INSTRUCTION MANUAL

MODIFICATION INSERT

Serial Number B040490

This insert is provided as a supplement to the instruction manual furnished with this modified instrument. The information given in this insert supersedes that given in the manual.

U.S.A. and foreign TEKTRONIX products covered by U.S. and foreign patents and/or patents pending.

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1420 MOD V2E

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1-15-75

1420 MOD V2E
OPERATING INSTRUCTIONS

Apply a minimum of 1V to a maximum of 4V P-P amplitude of 3.58MHz Subcarrier to the 1420 Mod V2E EXTERNAL SUBCARRIER REFERENCE input. Terminate the loop-through in 75Ω.

Switch the 1420 Mod V2E ∅ REF switch to EXTERNAL. The 1420 Mod V2E display is now referenced to the 3.58MHz Subcarrier.

The 1420 Mod V2E operates as the standard instrument in all other modes of operation.

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1420 Mod V2E

CIRCUIT DESCRIPTION

The subcarrier is picked off from the loop-through and drives series resonant peaking circuit L1204 and C1205. The output of the series resonant circuit is AC coupled, C1208, to a grounded base transistor, Q1215. Q1215 drives the base of an inverter, Q1235. Q1235 drives the front panel goniometer. Q1205, the circuit enable, is off as a result of removing the -15V from its base which is controlled by the ø REF switch, 5241.

Subcarrier amplitude is sampled at the collector of Q1782 (Demodulator board) and is fed to the peak detector - CR1233 and C1233 (Exts Sub board). This AGC signal drives on inverting amplifier U1235 which controls emitter follower Q1225. Q1225 acts as a current source to control the amplitude of external subcarrier to the decoders as the Ext Sub Ref input changes.

When the ø REF switch (S241) is in the EXTERNAL position, Q1781 (Demodulator board) is turned off not allowing the internal crystal to operate.

The INPUT switch (S245) has been changed to allow the internally generated clamp pulses to be referenced to the A INPUT channel when the INPUT switch is at A and the ø REF is at EXTERNAL. When the INPUT switch (S245) is at B and the ø REf switch is at (S241) EXTERNAL, the clamp pulses are referenced to the B Input.

With the INPUT to SUBCARRIER A and the ø REF to EXTERNAL, the clamp pulse times are determined by a free running oscillator.

1420 Mod V2E

CALIBRATION PROCEDURE

The 1420 Mod V2E should be calibrated using standard procedure with these additions.

#27 (j) Connect the Return Loss Bridge Unknown arm to the 1420 Mod V2E EXT. SUB. REF. input. Terminate the loop-through with the 75Ω termination.

(k) Check-return loss should not exceed 5mV with the frequency set at 3.58MHz.

(l) Remove the Return Loss Bridge from the 1420 Mod V2E input.

#28 ADJUST EXTERNAL SUBCARRIER PEAKING

(a) Connect a 3.58MHz External Subcarrier (1V-4V P-P) to the EXTERNAL SUBCARRIER REFERENCE input and terminate the loop-through in 75Ω.

(b) Connect the Video Generator output to the 1420 Mod V2E A INPUT. Terminate the A INPUT loop-through in 75Ω.

(c) Switch the 1420 MOD V2E ø REF switch (S241) to EXTERNAL and INPUT switch to A (S245).

(d) Connect the 10X probe from the Test Oscilloscope Differential Comparitor to TP-1221 on the Ext Sub board.

(e) Adjust - L1204 for the most positive DC level.

#29 CHECK EXT. SUB. DRIVE

(a) Connect the 10X probe from the Test Oscilloscope Differential Comparitor to TP1775 on the Demodulator board.

(b) Check for (x.8V) of Ext Subcarrier while varying the Ext Subcarrier Input amplitude (1V4V P-P) at the input loop-through. The Ext Subcarrier amplitude must not change more than ±50mV at TP-1775.

(c) Remove the 10X probe from TP-1775.

#30 CHECK EXT SUB SWITCHING

(a) Remove the Ext Sub Ref. input.

(b) Check for no signal on the 1420 Display.

THE TWO FOLLOWING EXAMPLES ARE STANDARD METHODS USED TO DOCUMENT ELECTRICAL AND MECHANICAL CHANGES TO ALL VIDEO MODIFIED PRODUCTS.

EXAMPLE A

In the event the design of this product necessitates the addition of new etched circuit boards, etched circuit cards, electrical assemblies, switches, etc. this Manual Insert will include a complete electrical and mechanical parts list in addition to electrical schematics.

EXAMPLE B

In cases where special features are added to existing etched circuit boards, etched circuit cards, electrical assemblies, switches, etc. only those additions, deletions, and changes to the standard Manual electrical and mechanical parts list will be noted in this Insert. In this example, the Insert electrical schematic will always supercede the standard Manual schematic.

NOTE

Part Numbers preceded by an asterisk are unique to Video Modified Products. These parts are not normally stocked, but replacements are available by contacting your Field Engineer. When ordering any replacement part be sure to give the full nine digit part number, description, serial number, and mod number.

1420 MOD V2E

MECHANICAL PARTS LIST

QTY.	PART NUMBER	STATUS	DESCRIPTION
		DEMODULATOR A-1	
1	670-3451-00		VA3965-02
15	131-0589-00	Add	Terminal Conn.
		EXTERNAL SUBCARRIER A-5	
1	670-4086-00		VA4565-00
14	131-0589-00	Add	Terminal Pins
1	131-0998-00	Add	Shield
32	136-0254-04	Add	Socket
1	337-1456-00	Add	Shield
		CHASSIS	
1	TV1-1546-00	Change	Panel, left front
1	TV2-1545-00	Add	Wiring harness, Ext. Sub.
1	TV3-0012-00	Change	Panel, Rear
1	TV6-0011-00	Change	Chassis, Power
2	129-0208-00	Add	Post, Hex, 4-40
2	131-0126-00	Add	Connector BNC, female
2	134-0026-00	Add	Plug, snap-in
1	670-3451-04	Change	ECB, Demodulator
1	670-4086-00	Add	ECB, Ext. Subcarrier

ELECTRICAL PARTS LIST

CKT. NO.	STATUS	PART NUMBER	DESCRIPTION
		EXTERNAL SUBCARRIER A-5	
670-4086-00		V4565-00	ECB, raw
COIL			
L1204	Add	114-0278-00	Coil, Var. 4.6 - 16.7μh
TRANSISTOR			
Q1205	Add	151-0220-00	Transistor, Repl. by 2N4122
Q1215	Add	151-0220-00	Transistor, Repl. by 2N4122
Q1225	Add	151-0302-00	Transistor, Repl. by 2222A
Q1235	Add	151-0333-00	Transistor, Repl. by MPS918
DIODE			
CR1204	Add	152-0141-02	Diode, Repl. by 1N4152
CR1233	Add	152-0141-02	Diode, Repl. by 1N4152
INTEGRATED CIRCUITS			
U1235	Add	156-0067-02	I.C. Replace by 741
CAPACITORS			
C1205	Add	283-0256-00	Cap. fixed 130pf 100V
C1206	Add	283-0111-00	Cap. fixed .1μf 50V
C1233	Add	283-0111-00	Cap. fixed .1μf 50V
C1235	Add	283-0111-00	Cap. fixed .1μf 50V
C1237	Add	283-0238-00	Cap. fixed.01μf 50V
C1281	Add	283-0111-00	Cap. fixed .1μf 50V
C1282	Add	283-0111-00	Cap. fixed .1μf 50V
C1286	Add	283-0111-00	Cap. fixed .1μf 50V
C1287	Add	283-0111-00	Cap. fixed .1μf 50V
C1291	Add	283-0111-00	Cap. fixed .1μf 50V
C1292	Add	283-0111-00	Cap. fixed .1μf 50V
RESISTORS			
R1201	Add	315-0153-00	Resistor, Carbon 15K 1/4W 5%
R1208	Add	315-0153-00	Resistor, Carbon 15K 1/4W 5%
R1210	Add	315-0303-00	Resistor, Carbon 30K 1/4W 5%
R1213	Add	315-0103-00	Resistor, Carbon 10K 1/4W 5%
R1216	Add	315-0152-00	Resistor, Carbon 1.5K 1/4W 5%
R1218	Add	321-0232-00	Resistor, Prec. 2.55K 1/8W 5%
R1226	Add	315-0202-00	Resistor, Carbon 2K 1/4W 5%
R1231	Add	315-0750-00	Resistor, Carbon 75Ω 1/4W 5%
R1237	Add	315-0475-00	Resistor, Carbon 4.7M 1/4W 5%
R1281	Add	315-0100-00	Resistor, Carbon 10Ω 1/4W 5%
R1284	Add	315-0100-00	Resistor, Carbon 10Ω 1/4W 5%
R1286	Add	315-0100-00	Resistor, Carbon 10Ω 1/4W 5%
R1804	Add	315-0361-00	Resistor, Carbon 360Ω 1/4W 5%

(Continued)

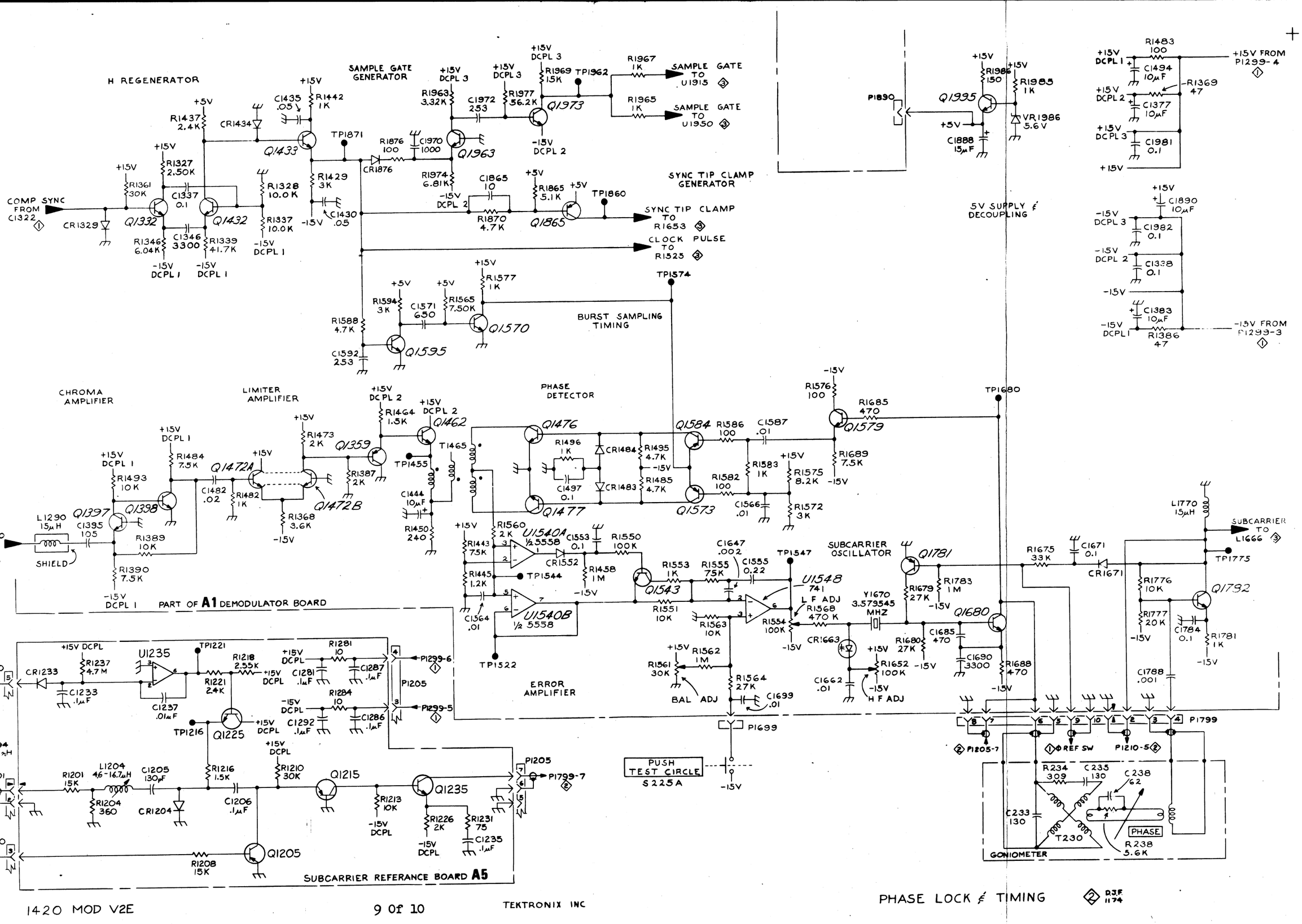
(Continued)

1420 MOD V2E

ELECTRICAL PARTS LIST

CKT. NO.	STATUS	PART NUMBER	DESCRIPTION
		CHASSIS	
S241	Change	TV5-0027-00	Switch, lever, Ref.
S245	Change	TV5-0026-00	Switch, lever, Input
L294	Add	276-0573-00	Core, torroid

A INPUT OR EXT SUBCARRIER
L290 20nH
C1032 .05
C1034 1.3 to 5.4
R1032 1.0M INPUT COMP
R1030 1.0M
Q1032
+15V DCPL 1
R1042 470
Q1034
R1024 10K
-15V DCPL 1
R1044 2.0K
R1048 2.0K
+15V DCPL 1
Q1036
R1022 2K
-15V DCPL 1
TP1010
C1010 130
R1012 1.50K
+15V
R1122 10K
SUBCARRIER CH COMP
CR1122
C1012 5.5 to 18
Q1120
C1124 0.1
R1124 4.7K
+15V
R1110 10K
CR1110
R1020 590
C1120 130
Q1110
C1116 0.1
+15V
R1112 4.7K
+15V
R1144 10K
CR1148
R1134 10K
C1136 1.0µF
Q1140
C1142 0.1
+15V
R1146 4.7K
SHIELD
INPUT AMPLIFIERS
COMP VIDEO TO L1290 ◇2
L1118 4.6-16.7µH
INPUT PHASE MATCHING
L1178 4.6-16.7µH
Q1201
C1204 0.1µF
R1202 4.7K
-15V
R1305 22.6K
-15V
GAIN CELL
DEMOD DRIVER
+15V DCPL 3
R1317 12K
+15V DCPL 3
VR1325 6.2V
CR1401
Q1318
Q1410
+15V DCPL 3
Q1412
L1305 40 to 80 nH PHASE BAL
C1303 .027
CR1304
R1425 10K
-15V DCPL 3
R1415 6.65K
TP1426
R1417 2K
-15V DCPL 3
CHROMA TO C1428 ◇3
R1407 100
CR1413
+15V
R1507 47K
R1405 2.10K
CAL GAIN
R1403 1K
Q1512
Q1502
R1503 680
R1510 100K
-15V
-15V
GAIN CELL CONTROL
+15V
R1326 200
Q1227
+15V
R1240 1K
TP1230
+5V
CR1225
+15V
C1243 0.1
Q1233
Q1222
+15V
R1241 1.5K
CR1235
R1246 1K
+15V
R1348 3.3K
Q1342
R1232 62K
CR1335
+15V
C1336 0.1
R1331 3K
+15V
C1333 .022
TP1330
Q1364
+15V
C1364 .02
R1268 300
R1366 10
C1373 47µF
R1370 240
R1276 360
+15V
R1373 15K
Q1372
R1375 1K
C1374 .02
Q1253
R1266 10K
-15V
CR1244
R1248 2.7K
+15V
C1242 .02
R1345 360
Q1348
Q1345
R1315 5.6K
C1322 .001
COMP SYNC TO Q1332 ◇2
R1312 1K
R1357 1.5K
+15V
R1256 39K
CR1255
SYNC STRIPPER
R1355 360
Q1355
R1255 11K
Q1362
C1361 15µF
CR1362
R1264 910K
-15V
P1299
+15V FROM P3300-1 ◇4
+15V
C1285 0.1
R1056 100
+15V DCPL 1
C1046 0.1
R1096 100
+15V DCPL 2
C1076 0.1
+15V DCPL 3
C1314 0.1
+15V TO ◇2 ◇3
P1299
P1205-4 ◇2
DECOUPLING
-15V DCPL 3
C1427 0.1
R1068 100
-15V DCPL 2
C1086 0.1
R1028 100
-15V DCPL 1
C1036 0.1
-15V
C1286 0.1
-15V TO ◇2 ◇3
P1299
-15V FROM P3399-5 ◇4
P1205-3 ◇2
INPUT SWITCHING
+15V DCPL 2
R1092 470
Q1084
+15V DCPL 2
Q1086
R1074 10K
-15V DCPL 2
R1084 2.0K
R1094 2.0K
+15V DCPL 2
Q1082
R1064 2K
-15V DCPL 2
C1084 1.3 to 5.4
R1072 1.0 M INPUT COMP
R1070 1.0M
B INPUT
L292 20nH
C1082 .05
TP1060
+15V
R1174 10K
CR1164
R1062 590
C1160 130
Q1160
C1074 0.1
+15V
R1176 4.7K
+15V
R1186 10K
CR1168
R1078 10K
C1178 1.0µF
Q1180
R1188 4.7K
C1188 0.1
≈+8V FROM P3050-4 ◇4
(YEL) DS211
(GRN) DS210
P1900
Q1801
R1600 4.7K
C1505 .01
CW
VAR GAIN
R224 680
R222 5K
UNCAL
CAL
GAIN
-15V
PART OF A1 DEMODULATOR BOARD
P1299
P1200
P1200
P1299
P1600
P1799-9 ◇2
P1210-3 ◇2
S241 Ø REF
A
B EXT
-15V
A
B
SUBCARRIER A-INPUT
S245 INPUT


H REGENERATOR
SAMPLE GATE GENERATOR
SYNC TIP CLAMP GENERATOR
BURST SAMPLING TIMING
CHROMA AMPLIFIER
LIMITER AMPLIFIER
PHASE DETECTOR
ERROR AMPLIFIER
SUBCARRIER OSCILLATOR
5V SUPPLY & DECOUPLING
COMP SYNC FROM C1322
COMP VIDEO FROM CR1148
SAMPLE GATE TO U1915
SAMPLE GATE TO U1950
SYNC TIP CLAMP TO R1653
CLOCK PULSE TO R1525
+15V FROM P1299-4
-15V FROM P1299-3
PUSH TEST CIRCLE S225A
EXT SUB INPUT
SUBCARRIER TO L1666
PART OF A1 DEMODULATOR BOARD
SUBCARRIER REFERANCE BOARD A5
GONIOMETER
PHASE
L HF ADJ
BAL ADJ
H F ADJ
Q1332
Q1432
Q1433
Q1973
Q1963
Q1865
Q1570
Q1595
Q1359
Q1462
Q1476
Q1477
Q1584
Q1573
Q1579
Q1543
Q1680
Q1781
Q1792
Q1995
Q1397
Q1398
Q1472A
Q1472B
Q1215
Q1235
Q1205
U1540A
U1540B
U1548
T1465
T230
Y1670 3.579545 MHZ

PUSH TEST CIRCLE S2253

P1600

SUBCARRIER FROM Q1782 ◇2

TP1775

L1666 2 TO 6μH

TP1625

TP1710

R1612 90.9

C1646 650

QUAD PHASE

C1653 510

R1602 90.9

TP1605

R1702 100

R1701 100

R-Y DEMODULATOR

R1717 4.7K

U1715 1496

R1724 470

R1728 470

R1720 499

R1709 100

+15V

L1821 65 TO 190μH

L1827 22 TO 80μH

TP1811

R-Y FILTER

C1830 678

C1831 330

C1829 70

R1920 499

R1837 15K

TP1610

R1603 10K

+5V

C1701 0.1

C1720 0.1

R1616 1.1K

+15V

R1615 330

Q1605

R1623 1.1K

180° PHASE SWITCHER

R1518 4.7K

R1525 4.7K

CLOCK PULSE FROM Q1433 ◇2

Q1528

Q1718

R1622 330

U1614 7474

R1625 2K

P1600

C1428 .01

R1635 100

L1636 15μH

C1731 130

TP1729

CHROMA FROM Q1412 ◇1

SYNC TIP CLAMP

SYNC TIP CLAMP FROM Q1865 ◇2

R1653 390

Q1739

R1645 15K

-15V

R1735 499

C1744 0.1

R1744 6.8K

R1730 8.2K

H GAIN

R1759 100

R1760 499

C1835 678

C1836 330

C1850 70

R1740 470

R1739 470

65 TO 190μH L1841

22 TO 80μH L1847

TP1840

B-Y FILTER

R1745 100

R1747 100

R1746 100

U1755 1496

R1735 4.7K

B-Y DEMODULATOR

R1839 15K

R1942 499

R1944 7.50K

TP1954

R1947 3.9K

R1951 10K

H ALIGN

SAMPLE GATE FROM R1965 ◇2

U1950 3080

Q1855

C1951 1.0

R1960 1K

R1962 12K

C1962 .01

B-Y CLAMP

+15V

U1915 3080

Q1811

C1910 1.0

R1910 1K

R1902 12K

C1902 .01

R-Y CLAMP

SAMPLE GATE FROM R1967 ◇2

VR1932 6.2V

Q1928

Q1927

R1923 2K

R1831 2K

R1924 10K

-15V

Q1929

R1925 560

R1912 7.50K

R1916 10K

V ALIGN

R1921 3.9K

TP1919

R1826 75K

R1946 75K

R-Y AMPLIFIER DRIVER

R1940 2K

Q1935

Q1933

VR1839 6.2V

R1934 10K

B-Y AMPLIFIER DRIVER

Q1937

R1948 560

P1901

VERTICAL POSITION

R430 50K

CW

P1950

R440 50K

HORIZONTAL POSITION

P2000

+210 V DCPL 1 FROM P3900-6 ◇4

-15V FROM P3399-4

GND FROM MAIN CHASSIS

TO CRT UPPER (BLUE)

TO CRT LOWER (BROWN)

P2950

TO CRT LEFT (RED)

P2991

TO CRT RIGHT (GREEN)

DECOUPLING

R2020 100

+210 V DCPL 1

R2070 100

210 V DCPL 2

C2065 0.1

R-Y AMPLIFIER

210 V DCPL 1

R2000 22K

VERT INPUT

R2520 100

Q2700

R2250 12.1K

R2230 10K

½Q2655

R2615 715

R2720 330

R2630 715

C2835 180

R2540 226

R2535 100

Q2735

R2035 22K

+210V DCPL 1

B-Y AMPLIFIER

+210 V DCPL 2

R2075 22K

HORIZ INPUT

R2590 100

Q2775

R2290 10K

½Q2655

R2685 715

R2780 330

R2692 715

C2891 2 to 35

R2256 3.01K

R2560 226

DEFLT COMP

R2595 100

Q2795

C2890 110

R2095 22K

+210V DCPL 2

A2 DEFLECTION BOARD

◇3 DJF 12-74

· PART OF A1 DEMODULATOR BOARD