SERVICE AND OPERATION MANUAL

KJ-XX15 SERIES, 13",19"
OPEN FRAME COLOR MONITORS

HAPP CONTROLS

Manufacturer of Electronic Controls

Information in this publication current as of April, 2000.
Information subject to change as display technology advances.

This monitor has been designed and manufactured to deliver high performance video. For continued peak performance use and safe operation, only high quality Happ Controls replacement parts or their exact specified equivalent when servicing.

SAFETY PRECAUTIONS AND WARNINGS

Service Warning

This display contains HIGH VOLTAGE capable of delivering LETHAL quantities of energy. Service should only be attempted by trained personnel familiar with the potential dangers inherent with high voltage equipment.

Safety Related Component Warning

Certain components used in Happ Controls color monitors are critical for safe operation of the display. These parts numbers are marked by (⚠) in the parts list and on the schematic diagram. It is essential that these safety critical components be replaced only with exact manufacturer specified components to prevent the possibility of excessive X-radiation emission, electrical shock, fire, or premature component failure. Modifying the original design without written approval from Happ Controls is expressly forbidden, will void the original parts and labor warranty, and may result in creating a hazardous situation.

X-Radiation Warning

COMPONENTS WHITCH MAY AFFECT POTENTIAL EXCESS EMMISSION OF X-RADIATION IN THE HORIZONTAL DEFLECTION AND HIGH VOLTAGE CIRCUITS (INCLUDING THE PICTURE TUBE). ARE INDICATED IN THE PARTS LIST BY A (★). USE ONLY TYPE AND RATING OF REPLACEMENT COMPONENT AS SHOWN IN THE PARTS LIST.

1. The only potential source of X-radiation emission is the picture tube. When the high voltage and horizontal deflection circuits are operating correctly there is no possibility of excess X-radiation emission. NEVER attempt to modify these circuits.
2. Periodically check the high voltage with a reliably calibrated meter for values not in excess of manufactures recommendations. See High Voltage Shut-down Circuit, page 4, for further details.

CRT Warning

All picture tubes used in Happ Controls monitors are equipped with an integral implosion protection system. The picture tube is, however, a highly evacuated component whose outside surfaces are subject to strong external forces. Care must be exercised so as not to bump or scratch the tube during installation or servicing as this may cause the tube to implode, resulting in possible personal injury and property damage. Shatter-proof goggles must be worn by individuals while handling the CRT or installing the display in the cabinet. Do not handle the CRT by the neck.

1. Always ensure the high voltage at the anode cap is fully discharged prior to handing or service.
2. Replace picture tube only with same type and number.

Product Safety and Service Guidelines

1. Service should be performed only after reading all of the warnings and precautions in this manual and as labeled on the CRT and chassis.
2. Where a short circuit has occurred, replace all components that indicate evidence of overheating. Also check for evidence of overheating or poor connection on all plastic connectors.
3. Inspect wiring for frayed leads and damaged insulation. When service is required, observe original lead dress assume lead dress is followed as from the factory, especially in the high voltage circuitry area.
4. Do not expose this display to rain or place in areas where the potential for exposure to moisture is high. Additionally, do not mount the remote VR PWB if so equipped outside the cabinet or in areas where there is a possibility of exposure to moisture.
5. All protective devices must be reinstalled per original design.

PERFORMANCE AND OPERATING DATA

1. Power Supply
This color monitor shall maintain the specified performance in the range described below :
Frequency : 47-63Hz
Voltage : 90-264 Vac
Consumption : Less than 70 Watts

2. Input Signal
The reference video contlloler used for adjustment and test Will guarantee the performence decribed below.

Video signals
Red, Green, Blue analog input
300 ohm termination to ground
Level : 0 to 1.2Vpp
Polarity : Positive

Sync signals
Separate H/V sync input
1 kΩ termination to ground
Level : TTL level
Polarity : Positive or Negative

3. Horizontal Deflection
Scanning Frequency : 15.75KHz
Ratrace period : <8.0μs

4. Vertical Deflection
Scanning Frequency : 50-120Hz
Ratrace period : <900μs

5. linearity
± 5%

6. Picture Size Regulation

Static Regulation	Dynamic Regulation
2%	1.5%

7. Geometric Distortion
It is acceptable that pincushion, trapezoide, parallelogram, barrel distortion, out of orthogonality. and various waves can appear all together, If the data area parameter remains within the limits of 2%.

8. Degaussing
This color monitor shall amploy an automatic degaussing circuit, The degaussing sequency shall be selfactivated at the time of switch-on, After a degaussing cycle the demagnetizing circuit shall recover and be fully functional again min, 60 minutes after switch-off.

9. High Voltage
This color monitor shall employ an X-radiation shut-down protection with internal circuitry.
14" : 26KV
20" : 27KV

10. Environmental Conditions
Temperature : 10° ~40° C(Operating)
Humidity : 10 ~ 90%, no condensation

OPERATING INSTRUCTIONS

1. Apply line AC, 90V~264V, in your locality to the monitor through W801.

2. Apply signal source to the monitor through W201.

3. Set up user adjustable controls.

All controls are preset at the factory for optimum performance. If adjustment is necessary to suit program material, most adjustments can be made using only the controls on the remote VR PWB. Other controls in the monitor should be adjusted only if those controls have been tampered with or if major repairs were necessary on the monitor.

CONTROLS

1.Remote VR PWB
Contrast, VR101
Brightness, VR102
Horizontal Centering, VR103
Horizontal Size, VR106
Vertical Centering, VR104
Vertical Size, VR105

2. Main PWB
Horizontal Hold, VR301
Vertical Hold, VR401

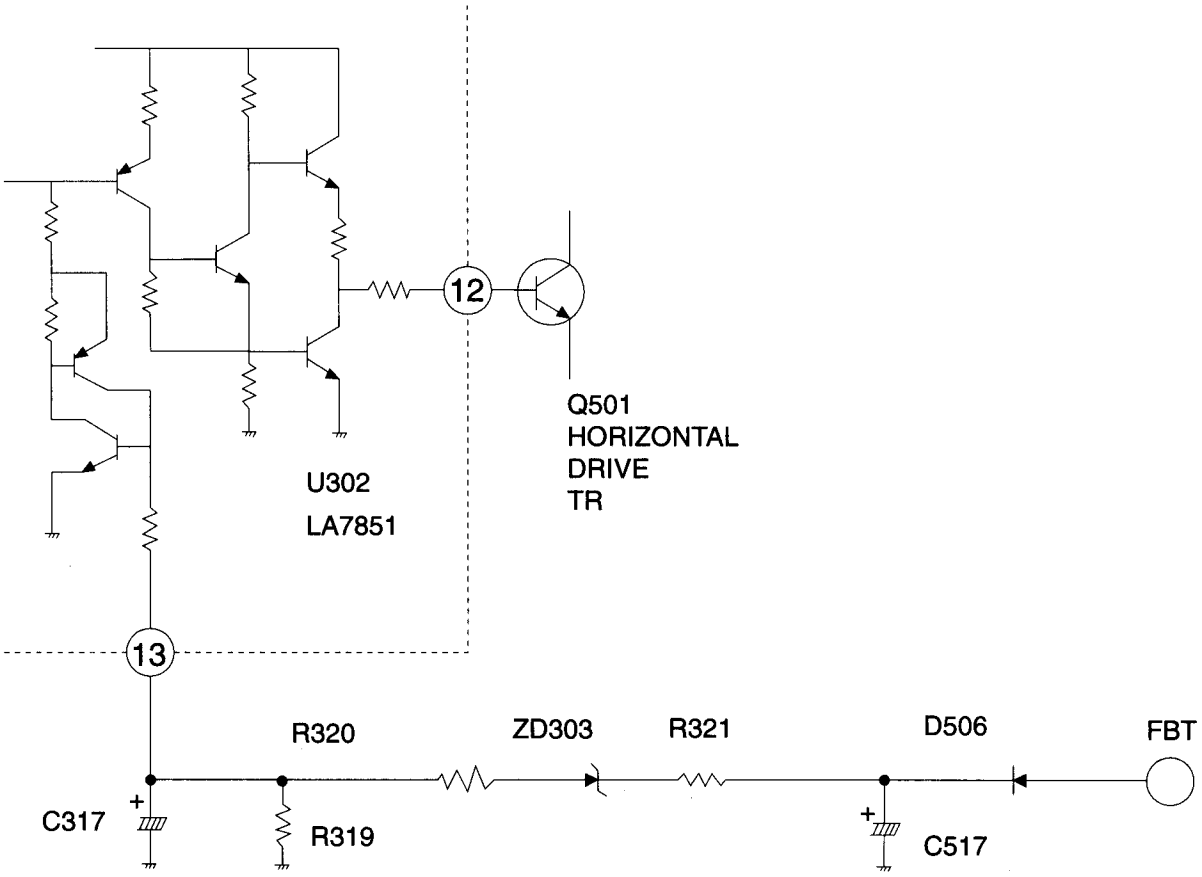
3. Flyback Transformer
Focus Adjustment
Screen Adjustment

4. Neck PWB
Red Cut-off, VR701
Green Cut-off, VR703
Blue Cut-off, VR705
Red Gain, VR702
Green Gain, VR704
Blue Gain, VR706

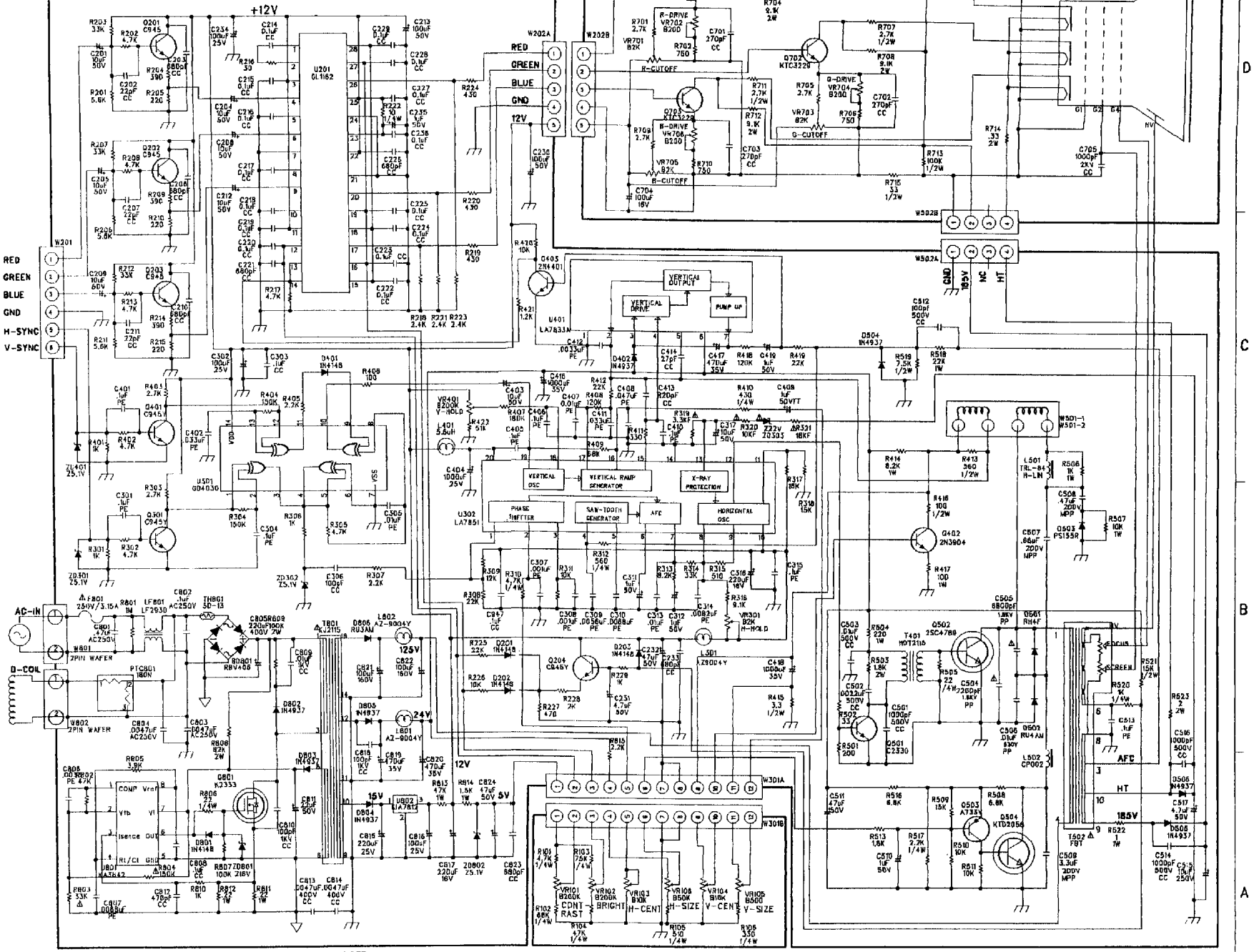
These controls in main, neck PWB and flyback transformer have been preset and sealed at the factory and should not require further attention.

HIGH VOLTAGE SHUT-DOWN CIRCUIT

The chassis of this color monitor has been designed to emit a minimum of soft X-radiation, in accordance with US DHHS rules 21 CFR, subchapter J, applicable at date of manufacture.
A high voltage shut-down circuit, as shown below, guarantees horizontal oscillation shut-down.
A flyback pulse is generated at pin 10 of flyback transformer. This pulse is fed through resistive divider network to pin 13 of IC U302
The resistive divider is such that the value of resistors R319,R320 and R321 is set so that zener diode ZD303 will conduct when the flyback pulse becomes abnormally high.
A reference voltage is maintained by IC U302 internal circuitry. When ZD302 is conducting and the flyback pulse becomes equal to or greater than the reference voltage within IC U302, internal IC circuitry will act to shut off drive TR Q501.
Thus horizontal oscillation, and therefore high voltage, will be effectively shut down.
The protective circuit is released by turning off the monitor and reapplying power.
If this circuit is working to shut down the monitor, then immediate service is required.



KJXX15 SCHEMATIC DIAGRAM



WARNING

This document contains safety critical components.
All parts shown in the ⚠ marks of the schematic are safety critical.
For continued safety replace safety critical components only
with manufacturers recommended exact replacements.

NOTE

1. All resistors are in ohms, K=1,000, M=1,000,000.
2. Rated power of resistor is in 1/6W unless otherwise specified.
3. Working voltage of capacitor is 50V in type CC,
   100V in type PE unless otherwise specified.

4. Abbreviation
   - CC : Ceramic disk capacitor
   - PE : Polyester film capacitor
   - MP : Metalized polyester film capacitor
   - PP : Polypropylene film capacitor
   - MPP : Metalized polypropylene film capacitor
   - TT : Tantalum electrolytic capacitor

DRAWN: YOUNG JIN SYSTEM	DATED: 1998. 04. 23	COMPANY: KUK JAE CORPORATION	DRAWING NO:
CHECKED:	DATED:	TITLE: KJ 2115	REV:
QC:	DATED:		
RELEASED:	DATED:	CODE: • • • •	SIZE: SHEET 1 OF 1

PARTS LIST

LOCATION NO.	PARTS NAME	SPECIFICATIONS
TRANSFORMERS, COILS		
L301	INDUCTOR	AZ9004Y
L401	INDUCTOR	5.6μH
L501	COIL, LIN	TRL-64
L502	COIL, CHOKE	CP002
L801	INDUCTOR	AZ9004Y
L802	INDUCTOR	AZ9004Y
LF801	LINE FILTER	SLF-2501
T501	TRANS, DRIVE	1034G
T502	FBT	FP0021
T801	TRANS, POWER	MAIN2115
INTEGRATED CIRCUITS		
U201	IC	LM1205
U301	IC	GD4030B
U302	IC	LA7851
U401	IC	LA7833
U801	IC	KA3842
U802	IC	KA7812
SEMI-CONDUCTORS		
Q201	TR	KSC945Y
Q202	TR	KSC945Y
Q203	TR	KSC945Y
Q204	TR	KSC945Y
Q301	TR	KSC945Y
Q401	TR	KSC945Y
Q402	TR	2N3904
Q403	TR	2N4401
Q501	TR	KSC2330
Q502	TR	2SC4769
Q503	TR	KSA733Y
Q504	TR	KTD2058
Q701	TR	KTC3229
Q702	TR	KTC3229
Q703	TR	KTC3229
Q801	TR	2SK1342
D201	DIODE	1N4148
D202	DIODE	1N4148
D203	DIODE	1N4148
D401	DIODE	1N4148
D402	DIODE	1N4937
D501	DIODE, DAMPER	RH4F
D502	DIODE, DAMPER.	RU4AM
D503	DIODE	PS156R
D504	DIODE	1N4937
D505	DIODE	1N4937
D506	DIODE.	1N4937
D801	DIODE	1N4148
D802	DIODE	1N4937
D803	DIODE	1N4937
D804	DIODE	1N4937
D805	DIODE	1N4937
D806	DIODE	RU3AM
RESISTORS		
TH801	PTC	5D-13
VR101	RES,VARIABLE	B200K,SEMI,92E
VR102	RES,VARIABLE	B200K,SEMI,92E
VR103	RES,VARIABLE	B10K,SEMI,92E
VR104	RES,VARIABLE	B10K,SEMI,92E
VR105	RES,VARIABLE	B500 Ω ,SEMI,92E
VR106	RES,VARIABLE	B30K,SEMI,92E
VR301	RES,VARIABLE	B2K,SEMI,065C

LOCATION NO.	PARTS NAME	SPECIFICATIONS
VR401	RES,VARIABLE	B200K,SEMI,065C
VR701	RES,VARIABLE	B2K,SEMI,117E
VR702	RES,VARIABLE	B200,SEMI,117E
VR703	RES,VARIABLE	B2K,SEMI,117E
VR704	RES,VARIABLE	B200,SEMI,117E
VR705	RES,VARIABLE	B2K,SEMI,117E
VR706	RES,VARIABLE	B200,SEMI,117E
R101	RES, CARBON	4.7 KΩ
R102	RES, CARBON	68 KΩ
R103	RES, CARBON	75 KΩ
R104	RES, CARBON	47 KΩ
R105	RES, CARBON	510 Ω
R106	RES, CARBON	430 Ω
R201	RES, CARBON	5.6 KΩ
R202	RES, CARBON	4.7 KΩ
R203	RES, CARBON	33 KΩ
R204	RES, CARBON	390 Ω
R205	RES, CARBON	220 Ω
R206	RES, CARBON	5.6 KΩ
R207	RES, CARBON	33 KΩ
R208	RES, CARBON	4.7 KΩ
R209	RES, CARBON	390 Ω
R210	RES, CARBON	220 Ω
R211	RES, CARBON	5.6 KΩ
R212	RES, CARBON	33 KΩ
R213	RES, CARBON	4.7 KΩ
R214	RES, CARBON	390 Ω
R215	RES, CARBON	220 Ω
R216	RES, CARBON	30 Ω
R217	RES, CARBON	4.7 KΩ
R218	RES, CARBON	2.4 KΩ
R219	RES, CARBON	430 Ω
R220	RES, CARBON	430 Ω
R221	RES, CARBON	2.4 KΩ
R222	RES, CARBON	10 Ω
R223	RES, CARBON	2.4 KΩ
R224	RES, CARBON	430 Ω
R225	RES, CARBON	22 KΩ
R226	RES, CARBON	10 KΩ
R227	RES, CARBON	470 Ω
R228	RES, CARBON	2 KΩ
R229	RES, CARBON	1 KΩ
R301	RES, CARBON	1 KΩ
R302	RES, CARBON	4.7 KΩ
R303	RES, CARBON	2.7 KΩ
R304	RES, CARBON	150 KΩ
R305	RES, CARBON	4.7 KΩ
R306	RES, CARBON	1 KΩ
R307	RES, CARBON	2.2 KΩ
R308	RES, CARBON	22 KΩ
R309	RES, CARBON	12 KΩ
R310	RES, CARBON	4.7 KΩ
R311	RES, CARBON	10 KΩ
R312	RES, CARBON	560 Ω
R313	RES, CARBON	8.2 KΩ
R314	RES, CARBON	33 KΩ
R315	RES, CARBON	510 Ω
R316	RES, CARBON	9.1 KΩ
R317	RES, CARBON	15 KΩ
R318	RES, CARBON	15 KΩ
R319	RES, CARBON	3.3 KΩ
R320	RES, CARBON	10 KΩ
R321	RES, CARBON	18 KΩ
R401	RES, CARBON	1 KΩ

PARTS LIST

LOCATION NO.	PARTS NAME	SPECIFICATIONS
R402	RES, CARBON	4.7 KΩ
R403	RES, CARBON	2.7 KΩ
R404	RES, CARBON	150 KΩ
R405	RES, CARBON	2.2 KΩ
R406	RES, CARBON	100 Ω
R407	RES, CARBON	220 KΩ
R408	RES, CARBON	120 KΩ
R409	RES, CARBON	68 KΩ
R410	RES, CARBON	470 Ω
R411	RES, CARBON	330 Ω
R412	RES, CARBON	22 KΩ
R413	RES, CARBON	560 Ω
R414	RES, MOF	560 Ω
R415	RES, CARBON	3.9 Ω
R416	RES, CARBON	100 Ω
R417	RES, MOF	100 Ω
R418	RES, CARBON	120 KΩ
R419	RES, CARBON	22 KΩ
R420	RES, CARBON	10 KΩ
R421	RES, CARBON	1 KΩ
R422	RES, CARBON	820 KΩ
R501	RES, CARBON	200 Ω
R502	RES, CARBON	33 Ω
R503	RES, MOF	1.8 KΩ
R504	RES, MOF	220 Ω
R505	RES, CARBON	22 Ω
R506	RES, MOF	1 KΩ
R507	RES, MOF	10 KΩ
R508	RES, CARBON	6.8 KΩ
R509	RES, CARBON	15 KΩ
R510	RES, CARBON	10 KΩ
R511	RES, CARBON	10 KΩ
R512	JUMPER WIRE	
R513	RES, CARBON	1.8 KΩ
R516	RES, CARBON	6.8 KΩ
R517	RES, CARBON	2.2 KΩ
R518	RES, MOF	22 KΩ
R519	RES, CARBON	7.5 KΩ
R520	RES, CARBON	1 KΩ
R521	RES, CARBON	15 KΩ
R522	RES, MOF	1 Ω
R523	RES, MOF	2 Ω
R701	RES, CARBON	2.7 KΩ
R702	RES, CARBON	680 Ω
R703	RES, CARBON	2.7 KΩ
R704	RES, MOF	9.1 KΩ
R705	RES, CARBON	2.7 KΩ
R706	RES, CARBON	680 Ω
R707	RES, CARBON	2.7 KΩ
R708	RES, MOF	9.1 KΩ
R709	RES, CARBON	2.7 KΩ
R710	RES, CARBON	680 Ω
R711	RES, CARBON	2.7 KΩ
R712	RES, MOF	9.1 KΩ
R713	RES, CARBON	100 KΩ
R714	RES, MOF	0.33 Ω
R715	RES, CARBON	33 Ω
R801	RES, CARBON	1 MΩ
R802	RES, CARBON	47 KΩ
R803	RES, CARBON	6.8 KΩ
R804	RES, CARBON	39 KΩ
R805	RES, CARBON	6.8 KΩ
R806	RES, CARBON	22 Ω
R807	RES, CARBON	100 KΩ
R808	RES, MOF	68 KΩ
R809	RES, MOF	100 KΩ
R810	RES, CARBON	1 KΩ
R811	RES, MOF	0.22 Ω
R812	RES, MOF	0.22 Ω
R813	RES, MOF	1 Ω
R814	RES, MOF	1.5 KΩ
R815	RES, CARBON	2.2 KΩ

CAPACITORS

C201	CAP, ELT	10μF, 50V
C202	CAP, CC	22pF, 50V
C203	CAP, CC	680pF, 50V
C204	CAP, ELT	10μF, 50V
C205	CAP, ELT	10μF, 50V
C206	CAP, CC	680pF, 50V
C207	CAP, CC	22pF, 50V
C208	CAP, ELT	10μF, 50V
C209	CAP, ELT	10μF, 50V
C210	CAP, CC	680pF, 50V
C211	CAP, CC	22pF, 50V
C212	CAP, ELT	10μF, 50V
C213	CAP, ELT	100μF, 25V
C214	CAP, CC	0.1μF, 50V
C215	CAP, CC	0.1μF, 50V
C216	CAP, CC	0.1μF, 50V
C217	CAP, CC	0.1μF, 50V
C218	CAP, CC	0.1μF, 50V
C219	CAP, CC	0.1μF, 50V
C220	CAP, CC	0.1μF, 50V
C221	CAP, CC	680pF, 50V
C222	CAP, CC	0.1μF, 50V
C223	CAP, CC	0.1μF, 50V
C224	CAP, CC	0.1μF, 50V
C225	CAP, CC	0.1μF, 50V
C226	CAP, CC	680pF, 50V
C227	CAP, CC	0.1μF, 50V
C228	CAP, CC	0.1μF, 50V
C229	CAP, CC	0.1μF, 50V
C230	CAP, ELT	100μF, 25V
C231	CAP, ELT	4.7μF, 50V
C232	CAP, ELT	47μF, 50V
C233	CAP, CC	680pF, 50V
C234	CAP, ELT	100μF, 25V
C301	CAP, PE	0.1μF, 100V
C302	CAP, ELT	100μF, 25V
C303	CAP, CC	0.1μF, 50V
C304	CAP, PE	0.1μF, 100V
C305	CAP, PE	0.01μF, 100V
C306	CAP, CC	100pF, 50V
C307	CAP, PE	0.001μF, 100V
C308	CAP, PE	0.001μF, 100V
C309	CAP, PE	0.0056μF, 100V
C310	CAP, PE	0.0068μF, 100V
C311	CAP, ELT	1μF, 50V
C312	CAP, ELT	1μF, 50V
C313	CAP, PE	0.01μF, 100V
C314	CAP, PE	0.0082μF, 100V
C315	CAP, PE	0.1μF, 100V
C316	CAP, ELT	220μF, 16V

PARTS LIST

LOCATION NO.	PARTS NAME	SPECIFICATIONS
C317	CAP, ELT	10μF, 50V
C318	CAP, CC	0.1μF, 50V
C401	CAP, PE	0.1μF, 100V
C402	CAP, PE	0.033μF, 100V
C403	CAP, ELT	10μF, 50V
C404	CAP, ELT	1000μF, 25V
C405	CAP, PE	0.1μF, 100V
C406	CAP, PE	0.1μF, 100V
C407	CAP, PE	0.01μF, 100V
C408	CAP, PE	0.047μF, 100V
C409	CAP, TT	1μF, 35V
C410	CAP, PE	0.1μF, 100V
C411	CAP, PE	0.033μF, 100V
C412	CAP, PE	0.033μF, 100V
C413	CAP, CC	820μF, 50V
C414	CAP, CC	27pF, 50V
C415	CAP, CC	0.001μF, 50V
C416	CAP, ELT	1000μF, 35V
C417	CAP, ELT	470μF, 35V
C418	CAP, ELT	1000μF, 35V
C419	CAP, ELT	1μF, 50V
C501	CAP, CC	0.001μF, 500V
C502	CAP, CC	0.0022μF, 500V
C503	CAP, CC	0.01μF, 500V
C504	CAP, PP	2200pF, 1.6KV
C505	CAP, PP	6800pF, 1.6KV
C506	CAP, PP	153μF, 630V
C507	CAP, MPP	0.68μF, 200V
C508	CAP, MPP	0.47μF, 200V
C509	CAP, MPP	3.3μF, 200V
C510	CAP, ELT	1μF, 50V
C511	CAP, ELT	1μF, 50V
C512	CAP, CC	100pF, 500V
C513	CAP, PE	0.1μF, 100V
C514	CAP, CC	0.001μF, 500V
C515	CAP, ELT	10μF, 250V
C516	CAP, CC	0.001μF, 500V
C517	CAP, ELT	4.7μF, 50V
C701	CAP, CC	270pF, 50V
C702	CAP, CC	270pF, 50V
C703	CAP, CC	270pF, 50V
C704	CAP, ELT	100μF, 16V
C705	CAP, CC	0.001μF, 2KV
C801	CAP, X	0.47μF, AC250V
C802	CAP, X	0.1μF, AC250V
C803	CAP, Y	0.0047μF, 400V
C804	CAP, Y	0.0047μF, 400V
C805	CAP, ELT	220μF, 400V
C806	CAP, PE	0.0033μF, 100V
C807	CAP, PE	0.0068μF, 100V
C808	CAP, CC	0.1μF, 50V
C809	CAP, CC	0.01μF, 1KV
C810	CAP, CC	100pF, 1KV
C811	CAP, ELT	22μF, 50V
C812	CAP, CC	470pF, 50V
C813	CAP, Y	0.0047μF, 400V
C814	CAP, Y	0.0047μF, 400V
C815	CAP, ELT	220μF, 25V
C816	CAP, ELT	100μF,25V
C817	CAP, ELT	220μF, 25V
C818	CAP, CC	100pF, 1KV
C819	CAP, ELT	470μF, 35V
C820	CAP, ELT	470μF, 35V
C821	CAP, ELT	100μF, 160V
C822	CAP, ELT	100μF, 160V
C823	CAP, CC	680pF, 50V
C824	CAP, ELT	47μF, 50V

MISCELLANEOUS

F801	FUSE & CLIP	T3.15AH, 250V
PTC801	PTC	180N, 3PIN
BD801	DIODE	1N4148
W201	CONNECTOR	6PIN WAFER, 5mm
W202A	CONNECTOR	5PIN WAFER, 2.5mm
W301A	CONNECTOR	12PIN WAFER, 2.5mm
W501	CONNECTOR	6PIN WAFER, DY
W501-1	CONNECTOR	4PIN WAFER, DY
W502A	CONNECTOR	4PIN WAFER, 2.5mm
W801	CONNECTOR	2PIN WAFER, 7.5mm
W802	CONNECTOR	GT PIN , 10mm
ZD301	DIODE,ZENOR	Z5.1V
ZD302	DIODE,ZENOR	Z5.1V
ZD303	DIODE,ZENOR	22BSC
ZD401	DIODE,ZENOR	Z5.1V
W202B	CONNECTOR	5PIN WAFER, 2.5mm
W502B	CONNECTOR	4PIN WAFER, 2.5mm
W301B	CONNECTOR	12PIN WAFER, 2.5mm
P701	SOCKET, CRT	ISHS08
P702	GT PIN	GT PIN
P703	GT PIN	GT PIN
	WIRE A'SSY	4PIN TO 4PIN, 250mm
	WIRE A'SSY	5PIN TO 5PIN, 250mm
	WIRE A'SSY	12PIN TO 12PIN, 1,200mm
	PCB	CEM-1, 70X42mm
	SIGNAL CABLE	6PIN WIRE A'SSY
	POWER CORD	3PIN TO 3PIN
	PCB MAIN	CEM-1, 245X195mm