



MASTERKEY CK
DOWNSTREAM LINEAR
RGB CHROMA KEYER

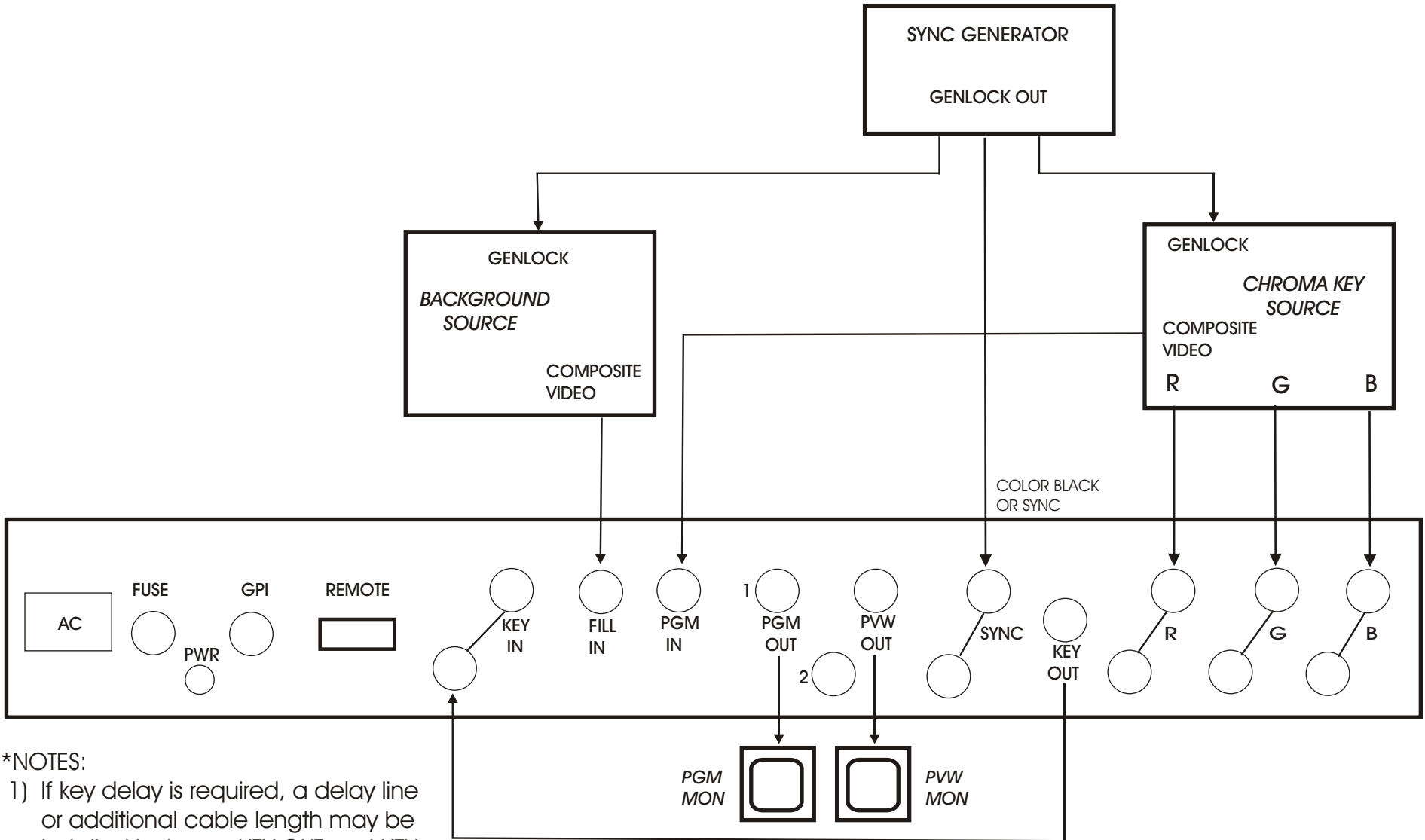
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IMPORTANT - PLEASE NOTE

This unit has been calibrated and internally timed to accept "0 timed" signals at the PGM, FILL and KEY inputs. Do not use the internal delay lines to compensate for mistimed input signals as this will affect the video levels and frequency response. Use external delay lines to achieve proper timing.

CABLING FOR MASTERKEY CK



***NOTES:**

- 1) If key delay is required, a delay line or additional cable length may be installed between **KEY OUT** and **KEY IN**.
- 2) Terminate all unused loop through inputs.

LINEAR KEYING DEFINED

To best describe the linear keying function of MASTERKEY, it is first necessary to review the traditional method of luminance keying, usually referred to as "fast" or "hard" keying.

In this process, the key video generates a waveform with very fast risetimes. Any video level above the setting of the clip control will form a square wave, which causes the keyer to switch from background to insert video. Conversely, whenever the key level drops below the clip setting the keyer will switch back to background video. This amplitude controlled switching results in noticeably hard edges between background and insert picture information. By slowing the risetime of this keying waveform it is possible to soften the key edge somewhat, which is known as "soft" keying. However, the main problems of fast keying still remain: the inability to faithfully follow key signal level variations in an analog fashion plus the switching artifacts present along the key edges.

The smooth sharply defined edges inherent in modern anti aliased character generators, DVE's and graphics generators cannot be fully retained if inserted with this type of hard key.

The MASTERKEY linear keying system overcomes this problem by using a wideband multiplier circuit rather than hard switching to control the background/insert transition.

To graphically explain the MASTERKEY system let us visualize the shaded area in Fig. 1 as representing the control zone of the wideband multiplier. The background (program) video is fed to one input of the multiplier circuit and the insert video is fed to the second input. The key input is an unmodulated 5 step (A). Note that with no signal appearing in the control zone the multiplier output will be 100% background video and 0% insert video.

The key waveform can be moved into the control zone by an increase in key waveform amplitude, a positive in DC offset or a combination of both.

The MASTERKEY remote panel incorporates a GAIN and a SLOPE control. The amplitude of the key signal is controlled by the GAIN and DC offset by the SLOPE.

As the stairstep enters the control zone the background video level within the stairstep shape will begin to decrease and the insert video will begin to increase by the same ratio.

Waveform B represents an increase in SLOPE and the entire stairstep is controlling the multiplier. At the top step, the output will be 100% insert and 0% background. At the third step, the output will be 50% of each and the bottom step would produce 0% insert and 100% background. This situation represents a 1:1 linearity ration and is a good test to determine any keyer's linearity. With full field white in one input, black in the second input and a ramp or stairstep key signal, the program output waveform should closely match the key signal input.

Waveform C shows the results of full GAIN and minimum SLOPE. Only the top 2 steps are controlling the multiplier. The transition along the key edge would be less gradual than with waveform B.

By decreasing the GAIN and increasing the SLOPE, the entire waveform is controlling the multiplier but the amplitude change vs. time is very small (waveform D). This would produce a transition approaching an additive mix between background and insert.

The superb linear keying capability of MASTERKEY makes possible a virtual seamless inlay of anti aliased graphics and DVE sources. The wide range of user control gives it the versatility to produce flawless inserts of even the most difficult keying material.

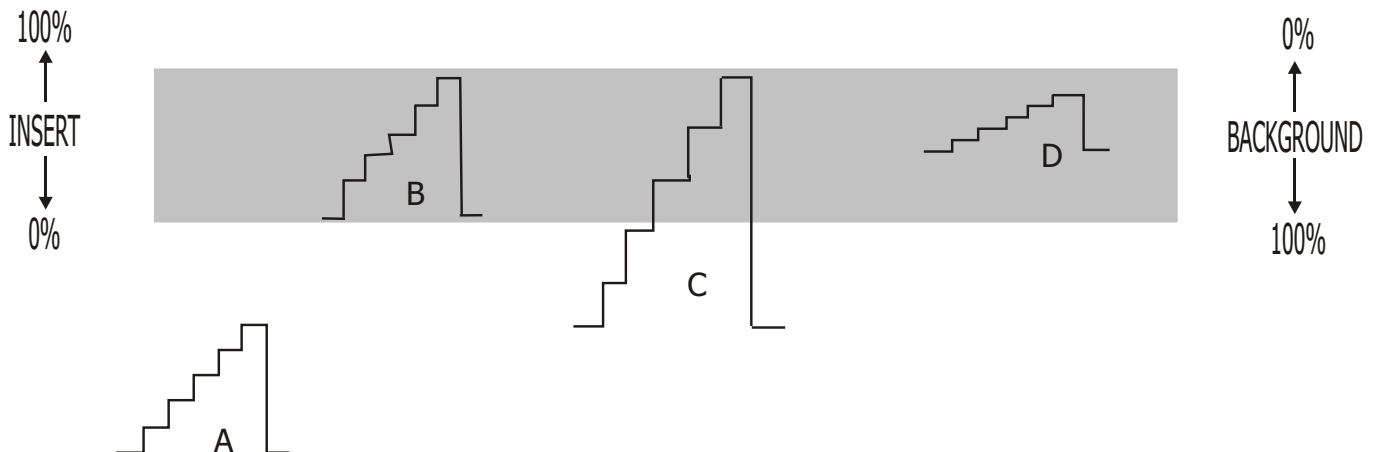


FIG. 1

MASTERKEY CK INSTALLATION & OPERATION

1. Connect program video from upstream production or master control video switcher to FILL IN. This video will be the program video out of the MASTERKEY when no key is inserted and it is not faded to black. This video will also be the background source when a key is inserted.
2. Connect composite video from camera into PGM input. This video must be synchronous with FILL video and must be horizontal and S/C timed to match FILL video.
3. Connect RGB outputs of camera into RGB inputs and terminate or loop through to other equipment.
4. Connect color black or sync to SYNC input.
5. Connect KEY OUT to KEY IN and terminate.
6. Connect PVW out to a preview picture monitor. This output allows the operator to preview the keyed picture and make necessary adjustments before mixing the key into Program. The preview output is not affected by the fade to black.
7. Connect the PGM OUT (2 are provided) to whatever destination is required and terminate.
8. With both faders in the UP position, the FILL input will appear at the Program output.
9. Monitor PVW output.
10. Turn the GAIN and SLOPE controls on the remote panel to approximately mid-range.
11. The digitally operated HUE control is located behind the front panel of the chassis. Remove the two thumbscrews securing the front panel. The center circuit board has two pushbuttons labeled + and -, and there is a blue LED and green LED. By depressing and holding either pushbutton, the unit will continuously rotate the keying hue full circle.

As the required key color is coming into range, the appropriate LED (blue or green) will illuminate. At this point, briefly tap the + or - button while observing the preview output picture, and carefully adjust the GAIN and SLOPE controls on the remote panel for the best chroma key. This hue setting will remain in non-volatile memory.

12. Sliding the KEY fader to the down position will dissolve the PGM output to the chroma keyed video.
13. Sliding the BLACK fader to the down position will fade the PGM output to black.
14. Depending on the path length of the camera's encoder, it may be necessary to delay the key signal. A black edge along the left hand edge of the fore ground subject, indicates that the key signal requires delay. Insert the appropriate delay line between KEY OUT and KEY IN connectors on the back panel.

MASTERKEY CK CALIBRATION PROCEDURE LK-1 PC BOARD

NOTE: This unit has been factory calibrated to less than 1 degree path differential and unity levels throughout. The following instructions are for reference only.

- 1) Connect color bars to PGM IN.
- 2) Loop window signal through KEY IN and into FILL IN.
- 3) Monitor PVW OUT on WFM horiz. display.
- 4) Adjust SLOPE and GAIN controls until overshoots of window key signal are visible on WFM.
- 5) Adjust jumpers on DL2 to achieve equal amplitude overshoot at leading and trailing edge of window key.
- 6) Connect color bars to FILL IN, terminate KEY IN with no input.
- 7) Turn SLOPE and GAIN fully CCW.
- 8) Adjust VR4 for 100 IRE bars.
- 9) Turn SLOPE fully CW.
- 10) Adjust VR6 for 100 IRE bars.
- 11) Rotate SLOPE between extremes and adjust VR2 to balance black level at each end of SLOPE.
- 12) Monitor PVW OUT on vectorscope (externally referenced).
- 13) SLOPE and GAIN full CCW.
- 14) Rotate SLOPE control between limits. Adjust jumpers on DL1 and fine phase adjust VC1 for zero phase shift of bar vectors.
- 15) Monitor PGM OUT on WFM.
- 16) SLOPE CW, GAIN CCW, KEY fader up.
- 17) Adjust RV2 for 100 IRE bars.
- 18) KEY fader down.
- 19) Adjust VR5 for 100 IRE bars.
- 20) Monitor PGM OUT on vectorscope, SLOPE CW.
- 21) Adjust DL3 jumpers and fine trim VC2 for zero phase shift at each end of KEY fader.
- 22) BLACK fader down.
- 23) Adjust VR12 for 7.5 IRE setup. (0 IRE for PAL)
- 24) Adjust RV3 for 40 IRE sync.
- 25) Connect multiburst to PGM IN.
- 26) KEY and BLACK faders up.
- 27) Adjust VC5 for flat response.

MASTERKEY 1 CONTROL PANEL CALIBRATION

(All adjustments located on motherboard)

NOTE: This unit has been factory calibrated to less than one degree path differential and unity levels throughout. The following instructions are for reference only.

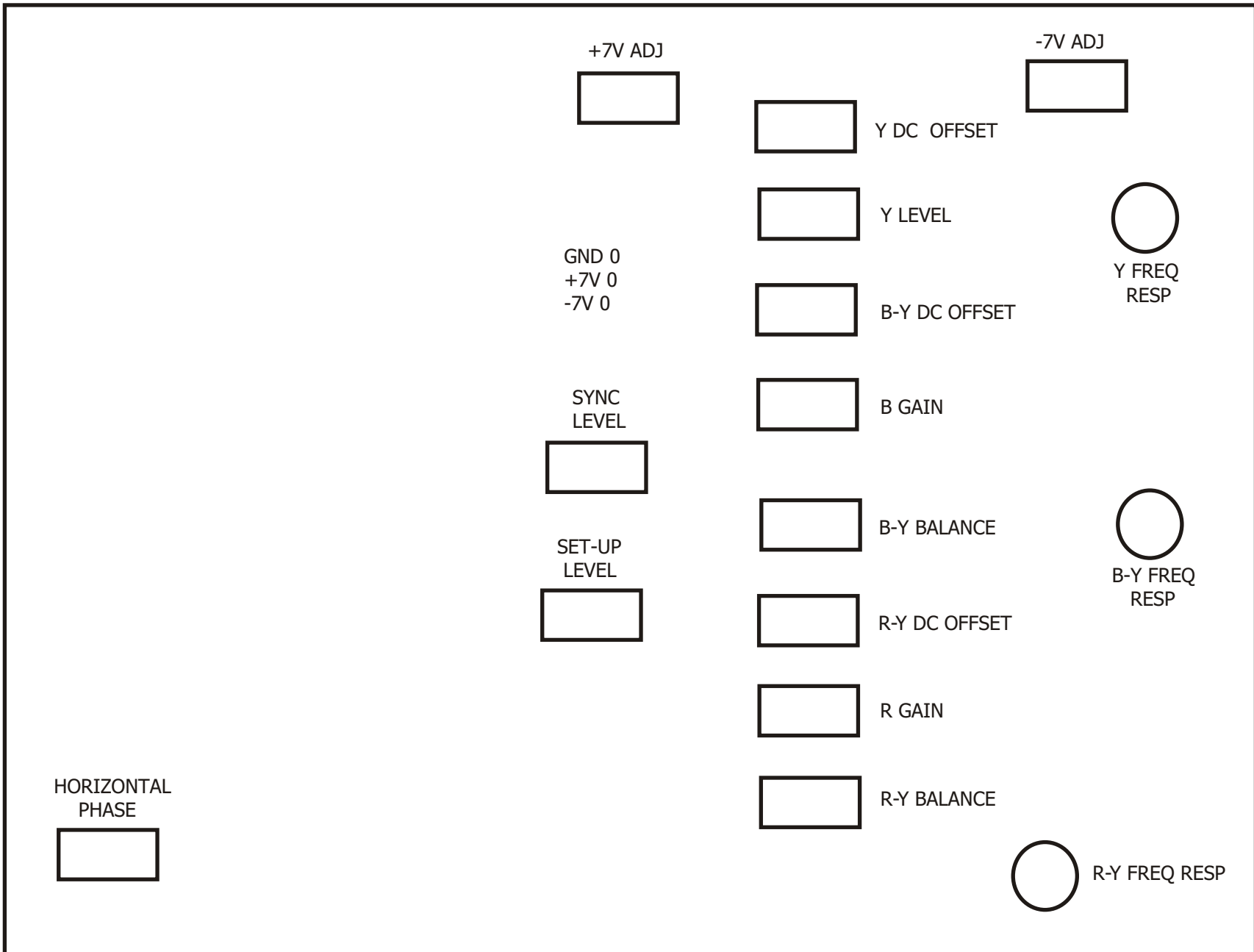
- 1) Connect color bars to PGM IN.
- 2) Connect staircase signal to KEY IN and loop through to FILL IN.
- 3) Monitor PVW OUT.
- 4) Controls are labelled MIX, BLACK, SLOPE, GAIN. There are two limit pots for each function and considerable interaction between each pair. When calibrating, check that the adjustment for one extreme has not affected the opposite extreme. Do not turn the trim pots beyond the point specified in the procedure as this will limit the effective range of the controls on the remote panel.
- 5) Scope jumper J4 at the center rear of the LK1 plug-in PC board.
- 6) To set GAIN limits: Adjust RV8 for 1Vp-p key signal with remote GAIN control fully CCW. Adjust RV7 for 7.5Vp-p key signal with remote GAIN control fully CW.
- 7) To set SLOPE limits: Turn remote GAIN control to mid range. Adjust RV5 for PGM video with SLOPE control fully CCW.
Adjust RV6 for FILL video with SLOPE control fully CW.
Blanking level of key signal at J4 should vary from approx. 1V DC with SLOPE CCW to +5V DC with SLOPE fully CW.
- 8) Monitor PGM OUT.
- 9) To set MIX limits: Adjust RV2 for PGM video with KEY fader up. Adjust RV1 for FILL video with KEY fader down.
- 10) To set BLACK limits: Adjust R3 for BLACK with fader down. Adjust R4 for PGM video with fader up.

CALIBRATION INSTRUCTIONS TYPE 734 RGB KEY PROCESSOR

1. Check +7V and -7V test points. Adjust R117 (+7V) and R119 (-7V) as required.
2. Feed 75% saturated RGB color bars and sync or black burst to appropriate inputs.
3. Scope pin 6 of U2. Adjust B GAIN and B-Y LEVEL pots for 700 mVp-p of B-Y signal, consistent with 0 V on white and black bars.
4. Adjust B-Y DC 0 pot for 0 VDC at blanking. Note: color difference signals (B-Y and R-Y) are bi-polar (+350 mV and -350 mV from blanking).
5. Scope pin 6 of U4 and adjust appropriate pots as in steps 3 and 4 for proper level and DC offset of the R-Y signal
6. Scope pin 6 of U3 and U5. The waveforms should be identical to those at U2 and 4 but inverted.
7. Scope pin 6 of U1. Adjust HUE control for maximum output of blue bar on key signal.
8. Adjust SYNC pot for 300 mV of sync on key signal.
9. Adjust SET-UP pot for 0 set-up key signal.
10. Adjust 'Y' LEVEL pot for 1.5 Vp-p of key signal, measuring from blanking to tip of blue bar.
11. Adjust Y DC pot for 0 VDC blanking.
12. Adjust VC1 trim cap for clean square waves of bar key signal with no overshoot or rounding.
13. Trim cap VC4 sets the P.P.L. Scope pin 22 of U8 and adjust VC4 for midpoint between positive and negative excursions.

NOTE: These calibration instructions are valid for non-comp (no sync) on the RGB signals, and the 734 board has been factory calibrated to this standard. Should the RGB signals all contain sync. it will be necessary to adjust SYNC level pot and Y DC 0 pot. This board will not accept RGB signals with sync on GREEN only. An additional board is available for this standard.

734 TRANSLATOR ADJUSTMENTS



CALIBRATION INSTRUCTIONS

SCP-030 SIN/COS PROCESSOR BOARD

1. Connect 75% saturated RGB color bars to appropriate inputs.
2. Connect composite NTSC signal to FILL input, and terminate REF OUT BNC
3. With power OFF, depress and hold "-" button on front left edge of SIN/COS board. Turn power ON and release "-" button. This sequence puts the processor into the calibrate mode.
4. Using a digital voltmeter, adjust R-Y balance (RV1) for exactly 0.910 volts on pin 3 of U3.
5. Adjust B-Y balance (RV2) for the same, on pin 3 of U4.
6. Scope pin 6 of U1 on 734 board. Adjust Key Level (RV3) for 1.5V p-p from blanking to top of blue bar.
7. Turn power off and back on. Blue LED will illuminate, indicating the ideal range for keying to a blue background. See operating instructions for key color adjustment.

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LK-1 BOARD

PARTS LIST

O OHM	3	R11, R53, R147
22	1	R135
51	5	R2, R8, R39, R46, R130
100	1	R140
240	1	R80
330	3	R27, R33, R73
390	1	R139
430	1	R71
470	6	R58, R60, R98, R99, R120, R121
510	3	R30, R37, R41
620	2	R24, R79
750	9	R3, R4, R22, R23, R28, R36, R40, R123, R131
910	1	R25
1K	6	R62, R63, R68, R75, R92, R117
1K2	5	R13, R45, R48, R61, R65
1K5	4	R26, R66, R70, R132
2K	4	R96, R97, R113, R115,
2K2	1	R149
2K7	2	R74, R129
3K3	1	R150
3K9	1	R111
4K7	4	R55, R138, R143, R146
7K5	6	R67, R69, R95, R100, R116, R118
10K	9	R9, R10, R47, R51, R56, R57, R59, R94, R104
12K	1	R64
15K	1	R151
22K	1	R52
47K	2	R1, R38
82K	3	R50, R142, R144
75 1%	13+	R5, R6, R7, R31, R32, R34, R35, R43, R44, R102, R110, R133, R134, (R136 & R137 ONLY ON MK-1)
715 1%	2	R122, R126
1.21K 1%	13	R14, R15, R20, R21, R93, R101, R103, R105, R106, R109, R119, R124, R125
2.43K 1%	3	R17, R18, R19
1N4148	3	CR9, CR10, CR11
33uH	1	L1

8PIN	7	U1, U3, U5, U6, U7, U9, U17
14PIN	7	U4, U8, U15, U16, DL1, DL2, DL3
16 PIN	2	U2, U10
56pF	1	C77
68pF	1	C38
0.1uF/50v	3	C12, C27, C86
0.1uF/63	30	C6, C7, C11, C13, C16, C17, C19, C24, C25, C26, C28, C29, C30, C32, C35, C36, C37, C57, C59, C60, C61, C62, C65, C70, C74, C75, C78, C80, C92, C93
1uF/35v	5	C5, C58, C69, C72, C81 (C69 & C81 ADD A 0.1uF/50v)
10uF/35v	2	C18, C31 (C18 ADD A 0.1uF/50v)
2N4124	2	Q2, Q4
2N4126	5	Q5, Q6, Q7, Q9, Q12
2N4391	2	Q1, Q3
2-20pF	2	VC1, VC2
5-60pF	1	VC5
1K POT	2	RV2, VR12
50 POT	1	VR2
50K POT	1	RV3
500 POT	3	VR4, VR5, VR6
100uF/10v	4	C1, C2, C21, C22
100uF/25v	2	C4, C33
1000uF/10v	1	C76
BERG STRIP (2 X 10)	3	J2, J3, JP3
BERG STRIP (1 X 3)	3	JP2, J4, J5
JUMPER	1	VR3
130-096-553 (FEMALE)	1	J1
EL2020	7	U1, U3, U5, U6, U7, U9, U17
LM13700	1	U10
MC1496	3	U8, U15, U16
0408-C26	3	DL1, DL2, DL3

LK-1 LINEAR SUB BOARD

PARTS LIST

1N4148	6	CR3, CR4, CR5, CR6, CR7, CR8
220	2	R152, R156
330	1	R81
1K	1	R86
1K2	1	R155
2K2	1	R91
2K7	1	R84
4K7	1	R90
10K	1	R154
18K	1	R85
68K	1	R89
100K	2	R83, R88
270K	1	R82
1M0	1	R87
82uH	1	L2
14 PIN	3	U11, U12, U14
28 PIN	1	U13
1nOF	1	C52
100pF	2	C44, C49
150pF	1	C50
22pF	1	C66
330pF	1	C54
3n9F	1	C47
39pF	1	C48
510pF	1	C45
82pF	1	C88
680pF	1	C87
0.1uF/63v	4	C43, C46, C51, C53
MV104	1	VC3
2-20pF	1	VC4
20K POT	1	VR9
50K POT	1	VR8
10uF/50v	1	C42
74HC74	1	U12 (NATIONAL ONLY)
74HC14	1	U14
CD4069	1	U11
HD44007A	1	U13

MASTERKEY 1 MOTHERBOARD

PARTS LIST

DESCRIPTION	QUANTITY	COMPONENT NAME
4K7	2	R12, R4-R5
510	1	R9
3K3	1	R1-R2 (follow example above)
150	1	R13
680	1	CR1
1N4001	1	C1, C2, C3, C6, C8
1uF/35v	5	VR3
7912	1	VR2
7812	1	VR1
7805	1	C5, C7
1000u/16v	2	RV2, RV4, RV5, RV6, RV7, RV8
3296-W-1-502-5K	6	RV1, RV3
3296-W-203	2	CN2
103-40061	1	CN3
DEPF-9PV6	1	CN4
ICN 143-53-T (14 PIN IC)	1	
22u/35v	2	

MASTERKEY 1 CONTROL PANEL

PARTS LIST

- Slope Control - PEC RV6 1K RV6NAYSD 102A
 - Gain Control - PEC RV6 10K RV6NAYSD 103A
 - Mix Fader - Piher 1K Linear Slide Pot 6PCC 102L
 - Black Fader - Piher 1K Linear Slide Pot 6PCC 102L
 - Fader knobs - Piher P12621B
- 150R ¼ watt 5% resister

734 RGB KEY PROCESSOR

1N4148	5	D1, D2, D3, D4, D5
100	12	R1, R7, R27, R33, R47, R56, R62, R78, R101, R105, R109, R113
240	2	R118, R120
270	2	R52, R81
330	1	R89
390	2	R48, R75
680	6	R5, R22, R31, R61, R106, R114
750	4	R49, R50, R76, R77
910	1	R46
1K	2	R90, R94
1K2	1	R80
2K	1	R21
2K2	12	R16, R17, R18, R19, R43, R44, R45, R51, R72, R73, R74, R79
2K7	1	R96
3K3	6	R6, R20, R32, R60, R104, R112
4K7	6	R4, R30, R59, R97, R102, R110
5K6	1	R151
10K	1	R88
15K	2	R108, R116
18K	1	R93
22K	1	R150
47K	5	R3, R29, R58, R103, R111
68K	1	R100
100K	2	R92, R99
270K	1	R91
1M0	1	R98
75 1%	7	R2, R26, R28, R53, R57, R82, R87
1N4004	2	D6, D7
82uH	1	L1
1K21 .5%	3	R10, R36, R65
2K375 .5%	3	R8, R34, R63
6K228 .5%	3	R12, R38, R67
8 PIN	3	U1, U2, U4
14 PIN	2	U6, U7
28 PIN	1	U8
LM317	1	VR1
LM337	1	RV1

27pF	3	C13, C70, C71
39pF	1	C12
68pF	1	C56
82pF	1	C14
100pF	4	C9, C15, C50, C51
1n0F	1	C16
3n9F	1	C11
510pF	1	C10
0.1uF/63v	25	C1, C2, C3, C4, C5, C6, C19, C20, C22, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C61, C62
VK-20009-3B (CHOKE)	2	L2, L3
1uF/35v	2	C34, C35
10uF/35v	3	C17, C18, C21
2N4124	6	Q1, Q6, Q8, Q10, Q11, Q13
2N4126	5	Q2, Q7, Q9, Q12, Q14
MV104	1	MV1
2-20pF	1	VC4
5-60pF	3	VC1, VC2, VC3
1K POT	5	R14, R40, R69, R107, R115
2K POT	1	R117
5K POT	1	R119
50K POT	1	R95
200 POT	4	R41, R42, R70, R71
500 POT	1	R15
100uF/10v	4	C57, C58, C59, C60
1u0-M/63v	1	C8
100uF/25v	1	C7
103-40031 (MALE)	1	P1
EL2020 OR CLC430AJP	3	U1, U2, U4
4069	1	U6
74HC74	1	U7
HD44007	1	U8

SCP-030 SINE-COS PROCESSOR VER 3

BILL OF MATERIALS

May 29, 2000 15:30:25 Page 1

Revised: Monday, May 29, 2000

<u>Item</u>	<u>Quant</u>	<u>Reference</u>	<u>Part</u>
1	2	C1, C2	47p
2	14	C3, C4, C6, C7, C10, C11, C13, C14, C15, C20, C21, C23, C25, C27	0u1
3	4	C5, C9, C16, C19	56p
4	3	C12, C24, C28	2u2/16V tant
5	4	D1, D2, D3, D4	1N4128
6	1	LED1	BLUE LED
7	1	LED2	GREEN LED
8	2	RV1, RV2	50k
9	1	RV3	500R
10	5	R1, R7, R8, R14, R15	1k0
11	1	R2	10k
12	2	R4, R3	4k7
13	5	R5, R9, R10, R13, R17	75R
14	2	R6, R11	1k6
15	1	R12	750R
16	1	R16	2k2
17	2	S2, S1	PUSH BUTON
18	1	U1	Z86E43
19	1	U2	X9408WP
20	2	U5, U3	GT4123A
21	1	U4	CLC430
22	1	VR1	7805
23	1	VR2	7905
24	1	Y1	8.0 MHz

PS-1

PARTS LIST

240	2	R1, R2
1N4004	10	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
14 PIN IC	1	J1
0.1uF/63v	4	C5, C6, C9, C10
PS-1 POWER SWITCH	1	SW1
10uF/35v	2	C7, C8
5K POT	2	RV1, RV2
19782 FUSE HOLDER	1	F1
2200uF/35v	2	C2, C4
3300uF/35v	2	C1, C3
EAC-333 RECEPTACLE	1	POWER PLUG
HEAT SINK	2	IC1, IC2
LM317	1	IC1
LM337	1	IC2