

SKYWORTH®

SERVICE MANUAL

COLOUR TELEVISION PAL/SECAM BG/DK /NTSC PLAYBACK

CHASSIS : 3N10, 4N10

**MODEL : 1418, 1498, 1422,
2122,**

2199, 21F1, L21, D21

CHASSIS : 5N10

**MODEL: 2522, 2588, 25F1, 2998,
2922**

**2929, 29F1, 3423, 3498, 3898,
L25, D25, L29, D29, L34, D34**

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CAUTION

Before servicing the chassis, read the "X-Ray Radiation Precaution", "Safety Precaution" and "Product Safety Notice" on page 2 of this manual.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-Ray Radiation. To avoid such hazards, the high voltage must not be above the specified limit. The normal value of the high voltage of this receiver is 24KV at zero beam current (minimum brightness) under 220V AC power source. The high voltage must not, under any circumstances, exceed 29KV.
2. Each time a receiver requires servicing, the high voltage should be checked following the High Voltage Check procedure in this manual. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
3. The primary source of X-Ray Radiation in this TV Receiver is the picture tube. For continued X-Ray Radiation protection, the replacement tube must be exactly the same type tube as specified in the part list.
4. Some parts in this receiver have special safety – related characteristics for X-Ray Radiation protection. For continued safety, parts replacement should be undertaken only after referring to the Product Safety Notice.

SAFETY PRECAUTION

Warning: Service should not be attempted by anyone unfamiliar with necessary precaution on this receiver. The following are the necessary precautions observed before servicing this chassis.

1. Since the power supply circuit of this receiver is directly connected to the AC power line, an isolation transformer should be used during any dynamic service to avoid possible shock hazard.
2. Always discharge the picture tube anode to the CRT conductive coating before handling the picture tube. The picture tube is highly evacuated and if broken, glass fragment will be violently expelled. Use shatter proof goggles and keep picture tube away from the unprotected body while handling.
3. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as: non-metallic control knobs, insulating covers, shields, isolation resistor-capacitor network etc.
4. When replacing parts or circuit boards, disconnect the power cord.
5. When replacing a high wattage resistor (Metal oxide film resistor) on circuit board, keep the resistor 10mm (1/2in.) away from circuit board.
6. Connection wires must be kept away from components with high voltage or high temperature.
7. If any fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis part list.
8. The receiver is designed to operate with 220V(50/60Hz) AC mains.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-Ray Radiation protection afforded by them cannot necessarily be obtained by using replacement components rated for high wattage, etc. Replaced parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are shaded on the schematic diagram and the part list.

Before replacing any of these components, read the part list in this manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics, as specified in the part list may create shock, fire, and X-Ray Radiation or other hazards.

CHASSIS ADJUSTMENT

1. B+ voltage adjustment (For 3N and 4N chassis only)
 - 1-1 Connect 220V AC 50Hz to CN601 and switch on power switch SW601;
 - 1-2 Test the voltage with digital voltage meter between two terminals of C625;
 - 1-3 Adjust VR601 to obtain +110V \pm 0.5V reading on the digital voltage meter.

Note: The 5N chassis is auto B+ voltage by SE130 or SE140 used.
2. NTSC system absorbing adjustment
 - 2-1 Set sweep generator marker to 31.5MHz, 33.5MHz, 34.42MHz, 37MHz, 38MHz and 40.5MHz;
 - 2-2 Apply 80dBuV sweep signal to tuner IF terminal;
 - 2-3 Display demodulation probe connects to pre-I.F AMP input terminal, via. Q101 'b' pole;
 - 2-4 Set Q103 'c' pole and 'e' pole short circuit, adjust L104, and make the attenuation most at 33.5MHz.
3. Memory partial initializing
 - 3-1 Go to the function set menu (there are two ways;)
 - a. Press CH+(PROG+) key and CH-(PROG-) key on the control board at the same time and switch on power switch, then go to the function set menu.
 - b. After TV is on, press "factory" key (See Note 1) twin then go to the function set menu.
 - 3-2 Press 'PM' key and 'SM' key on the control board at the same time until the picture changes slightly (jumpiness or twinkling at one blow), this means the memory having been partial initialized. Operate repeatedly if the picture has no change.

All of the TV set must be partial memory initialized before exfactory or after change of the Chroma IC NN5198 / NN5199 or fully memory initialized after change of the EEPROM 24C04 (Note 4).
4. search and storage

COMPLETE MACHINE GENERAL ADJUSTMENT

1. Screen Voltage Adjustment.
 - 1-1 Press 'screen' key (See Note 1);
 - 1-2 Adjust the screen knob of FBT to get a horizontal faintness beam line;
 - 1-3 Press 'screen' key again or 'stand by' key to go to the normal work status;
2. Focus Voltage Adjustment.
 - 2-1 Receive monoscope pattern. Set picture mode standard status;
 - 2-2 Adjust the focus knob of FBT to get the clearest picture.
3. horizontal center adjustment
 - 3-1 Receive monoscope pattern;
 - 3-2 Press 'factory' key (See Note 1)one time and go to system parameter adjustment menu;
 - 3-3 Press 'MENU' key, go to horizontal and vertical parameter adjustment menu;
 - 3-4 Select 'H POSITION" by pressing 'PROG+' key and 'PROG-' key. Press 'VOL+' key and 'VOL-' key to obtain the horizontal center of the pattern at the center of CRT screen.

- 3-5 Exit system parameter adjustment menu by pressing 'factory' key twin.
4. PAL system vertical pincushion adjustment
 - 4-1 Receive PAL system cross hatch pattern signal;
 - 4-2 Press 'factory' key one time, go to system parameter adjustment menu;
 - 4-3 Press 'MENU' key, go to horizontal and vertical parameter adjustment menu;
 - 4-4 Select 'V LINE' and 'V SCURVE' by pressing 'PROG+' key and 'PROG-' key; press 'VOL+' key and 'VOL-' key and adjust corresponding parameter to obtain picture's vertical pin cushion a good status.

 5. PAL system vertical size and vertical center adjustment
 - 5-1 Continue operation 3. Select 'V HEIGHT' and 'V POSITION', press 'VOL+' key and 'VOL-' key adjust corresponding parameter to obtain picture's vertical size and vertical center adjustment a good status.
 - 5-2 Exit system parameter adjustment menu by pressing 'factory' key twin.

 6. White Balance adjustment

For Factory Auto Computer adjustment

 - 6-1 Receive white balance test signal;
 - 6-2 Set picture "MILD" mode.
 - 6-3 Insert the special plug into CN002, press adjustment key which belongs to white balance adjustment equipment and go to auto white balance adjustment;
 - 6-4 After adjustment well, remove the pug.

For Factory Auto Computer adjustment

 - 6-5 Press 'factory' key one time and go to system parameter adjustment menu;
 - 6-5 Press 'MENU' key once then go to the White Balance adjustment menu;
 - 6-6 Press 'Prog +' key and 'Prog -' key to select the R, G, B cutoff and R, B Driver.
 - 6-7 Press 'VOL+' key and 'VOL-' key to change. Or using the below direct key
 - 6-8 Key: **0** for SUB-BRIGHT, **1** for CUTOFF-R, **2** for CUTOFF-G,
3 for CUTOFF-B, **4** for DRIVER-R, **5** for DRIVER-B
 Recall for toggle the SubBright adjustment (Min. contrast, some CPU version is not work)

 7. Sub-bright adjustment
 - 7-1 Receive PHILIPS signal;
 - 7-2 Set picture "Mild" mode.
 - 7-3 Press 'factory' key one time and go to system parameter adjustment menu;
 - 7-4 Press digital key '0', select 'SUB-BRIGHT';
 - 7-5 Press 'VOL+' key and 'VOL-' key until Grey scale signal can be secerned;
 - 7-6 Exit system parameter adjustment menu by pressing 'factory' key twin.

 8. RF AGC adjustment
 - 8-1 Receive 60dBuV monoscope pattern;
 - 8-2 Press 'factory' key one time and go to system parameter adjustment menu;
 - 8-3 Press 'PROG+' key and 'PROG-' key , select ' RF AGC ';
 - 8-4 Press 'VOL+' key and 'VOL-' key to change the value of 'RF AGC' until picture's noise disturbing disappears just;

8-5 Exit system parameter adjustment menu by pressing 'factory' key twin.

9. NTSC system horizontal and vertical adjustment

Receive NTSC system cross hatch pattern. Adjustment's way is same as PAL system's.

10. warm up mode

10-1 Switch on power switch and Press 'factory' key one time; switch off power switch and switch on power switch again, at this time there is no signal white raster and won't switch off automatically. TV receiver can be sent to warm up line.

10-2 Before exit warm up line, press 'factory' key three times continue, at this time exit warm up mode , there is no signal and will appear LOGO pattern.

NOTES:

1. Connect the remote IC PIN7 and PIN16 through a jiggle switch on the USER remote handset , this switch is defined as "screen" key; Connect the remote IC PIN8 and PIN16 through a jiggle switch on the USER remote handset , this switch is defined as "factory" key,
2. On the product line's alignment service we must use special memorizer that has been well written data.
3. If having no special memorizer that has been well written data when servicing out of factory, we can use blank new EEPROM. EEPROM will be automatically totally initialized after main power switch is on. Most parameters are free-alignment after initialized; only need adjust the several parameters of function set parameter and system parameter adjustment menu.
4. If no blank new EEPROM or no special memorizer that has been well written data, we can use memorizer that has been written data instead, but must be totally initialized; the operation is as following:
 1. After TV is on, press "factory" key twin then go to the function set menu;
 2. Press 'AV/TV' key and 'MENU' key on the control board at the same time until the picture changes slightly (jumpiness or twinkling at one blow); this means the memory having been totally initialized. Operate repeatedly if the picture has no change;
 3. Switch off and exit;
 4. After initialized, adjust the several parameters of function set parameter and system parameter adjustment menu.
5. the parameters of function set parameter and system parameter adjustment menu **mustn't** be adjusted;
 1. system parameter adjustment menu (This is coming from the NN5198/ NN5199)
 - AFT
 - VIF VCO
 - H VCO
 - VIFDET NEG
 - VIFDET INT
 - VIFDET EXT
 2. the ninth digital and the tenth digital of function set parameter
 - These parameters must be IC interior values. If the above parameters have been changed, we must partially initialize the EEPROM.

6. two different initializing

1. fully initialize: initialize the EEPROM's most work data and preset default value. Including: work parameter of NN5199, horizontal and vertical parameter, OPTION parameter (via. function set parameter), picture mode parameter, volume mode parameter and white balance parameter.
2. partially initialize: only initialize work parameter of NN5199 and the ninth digital and the tenth digital of function set parameter(via. ISUD0, ISUD1,ISUD3,ISUD4,ISUD5),preset as interior values.

7. If use 21" Pure Flat tube , must adjust horizontal size and pincushion distortion as following:

1. Receive monoscope pattern; Adjust VR902 until overscan ratio (scanning size)to 92% to 96%
2. Receive cross hatch pattern signal; Adjust VR901 until the pinchusion of the CRT two sides are most straight.

8. If use 25" or above Pure Flat tube , must adjust horizontal size and pincushion distortion as following:

1. Receive 60dBuV PAL system monoscope pattern;
2. Press 'factory' key one time and go to system parameter adjustment menu;
3. Press 'MENU' key and select ' Position Menu ' as below
V POSITION for adjust vertical position 00 to 07
H POSITION for adjust Horizontal position 00 to 1F
V EHT for adjust vertical shape 00 to 0F
H EHT for adjust Horizontal shape 00 to 0F
4. Press 'MENU' key and select ' geometry Menu ' as below;
V-AMP for adjust vertical size 00 to 7F .
V_LINE for adjust vertical linearity 00 to 3F.
V_SC3 for adjust vertical S-correction X³ 00 to 3F.
H-AMP for adjust Horizontal size 00 to 3F.
EW-PARA for adjust Pincushion 00 to 3F.
EW-COR for adjust Pincushion corner 00 to 0F.
TRAPEZ for adjust trapezium 00 to 3F.
V_SC5 for adjust vertical S-correction X⁵ 00 to 0F.
5. Receive 60dBuV NTSC system monoscope pattern;
5.1 Repeat the above step 7.2 to 7.4.
6. Exit system parameter adjustment menu by pressing 'factory' key twin.

9. Option Code

1. Press 'factory' key twin and go to Option Code Menu

1	2	3	4	5	6	7	8	9	A
1	3	7	1	4	0	4	6	*	*

The first digit 8 Digit is set by Factory. The last two digit "9" and "A" is the random data from NN5198/NN5199.

Option digit 1:

Binary	Dec	Function	Default
000	0	SECAM L OFF, SECAM OFF, NTSC OFF	Default 7
001	1	SECAM L OFF, SECAM OFF, NTSC ON	

010	2	SECAM L OFF, SECAM ON, NTSC OFF	
011	3	SECAM L OFF, SECAM ON, NTSC ON	
100	4	SECAM L ON, SECAM OFF, NTSC OFF	
101	5	SECAM L ON, SECAM OFF, NTSC ON	
110	6	SECAM L ON, SECAM ON, NTSC OFF	
111	7	SECAM L ON, SECAM ON, NTSC ON	

Option digit 2:

Binary	Dec	Function	Default
000	0	RGB Beam limit ON, Woofer OFF, Sharp increase at 3MHz	Default 3
001	1	RGB Beam limit ON, Woofer OFF, Sharp increase at 4MHz	
010	2	RGB Beam limit ON, Woofer ON, Sharp increase at 3MHz	
011	3	RGB Beam limit ON, Woofer ON, Sharp increase at 4MHz	
100	4	RGB Beam limit OFF, Woofer OFF, Sharp increase at 3MHz	
101	5	RGB Beam limit OFF, Woofer OFF, Sharp increase at 4MHz	
110	6	RGB Beam limit OFF, Woofer ON, Sharp increase at 3MHz	
111	7	RGB Beam limit OFF, Woofer ON, Sharp increase at 4MHz	

Option digit 3:

Binary	Dec	Function	Default
000	0	System BG OFF, System I OFF, System M OFF.	Default 7
001	1	System BG OFF, System I OFF, System M ON.	
010	2	System BG OFF, System I ON, System M OFF.	
011	3	System BG OFF, System I ON, System M ON.	
100	4	System BG ON, System I OFF, System M OFF.	
101	5	System BG ON, System I OFF, System M ON.	
110	6	System BG ON, System I ON, System M OFF.	
111	7	System BG ON, System I ON, System M ON.	

Option digit 4:

Binary	Dec	Function	Default
000	0	Only AV1	No Default
001	1	AV1 + AV2	
010	2	Only AV1	
011	3	AV1 + AV2 + AV3	
100	4	AV1 + S-VHS	
101	5	AV1 + AV2 + S-VHS	
110	6	AV1 + S-VHS	
111	7	AV1 + AV2 + AV3 + S-VHS	

Option digit 5:

Binary	Dec	Function	Default
000	0	R/B gain =0.56, GAMMA ON , SKYWORTH game OFF	Default 4
001	1	R/B gain =0.56, GAMMA ON , SKYWORTH game ON	
010	2	R/B gain =0.56, GAMMA OFF , SKYWORTH game OFF	
011	3	R/B gain =0.56, GAMMA OFF , SKYWORTH game ON	
100	4	R/B gain =0.83, GAMMA ON , SKYWORTH game OFF	
101	5	R/B gain =0.83, GAMMA ON , SKYWORTH game ON	
110	6	R/B gain =0.83, GAMMA OFF , SKYWORTH game OFF	
111	7	R/B gain =0.83, GAMMA OFF , SKYWORTH game ON	

Option digit 6:

Binary	Dec	Function	Default
000	0	PIF = 38.0MHz , No Signal Auto OFF, Normal gain Tuner	Default 0
001	1	PIF = 38.0MHz , No Signal Auto OFF, High gain Tuner	
010	2	PIF = 38.0MHz , No Signal no Auto OFF, Normal gain Tuner	
011	3	PIF = 38.0MHz , No Signal no Auto OFF, High gain Tuner	
100	4	PIF = 38.9MHz , No Signal Auto OFF, Normal gain Tuner	
101	5	PIF = 38.9MHz , No Signal Auto OFF, High gain Tuner	
110	6	PIF = 38.9MHz , No Signal no Auto OFF, Normal gain Tuner	
111	7	PIF = 38.9MHz , No Signal no Auto OFF, High gain Tuner	

Option digit 7:

Binary	Dec	Function	Default
000	0	External SIF, QSS ON, Menu line ON	Default 4
001	1	External SIF, QSS ON, Menu line OFF	
010	2	External SIF, QSS OFF, Menu line ON	
011	3	External SIF, QSS OFF, Menu line OFF	
100	4	Internal SIF, QSS ON, Menu line ON	
101	5	Internal SIF, QSS ON, Menu line OFF	
110	6	Internal SIF, QSS OFF, Menu line ON	
111	7	Internal SIF, QSS OFF, Menu line OFF	

Option digit 8:

Binary	Dec	Function	Default
000	0	SKYWORTH picture OFF, No Blue Background, English OSD only	Default 0
001	1	SKYWORTH picture OFF, No Blue Background, English / Chinese OSD	
010	2	SKYWORTH picture ON, English OSD only	
011	3	SKYWORTH picture ON, English / Chinese OSD	
100	4	SKYWORTH picture OFF, No Blue Background, English OSD only	
101	5	SKYWORTH picture OFF, No Blue Background, English / Chinese OSD	
110	6	Customer LOGO ON or Blue Background, English OSD only	
111	7	Customer LOGO ON or Blue Background, English / Chinese OSD	

9. Customer LOGO

The TV set art allow to display the Customer LOGO from 1 to 9 digit Character during Power on or No signal. There is two method to set the Customer LOGO on.

9.1 Go to the function set menu (there are two ways:)

- Press CH+(PROG+) key and CH-(PROG-) key on the control board at the same time and switch on power switch, then go to the function set menu.
- After TV is on, press "factory" key (See Note 1) twin then go to the function set menu.

9.1.1 Press the AV button to toggle between LOGO and Option Code

9.1.2 Press the below button for the difference function:

Recall : for the SKYWORTH LOGO display

Timer : for quick Blue background display.

Number 0 to 9: For no. of Character LOGO display.

Program + /- : Select the LOGO Character for modify.

Volume +/- : Change of LOGO Character.

S.M. : Change the Blue Background mode or transparence mode.

P.M. : Change of the Character Color.

9.1.3 Press the AV button to toggle to the Option Code mode and press the "Factory" key twin to exit.

9.2 Direct write the data to the EEPROM address.

Address		
\$199h	No. of Character	00 to 09
\$19C - \$1A4h	Display Character	Refer table
\$19Ah	Character Color	Refer table

\$19Ah	Color
38h	White
39h	Red
3Ah	Green
3Bh	Yellow
3Ch	Blue
3Dh	Magenta
3Eh	Cyan
3Fh	Black

Data	Character	Data	Character	Data	Character
FF	Space	0C	C	18	O
01	1	0D	D	19	P
02	2	0E	E	1A	Q
03	3	0F	F	1B	R
04	4	10	G	1C	S
05	5	11	H	1D	T
06	6	12	I	1E	U
07	7	13	J	1F	V
08	8	14	K	20	W
09	9	15	L	21	X
0A	A	16	M	22	Y
0B	B	17	N	23	Z

COLOUR PURITY AND CONVERGENCE ADJUSTMENT

I. COLOUR PURITY ADJUSTMENT (See Fig.1)

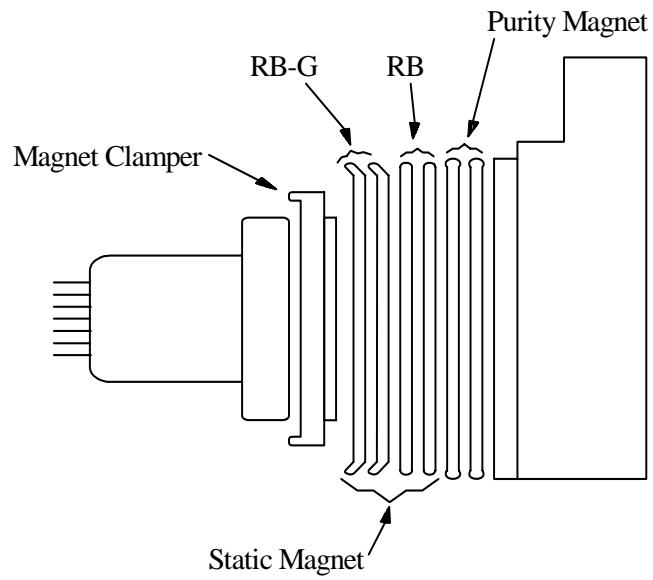
BEFORE ANY ADJUSTMENTS DESCRIBED BELOW ARE ATTEMPTED,V-HIGH, B+ VOLTAGE AND FOCUSING ADJUSTMENT MUST BE COMPLETED .

1. Place the TV receiver facing NORTH or SOUTH ,
2. Plug in TV receiver and turn it on .
3. Operate the TV receiver over 30 minutes.
 1. Fully degauss the TV receiver by using and external degaussing coil
 2. Receive a crosshatch pattern and adjust the static convergence control roughly.
 3. Loosen the clamp screw of the deflection yoke and pull the deflection yoke towards you.
 4. Enter into ADJUST MENU .set the values of C-R,C-G,C-B to "00".
 5. Adjust the purity magnets so that green field is obtained at the center of the screen.
 6. Slowly push the deflection yoke toward bell of CRT and set it where a uniform green field is obtained.
 7. Tighten the clamp screw of the deflection yoke.

II. CONVERGENCE ADJUSTMENT (See Fig.1)

1. Receive a dotted pattern.
2. Unfix the convergence magnet clamped and align red with blue dots at the center of the screen by rotating.(R,B)static convergence magnets.
3. Align Red/Blue with green dots at the center of the screen by rotating (RB-G) static convergence magnet.
4. Fix the convergence magnets by turning the clamped.

5. Remove the DY wedges and slightly tilt the deflection yoke horizontally and vertically to obtain the good overall convergence.
6. Fix the deflection yoke by wedges.
7. If purity error is found, follow "PURITY ADJUSTMENT" instructions.



(FIG.1)