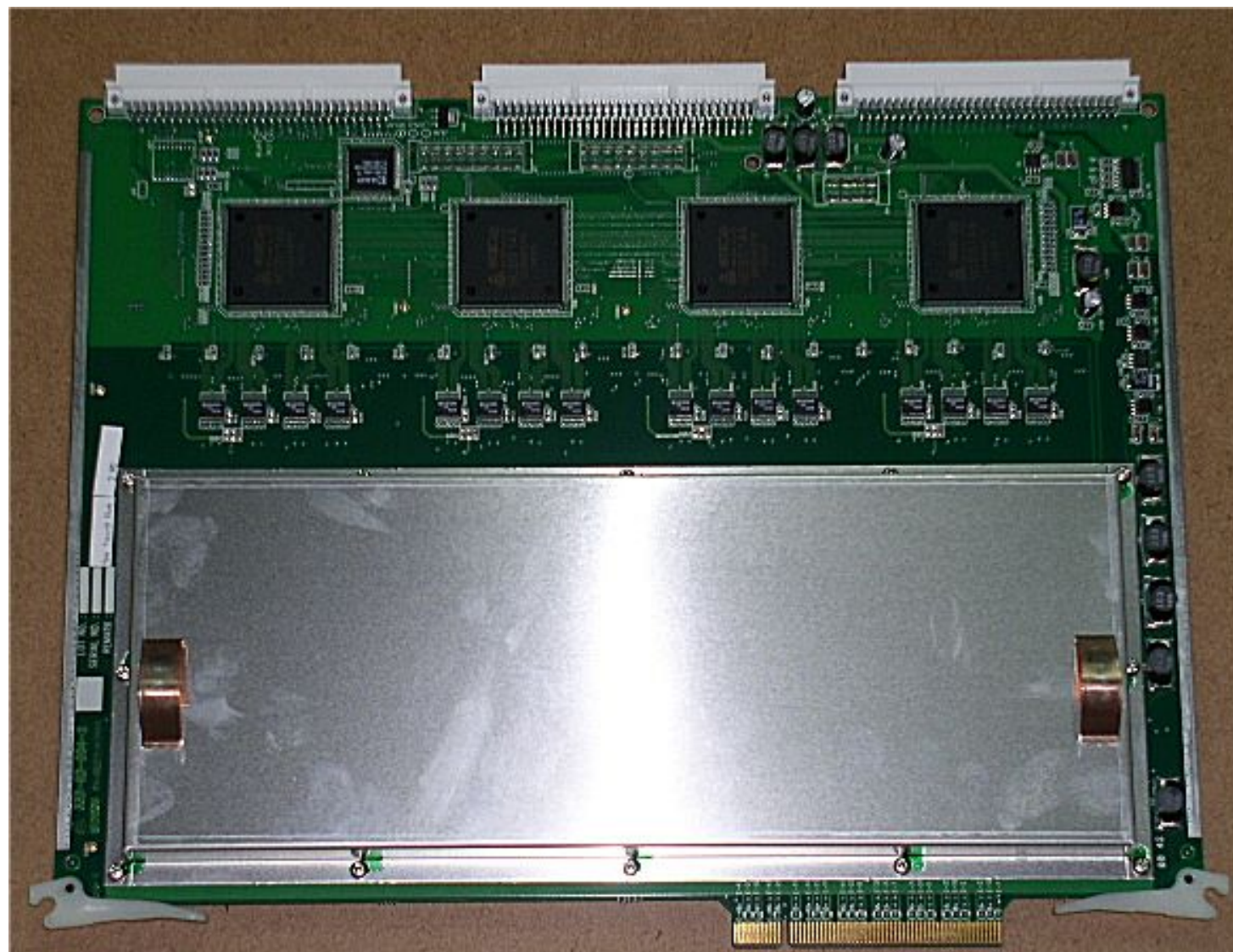


System Block Diagram

Beamforming Board

(BF B/D)

2. BF B/D



2. BF B/D

Board Specification

- 48 TX PULSER/Board
- 16 LIMITER/Board
- 16 TGC AMP/Board
- 16 A/D Converter/Board
- Synthetic Aperture support
- Trapezoidal Imaging support
- RX Dynamic Aperture function (Max. 64step)
- RX Apodization function (different curve support is available per Mode)
- Board version include in Board.
- Each BFIC function control is available
- Max. 4 of Multi-line receiving support

2. BF B/D

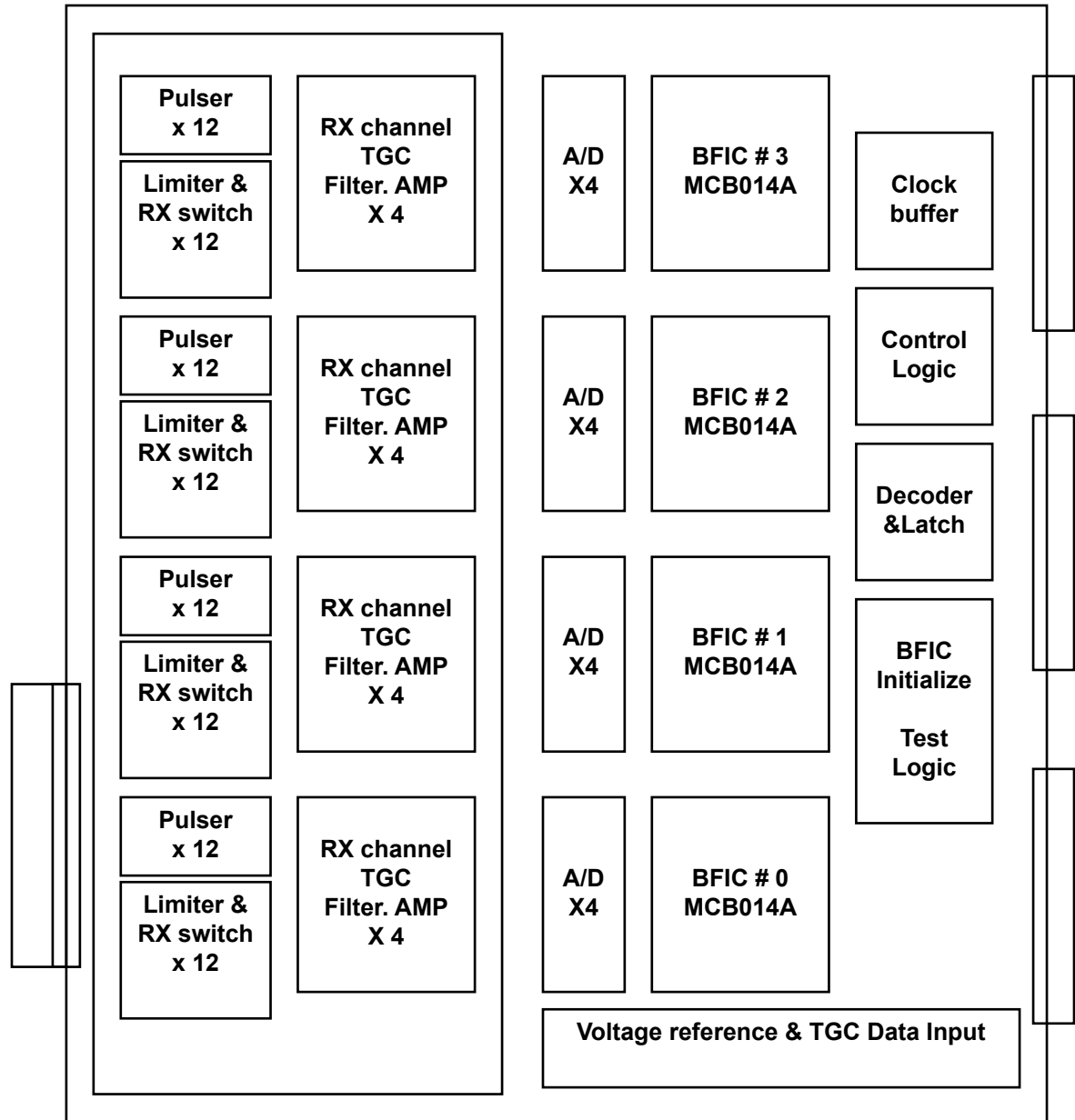
TX Pulse

1. MCB014A creates TX / RX switch select signals for each channel.
2. MCB014A gives Max. 12 signals to TX / RX each.
3. Max. 192 Element can control without additional circuit.

	No. of MCB014A per B/D	No. of TX Pulse per MCB014A
BEAMFORMER B/D # 0	4	$12 \times 4 = 48$
BEAMFORMER B/D # 1	4	$12 \times 4 = 48$
BEAMFORMER B/D # 2	4	$12 \times 4 = 48$
BEAMFORMER B/D # 3	4	$12 \times 4 = 48$

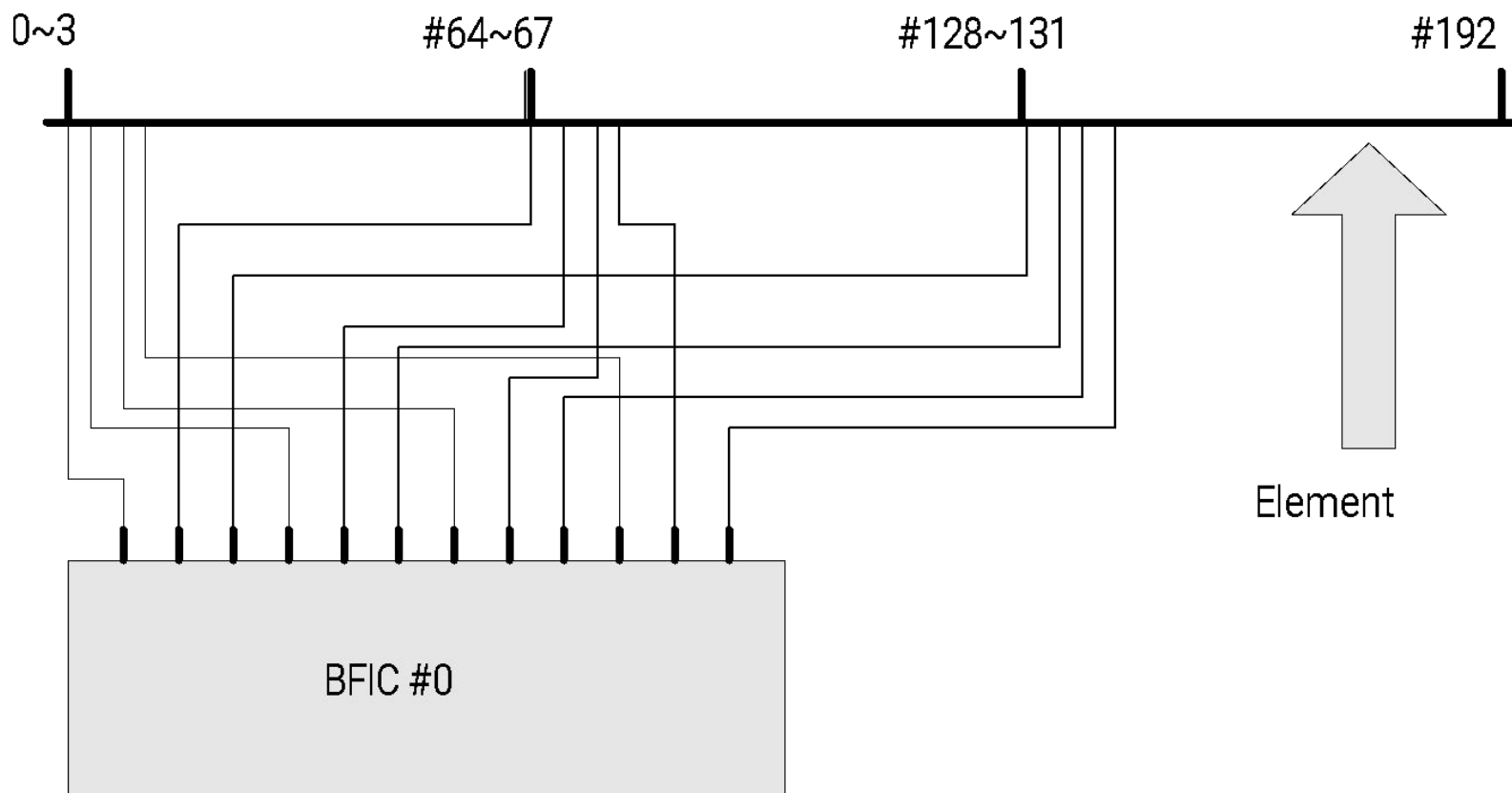
2. BF B/D

1. PROBE : 128/192 Elements
2. BFIC : 16 EA
3. Total CHANNEL : 64Ch (RX based)
4. 192 Element PROBE □ One BFIC will be connected to 12ea TX lines. (12 * 16 = 192)

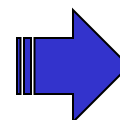


2. BF B/D

Connect between BFIC and 128ea Elements

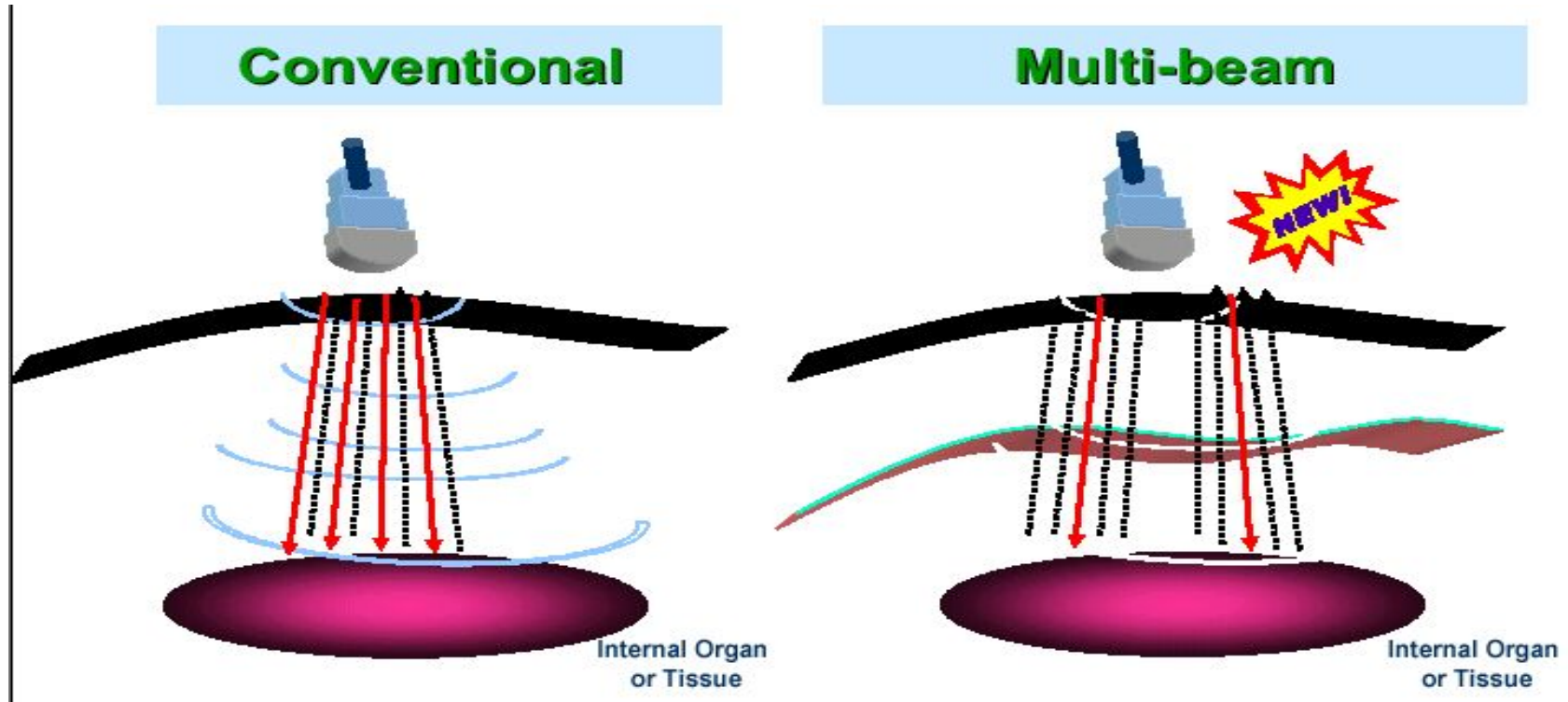


128 Probe □ BFIC 16 Chip * 8ea = 128 elements
 192 Probe □ BFIC 16 Chip * 12ea = 192 elements



Micro Processor

2. BF B/D



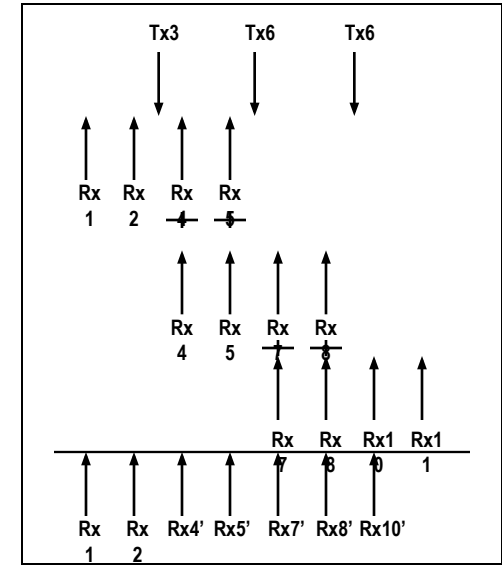
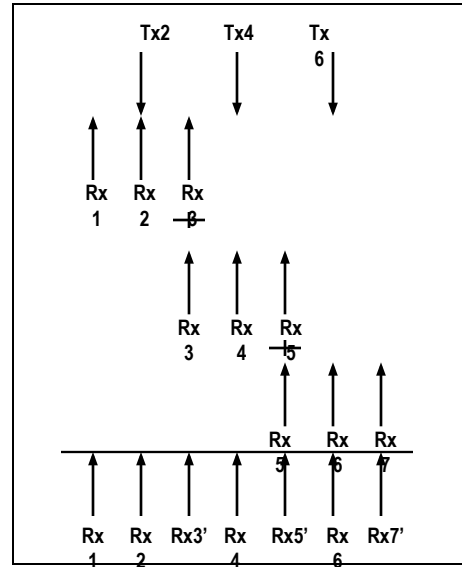
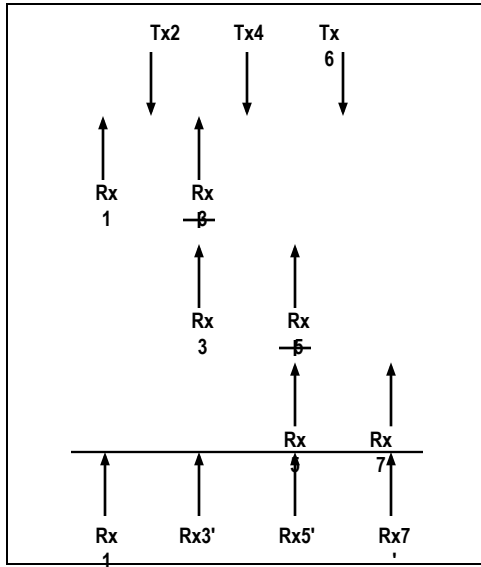
There are 2 way to realize Multi-line receiving function.

Dual Multi-line : One TX and 2 RX signal

Quad Multi-line : One TX and 4 RX signal

Much higher Frame Rate with acceptable resolution.

2. BF B/D



There are 2 way to realize Multi-line receiving function.

Dual Multi-line : One TX and 2 RX signal

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Much higher Frame Rate with acceptable resolution.

3. Service Issues & Tips

H/W 1.0 and H/W 2.0

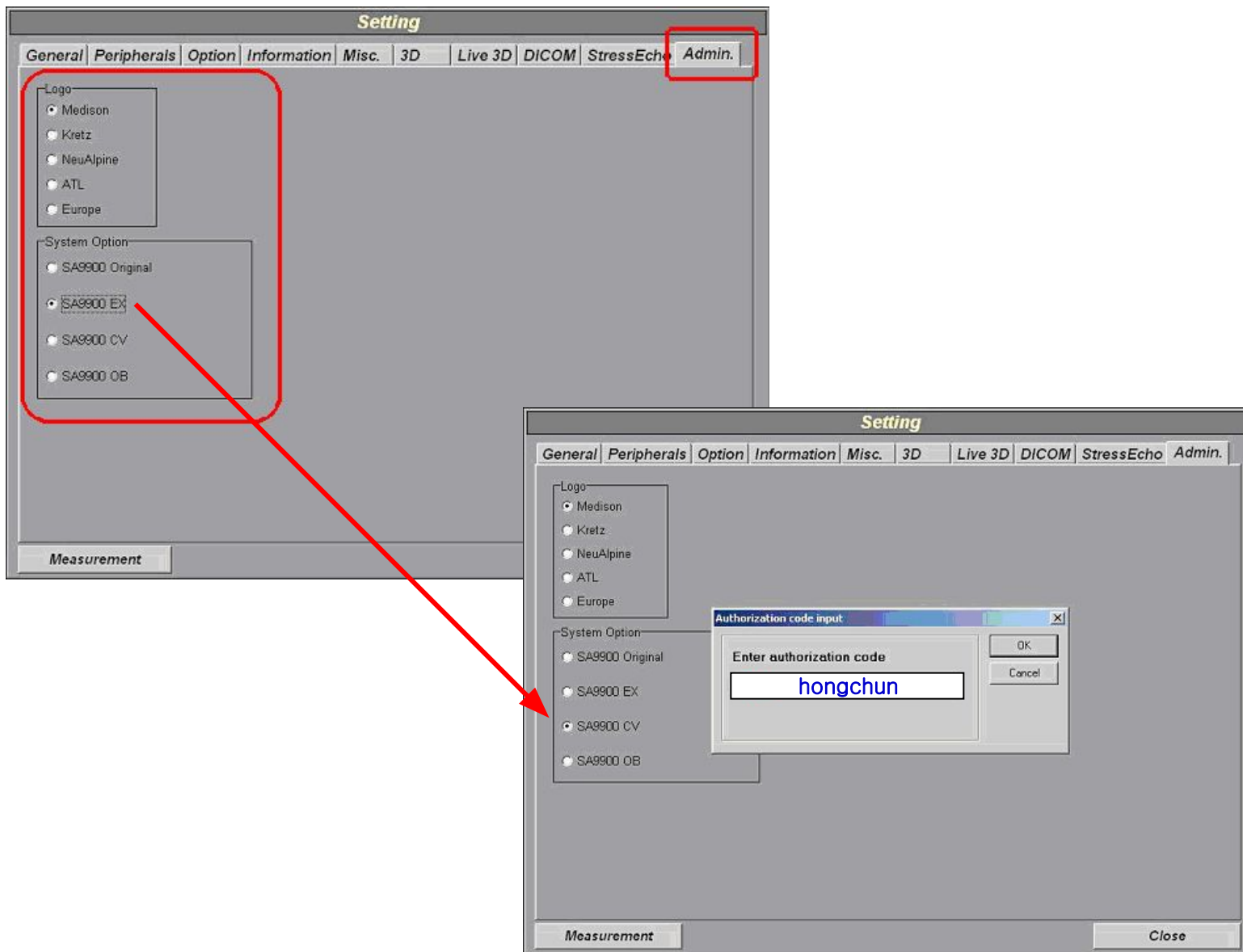
		H/W1.0	H/W2.0
B/D (Rev)	BD-332-DSC	~2A	3A~
	BD-332-DSP	~2A	2B(3A)~
	BD-332-VM	~1A	2A~
	AY-332-PC	~2A	2C~
	BD-MOTOR/CNG	~2C	2D~
Model		SA9900 Original	SA990EX/OB/CV
LIVE3D Option		X	O
S/W		1.xx.xx	2.xx.xx

3. Service Issues & Tips

Change SA9900 OB/CV/EX

- 1.Turn on the system.
- 2.Press “Ctrl key + d + hongchun” (you have to press Ctrl key and type “dhongchun”)
- 3.Press “SETUP” KEY on keyboard panel, and write all options password on the paper.
- 4.You can see “Admin” menu in SETUP mode. If you can’t see “Admin” menu, you have to try again as number (2).
- 5.Check “SA9900 CV or EX or OB” on System Option menu.
- 6.If you check “SA9900 CV or EX or OB”, you can see password windows.
- 7.Type “hongchun” in password windows.
- 8.Rebooting the system.
- 9.Check options.

3. Service Issues & Tips



3. Service Issues & Tips

SA9900 Options

Model	Option	Status
SA9900B	VOLUM3D	Standard
	FREEHAND3D	Standard
	PREMIUM3D	Standard
	CARDIAC	
	SONOVIEW	Standard
	DICOM	
	HARMONIC	Standard
	SONOUM	Standard
	STEFERED.CW	
	LIVE3D	Standard
	STRESSECHO	Impossible
	ECG	Impossible
	3D MOUSE	
SA9900CV	VOLUM3D	
	FREEHAND3D	
	PREMIUM3D	
	CARDIAC	Standard
	SONOVIEW	Standard
	HARMONIC	Standard
	STEFERED.CW	Standard
	DICOM	
	SONOUM	Standard
	LIVE3D	
	STRESSECHO	
	ECG	Standard
	3D MOUSE	
SA9900EX	VOLUM3D	Impossible
	FREEHAND3D	
	CARDIAC	Impossible
	SONOVIEW	Standard
	DICOM	
	HARMONIC	Standard
	STEFERED.CW	Impossible
	SONOUM	Standard
	LIVE3D	Impossible
	STRESSECHO	Impossible
ECG	Impossible	

3. Service Issues & Tips

Can't read CD-RW media at LG CD-RW drive.

LG CD-RW can not read specific brand CD-RW media after back-up in Sonoview □
You have to upgrade LG CD-RW firmware.

ftp://src_read:tkdnjs@goopy.medison.co.kr/download/Patch%20file/ETC/CD-RW%208401B.8402B/40x_firm.exe

[Upgrade method]

- ① Turn the system (Initial step)
- ② Get out to windows mode, and close all programs include main.
- ③ Copy firmware s/w program from CD to HDD, and extract it.
- ⑤ Take out CD from CD-RW drive, and check your CD-RW model.
- ⑥ Check your CD-RW, because if there is CD inside of CD-RW, it will make serious problem.
- ⑦ Click Up-Grade file.
- ⑧ After finish Up-Grade, turn off system, and reboot.

3. Service Issues & Tips

SA9900 Sonoview file size

It is different by 2D image and 3D image.

1. 2D saved image

- B/W : approximately 300KB / COLOR : approximately 900KB

2. 3D saved image

- It is different by ROI BOX size. Approximately 10MB.

3. 3D CINE

- Not fix.

3. Service Issues & Tips

VCR remote control

Only can use Panasonic MD830.

Because, this model has RS232C port.

You can use VCR remote control function by RS232C port.

[Setup] [Peripherals] Tab [Serial port] menu

You have to check "Com1 Panasonic MD 830" item.

It is impossible to use Sony SVO9500 MDP PAL with SA9900.

3. Service Issues & Tips

SA9900 Cine saving method

1. Press “Freeze” key, and press number [6] of Hotkey.



3. Service Issues & Tips

SA9900 Cine saving method

2. You can see Saving bar as like below picture.



3. Service Issues & Tips

SA9900 Cine saving method

3. Press [Sonoview] key, and you can see saved cine file.
Select your saved cine file, and press [Export] key.

The screenshot displays the 'Exam List' window. At the top, it shows 'Total Exams: 74', 'Exams Selected: 1', and 'Images Selected: 1 (13.49MB)'. Below this is a table of exam records with columns for ID, Name, Age, Gen..., Exam Date, Images, and Description. The first row is selected (ID 555). At the bottom, there are buttons for Review, Delete, Send, Print, Export, Backup, and Close.

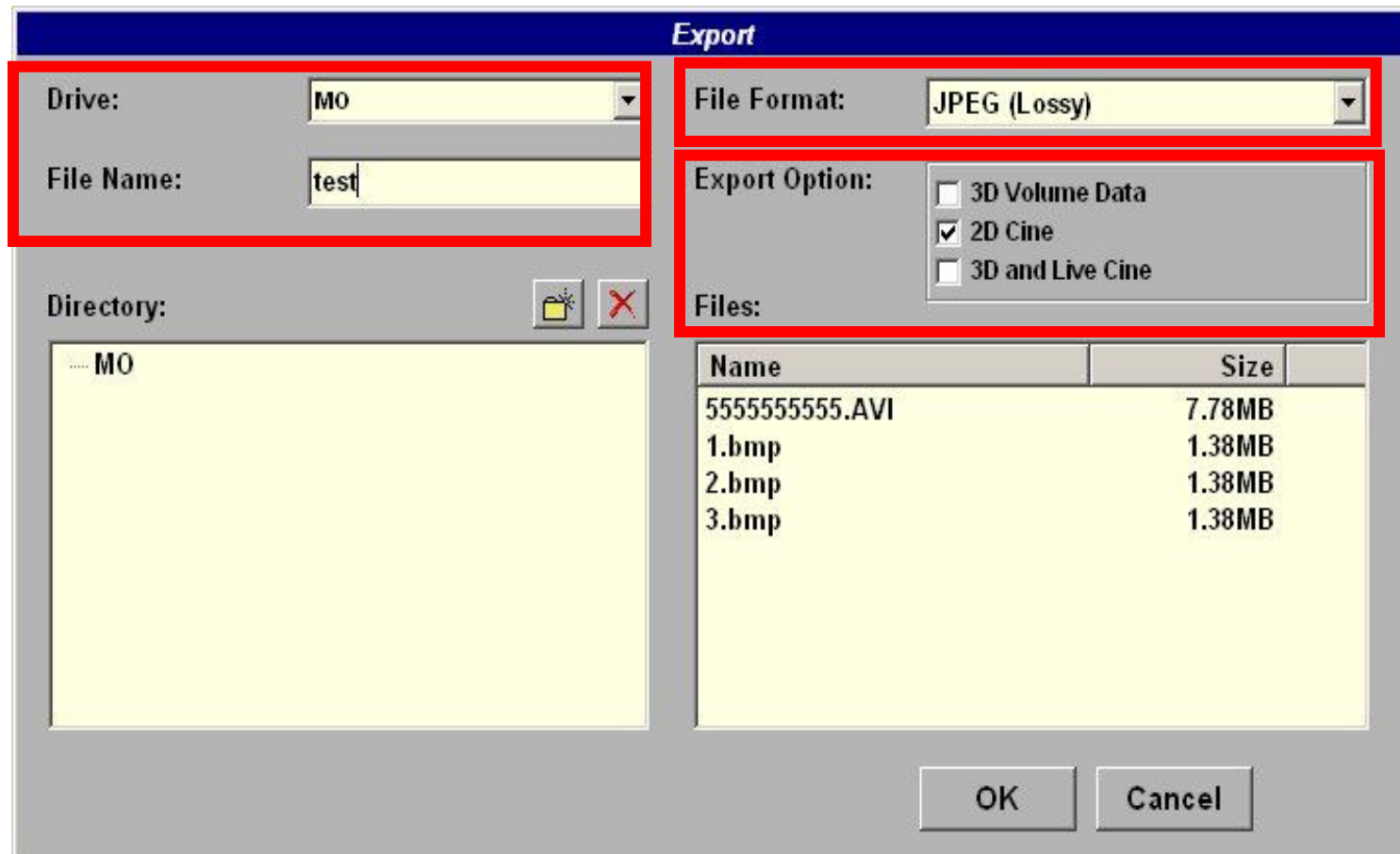
ID	Name	Age	Gen...	Exam Date	Images	Description
555	555		0	2004/04/28	1	
22222	222		0	2004/04/28	1	
54			0	2004/04/27	2	
yuiu			0	2004/04/26	9	
9876			0	2004/04/20	4	
vocal 1			0	2004/04/16	1	
test			0	2004/04/16	1	
heejung2	dr-100		0	2004/04/13	2	
heejung	dr_50		0	2004/04/13	4	
hanjoon	CD		0	2004/04/13	4	
heejung3	dr-150		0	2004/04/13	2	
HOMEWORK_DR_15/DR_150			0	2004/04/12	1	
HOMEWORK_DR_10/DR_100			0	2004/04/12	1	
HOMEWORK_DR_50 DR_50			0	2004/04/12	1	
P2.5AC			0	2004/03/31	2	
CV			0	2004/03/29	3	

3. Service Issues & Tips

SA9900 Cine saving method

4. Save this file in your MO diskette.

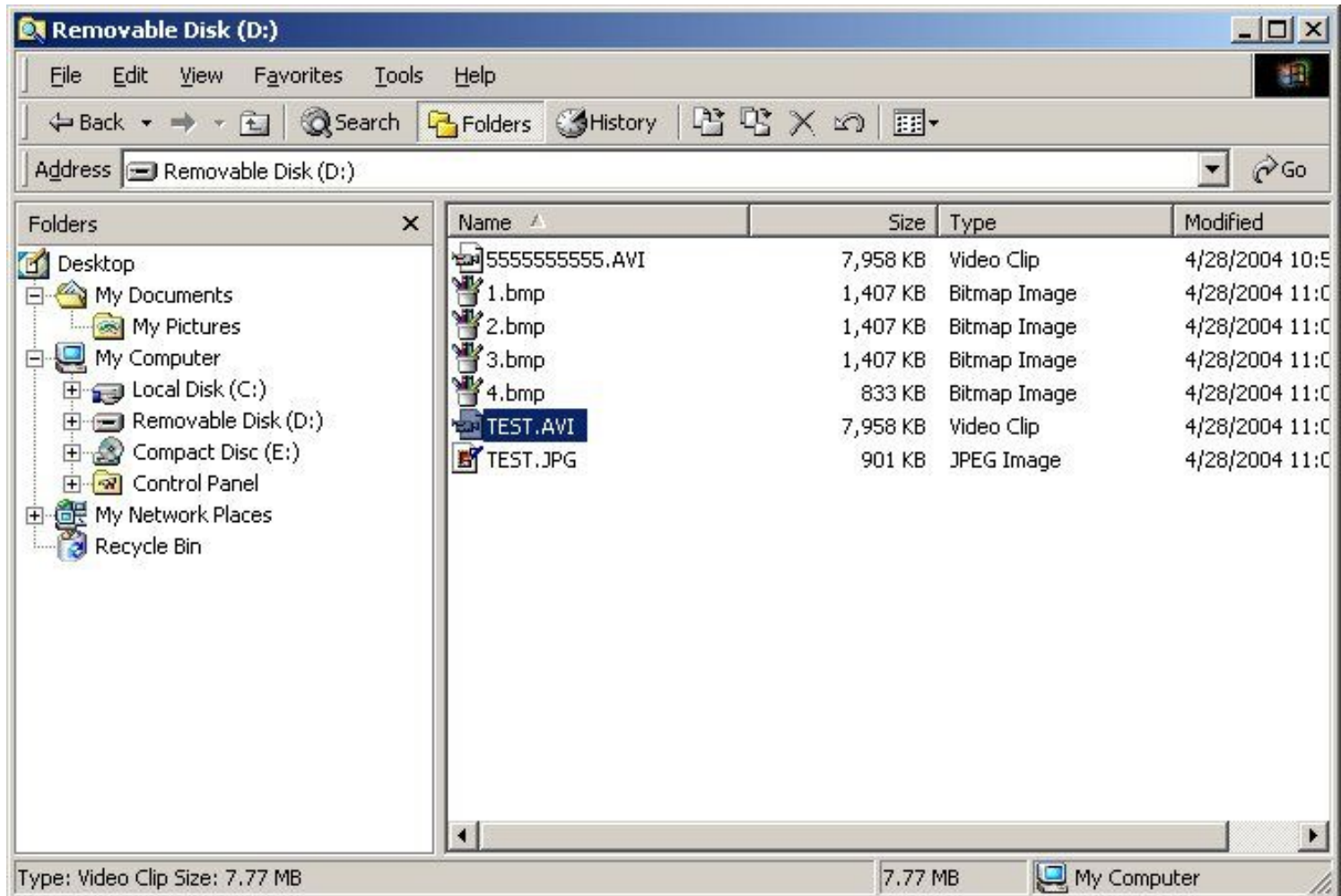
Set File Format to “JPEG(Lossy)” and Select [2D Cine] item of Export Option, and press [OK] button.



3. Service Issues & Tips

SA9900 Cine saving method

5. You can see saved cine file (avi file format) in your MO diskette.



3. Service Issues & Tips

SA9900 Cine saving method

6. See cine image by windows Media Player



4. Trouble Shooting

1. B/C/D Doppler Noise : Beep sounds in strong Echo point or unfocused area

- Change the Power Revision 08 to 09

2. 2-5EL Probe Color Noise : in C-mode, vertical color noise when set the color filter to F3

- Change the B/F Board Revision 3B to 3C

3. V4-7 Probe Color Noise : in C-mode, 4~5Khz PRF color noise occurs

- Change the B/F Board Revision 3B to 3C

4. Trouble Shooting

Error message

(1) Get out to 2D mode when use 3D mode with VAW4-7 probe. (It is only SA9900 Live model)

(2) Appear "Error code 1"

Change Motor B/D to new revision.

Part No	Before Version	After Version
AY- 332- MOTOR/CNG	3A / 3B	3C

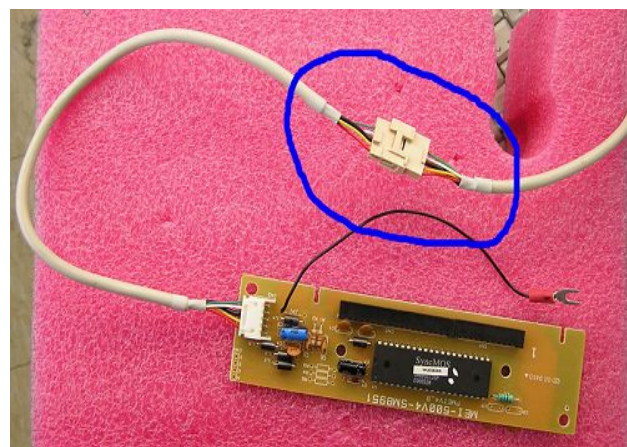
4. Trouble Shooting

System hang-up in patient ID input menu.

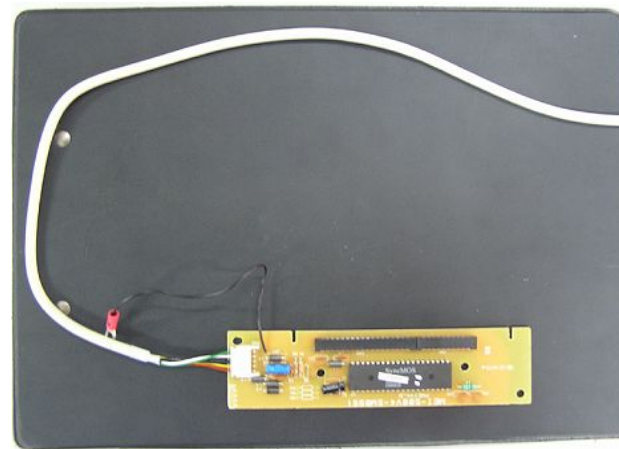
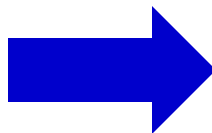
When you press patient ID button, the Alphanumeric keyboard is not working and system hang-up.

- Change keyboard Lamp invert board and Keyboard cable.

	Before	After
Invert B/D	256- Z- 003A	256- Z- 004A
Keyboard cable	CBL- 332- N/KB	CBL- 332- N/KB- 2



Old cable



New cable

4. Trouble Shooting

Stop Booting bar 78%, and appear below error message.

- **CHECK DSC READY ERROR , ERROR=2054**
- It is problem by DSC ADSP handshaking. So, it is DSC board problem.

4. Trouble Shooting

Appear below error message during booting, and hang-up system.

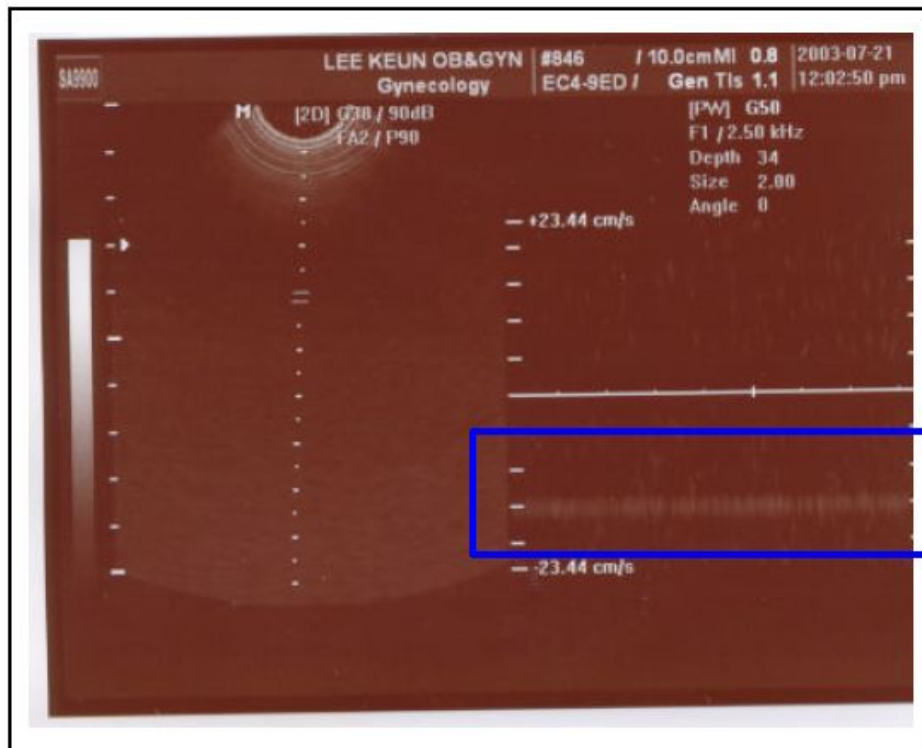
Failed to init Keypanel

- It can suspect two problems.
- One is Keypanel problem. In this case you have to change **Key I/F** board.
- The other is S/W problem. In this case, you have to use **ghost CD**.

4. Trouble Shooting

Appear Noise in Doppler mode when using PB-EC4-9/10ED

- This problem appear only the third probe port



Change CW board



Model	Part No	Before Ver	After Ver
SA9900OB, CV	BD-332-C/W	2C	2D
SA9900EX	BD-332C-CW	2B	2C

4. Trouble Shooting

Problem Part	Defective Symptom
CW	Sometimes error code 39 appears while cold start
CW	Don't stop motor of 3D Probe
CW	"No measure calculation package setting in probe:12, application: 0". And then c;\mainsys\data\set00\probe12\prob_p12.pd0 file net exist".

Problem Part	Defective Symptom
PSA	Only left probe connector works . If you connect probe at middle or right connector probe don't work
PSA	The system makes an image that looks like a probe with broken elements .

Problem Part	Defective Symptom
K/I	System hands up after 4-5 hours working
K/I	Alphanumeric keyboard don't work

Problem Part	Defective Symptom
KM	Trackball don't work well
KM	Don't work user buttons

4. Trouble Shooting

Problem Part	Defective Symptom
BF	Vertical lines in B and C modes when 3D probe selected.
BF	Colored spots on middle image with color doppler.
BF	Radial line on U/S image
BF	No image in the sector area.
BF	Dark zone in 2D mode
BF	Missing scan lines and Color Doppler distorsion.
BF	Image in the pie is distorted
BF	Appear white stripes in image.
BF	Missing of scan line.

Problem Part	Defective Symptom
DSC	When trying to boot system Error Code 29 shows on the screen and system stops booting
DSC	After 1 hour of examinations, B-image disappears.
DSC	White noise in spectral doppler image. completely distorted doppler sound. 2D image is O.K.
DSC	Sometimes after cold start there is no video synchronization. Once error code 39 was shown.
DSC	Errorcode 30 , machine doesn't boot
DSC	Cannot see the image clearly. The left hand side of echo image is very bright. The middle of echo image is blur. The right side of the echo image is dark in color.
DSC	Broken Cine image

4. Trouble Shooting

Problem Part	Defective Symptom
DSP	Spot on the image.
DSP	No doppler spectrum
DSP	No doppler sound
DSP	Appear error code 32
DSP	Error code " 67 " display when the program loading around 52%.
DSP	Sometimes the PW signal disappear and there is a lot of noise in the color mode.
DSP	Horizontal black lines on the image area.
DSP	Temporally stripes in screen
DSP	Error Code "35"
DSP	Upon initialization, when 36% is reached, the following message appear: c:\Main Sys\Data\set0\common\X2M-post.hd3 File not exist System Error "Please powerdown system& reboot " Error Code :0
DSP	Color noise.

4. Trouble Shooting

Problem Part	Defective Symptom
PC	Don't identify HDD.
PC	System doesn't start. Only Self test on the monitor.
PC	Hangs up after long time of running. After hanging, there is no reaction on any button pressing.
PC	When you get in BIOS System is stopped.
PC	System hangs up. This frozen is only in 3D-mode after starting of 3D-aquisition by 93% of whole process. Always by this 93%. If the machine have 40 minutes pause in the day, than this frozen are not too often.

Problem Part	Defective Symptom
MOTOR	Error message " error 85" with 3D probe.
MOTOR	The system gets out to 2D mode from 3D mode.
MOTOR	Not operating Live 3D

4. Trouble Shooting

Problem Part	Defective Symptom
V/M	No image in B mode.
V/M	No VGA In/Output. Can't use VCR or Printer
V/M	"System error,Please shut down and reboot, Error Code 31" during boot, system does not start
V/M	Broken video-out signal format and image on video-printer
V/M	No images shows when you review them in sonoview. Only grey and black squares.
V/M	Upon initialization, when 36%is reached, the following message appear: c:\ Main Sys \Data \set0 \common \X2M-post.hd3 File not exist System Error "Please powerdown system & reboot " Error Code :0
V/M	Character's color is changed red.
V/M	The color of echo Image is pink when you use sonoview
V/M	No booting, and display error information:please powerdown system and reboot(error code:54)