SERVICE BULLETIN NO.73

EDITED BY CUSTOMER ENGINEERING DIVISION

WANG VIDEO DISPLAY CHASSIS

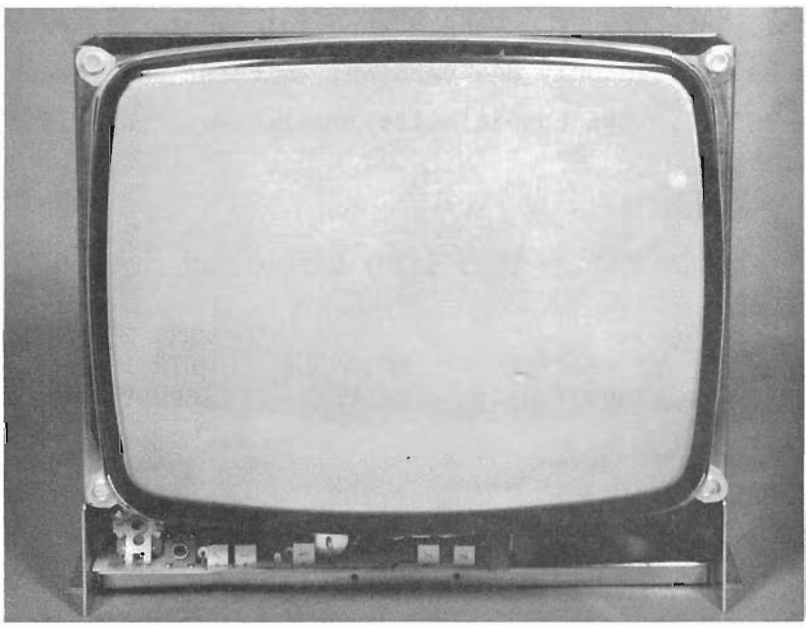


FIGURE 1 - WANG 12" CRT DISPLAY CHASSIS

1. INTRODUCTION

Wang Laboratories, Inc. is now manufacturing a video display chassis to replace the Motorola 9 inch (XM-227) and 12 inch (XM-351) chassis presently used in 2200 and 928 Systems. The new Wang display chassis will also be used in all future products requiring an integral CRT display unit.

WANG LABORATORIES, INC.

1 INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851. TEL. (617) 851-4111, TWX 710 343-6769, TELEX 94-7421

Printed in U.S.A.
13-210A

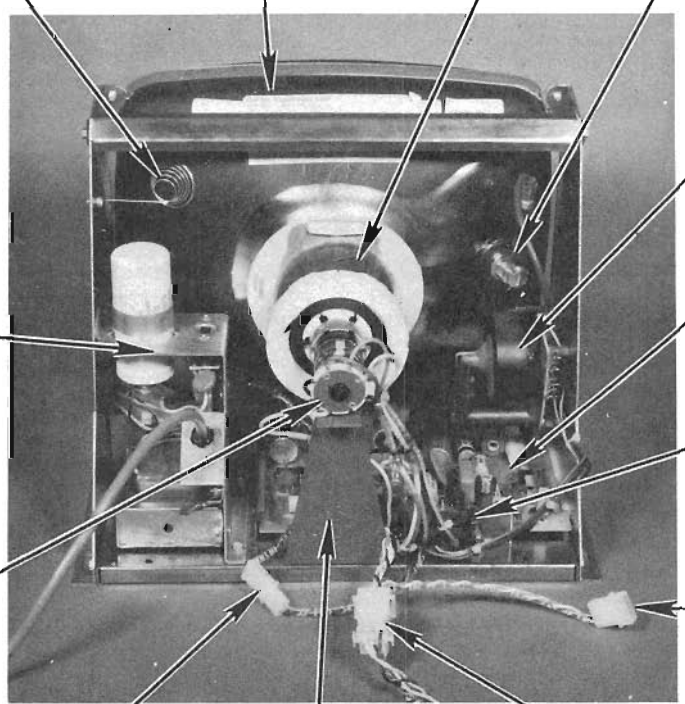
The Wang 12 inch (diagonal CRT screen measure) chassis will be manufactured as follows: one version with power supply, one version without power supply. The units *with* self-contained power supplies will currently be used in the 2210 and 2226, while units *without* power supplies will be used in future 2236, 2200F, and 928 work stations. DC power for the Wang display chassis will be taken directly from the host power supply in 2210, 2236 and future 2200F and 928 units. Generally speaking, the Wang display unit *with* power supply is directly interchangeable with Motorola 12 inch display units. Note that the Wang 9 inch (diagonal CRT screen measure) display will be made in only one version: *without* power supply, presently used only in PCS-II. See compatibility/replacement chart for 12 inch display products below.

WANG/MOTOROLA DISPLAY UNIT (12") REPLACMENT GUIDE

FOR REPLACEMENT CRT USE:	IF EXISTING PRODUCT HAS:	MOTOROLA DISPLAY	WANG DISPLAY WITH POWER SUPPLY	WANG DISPLAY WITHOUT POWER SUPPLY
MOTOROLA DISPLAY UNIT		YES	YES	YES
WANG DISPLAY WITH POWER SUPPLY		YES	YES	YES
WANG DISPLAY WITHOUT POWER SUPPLY		NO	NO	YES

FIGURE 2

WANG DISPLAY CHASSIS



Certain component loading variations on the 7256 board exist, depending on whether the board is used in a 9 inch display unit, or a 12 inch display unit. Loading variations are summarized in a chart on the 7256 schematic, attached to this bulletin.

2. DISASSEMBLY

2.1 CHASSIS REMOVAL

Both 12 inch and 9 inch models are secured in the host mainframe by four screws, exactly as Motorola units are.

2.2 7256 or 7256-1 BOARD REMOVAL

The 7256 board (12 inch monitor) or 7256-1 board (9 inch monitor) may be removed by pulling forward on the board. There is no need to remove the entire chassis to remove the 7256/56-1 board. The 7255 (+12V Regulator) is removeable, according to procedures outlined in Section 2.3.

2.3 POWER SUPPLY

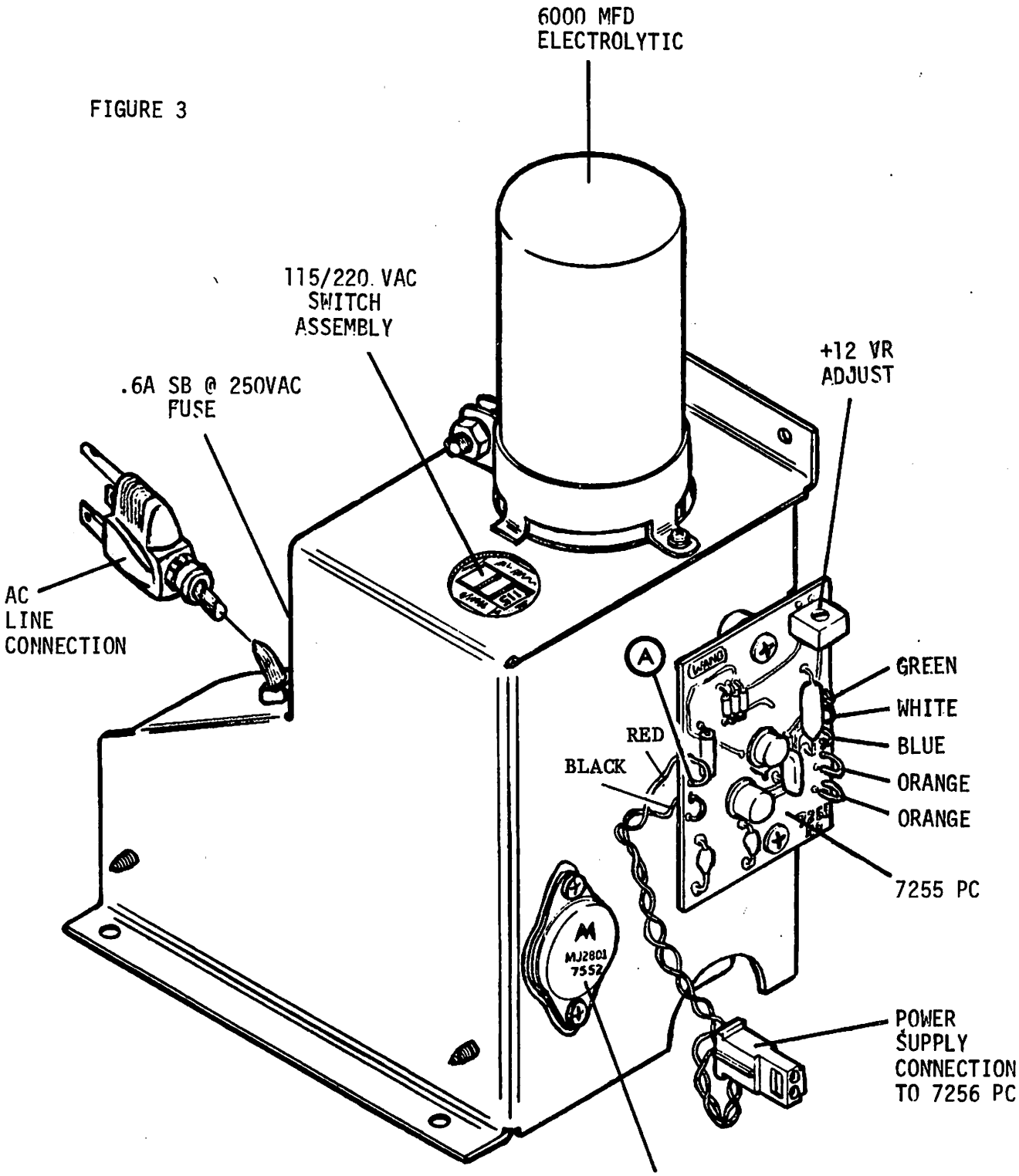
2.3.1 *POWER SUPPLY MODULE REMOVAL (12 INCH DISPLAY UNITS ONLY)*

Remove the AC plug from the AC power receptacle. Disconnect the nylon connector which links +12 volts to the 7256 pc. Remove the two screws from the left side display chassis flange (see Figures 2, 3) and remove the screws from the right side (bottom) of the power supply module. The power supply module can then be removed.

2.3.2 *POWER SUPPLY REGULATOR REMOVAL (210-7255; 12 INCH DISPLAY UNITS ONLY)*

Desolder the seven wires from the 7255, noting their solder points (see Figure 3 and 7255 schematic). Remove the two screws securing the board.

FIGURE 3


6000 MFD
ELECTROLYTIC
115/220 VAC
SWITCH
ASSEMBLY
.6A SB @ 250VAC
FUSE
+12 VR
ADJUST
AC
LINE
CONNECTION
GREEN
WHITE
BLUE
ORANGE
ORANGE
RED
BLACK
7255 PC
POWER
SUPPLY
CONNECTION
TO 7256 PC
MJ2801
7552
POWER SUPPLY MODULE
FOR WANG DISPLAYS
+12 VR
PASS TRANSISTOR

3. ADJUSTMENTS (ON 7256/56-1 BOARD)

See 7256 schematic for the following:

a) Connect a digital voltmeter to the +12V test point. Point A in Figure 3 or Figure 4; reference chassis ground.

b) For models with a power supply, adjust the +12 VR on the 7255 for +12.00 vdc $\pm$ .10 vdc.

c) For models without a power supply, adjust the +12V power supply in the host unit for +12.00 vdc $\pm$ .10 vdc.

d) Connect an oscilloscope to pin M (Figure 4). Adjust the Dynamic Focus coil (Z1) for an amplitude of 300V p-p as observed on the oscilloscope. Disconnect the oscilloscope.

e) Enter a program in the system to display a screen filled with the characters "HO".

f) Set both Horizontal hold (R33) and Vertical hold (R15) to middle of stable display range.

g) Adjust the vertical size (R24) for a vertical height of 8.5 inches (21.6 cm) on the 12" display; 4.5 inches (11.4 cm) on the 9" display.

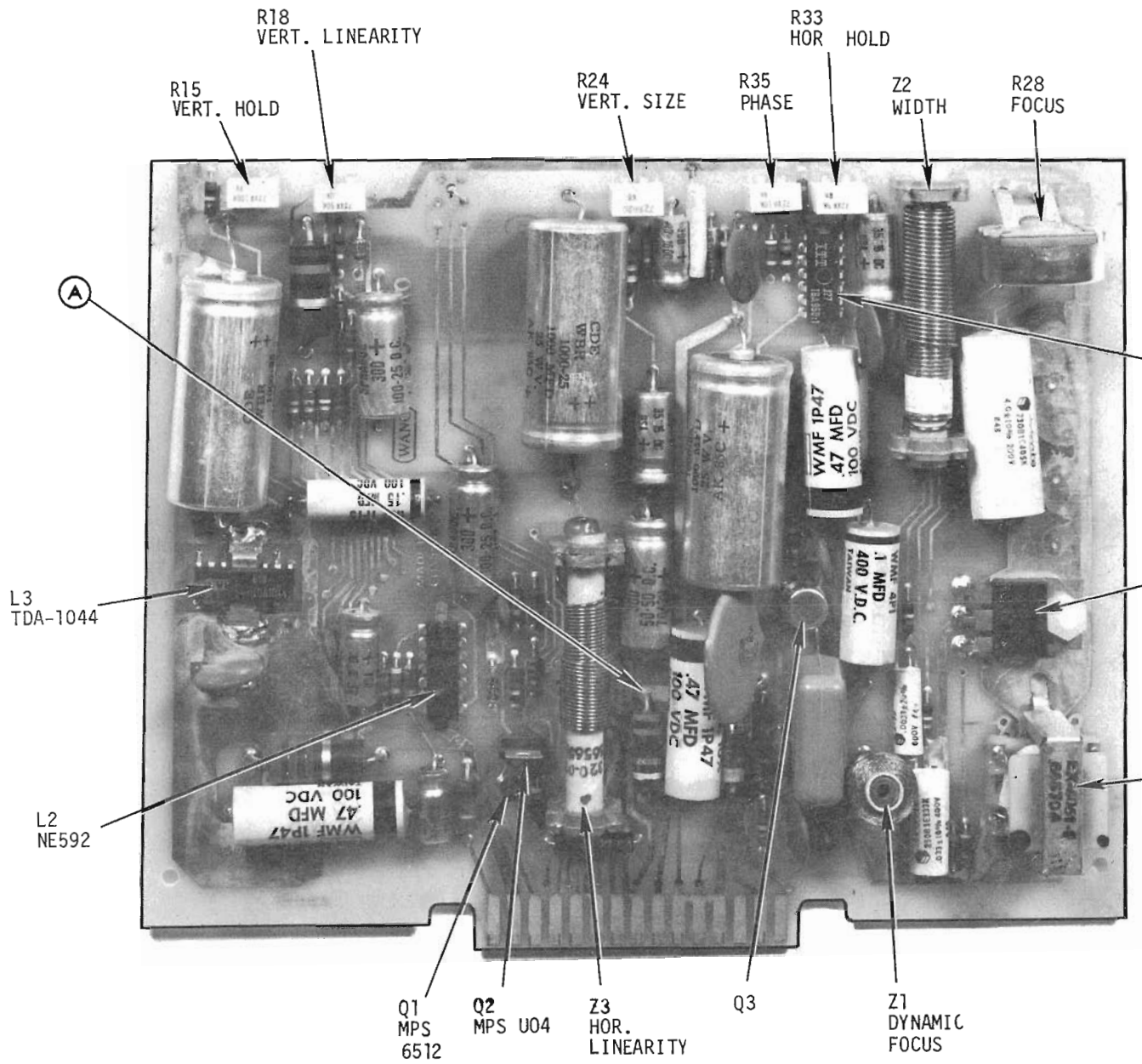
h) Adjust the vertical linearity (R18) for character rows of equal height.

i) Repeat g and h until both requirements can be met.

j) Adjust the width coil (Z2) for 10 inches (25.4 cm) of horizontal deflection on the 12" display or 6.5 inches (16.5 cm) on the 9" display.

k) Adjust the horizontal phasing (R35) for characters centered horizontally on the raster (turn the brightness up sufficiently to observe the raster).

l) Adjust the focus (R28) for the best overall focus.



7256 PC

FIGURE 4

BILL OF MATERIALS

FOR 12" DISPLAY

ASSEMBLY PART NUMBER 270 0362
ASSEMBLY DESCRIPTION 12" MONITOR ASSY(LESS PWR SUPPLY)

PART NUMBER			DESCRIPTION	CHG NO.	QUANTITY
210 7256		*	7256 MODULE	EC6047	1.00
220 0160			BRIGHTNESS POT CABLE ASSY C6482-140	EC6389	1.00
270 3068			12" CRT HARNESS ASSY D6482-139	EC6389	1.00
320 0052			DEFLECTION YOKE EX5012		1.00
336 0035			250 OHM CONTRAST CONTROL	EC6433	1.00
340 0101			CATHODE RAY TUBE 12" 530M12P31TE		1.00
350 2073			ANODE CONNECTOR (125-29)		1.00
380 3011			H-617 20000V RECTIFIER		1.00
446 0028			FILTER,CONTRAST PANEL D6836-100		1.00
451 1106		N	CHASSIS,12"MONITOR D6836-103		1.00
451 3856		N	PANEL,SIDE(L.H.)(12"M)D6836-102		1.00
451 3857		N	PANEL,SIDE(R.H.)(12"M)D6836-102		1.00
451 4472			BRKT,NECKSAVER(12"M)C6836-107		1.00
451 4473			BRKT,SUPPORT(12"M)B6836-104		1.00
452 4042			GUIDE,CARD RCG-2 4"		2.00
462 0293			SPCR,DELRIN 3/8DIA 4-40TAP B6835-505	EC6454	2.00
465 1643			SPRING,GROUNDING(12"MON)B6836-105		1.00
605 1004			CABLE TYE, PAN-TY PLTIM-M	EC6389	2.00
650 2120			4-40 X 3/8 PAN HD PHL MS SS SEMS		2.00
651 0005			INACT,#6 5/8LG SELF TAP SLT HEX T-B	EC6389	2.00
651 0024			#8X1/4 HEX HD SLOT TAP SCR TYPE-B	EC6389	9.00
651 0025			#10X5/16 HEX HD SLOT TAP SCR TYPE-B		4.00
651 0030			SCREW,SELF TAP T-B #4X1/2"L PNHD PH	EC6454	2.00
653 2002			NO. 4 INT T LK WASHER	EC6454	3.00
654 0101	R	*	CRIMP TERMINAL EDGE CONN #08-05-0301	EC6389	4.00
660 0027		*	1" PERMACELL TAPE #672 (BLACK)	EC6389	1.00

BILL OF MATERIALS

FOR 9" DISPLAY

ASSEMBLY PART NUMBER 270 0367

ASSEMBLY DESCRIPTION 9" MONITOR ASSY W/OUT PWR SUPPLY

PART NUMBER	DESCRIPTION	CHG NO.	QUANTITY
210 7256 1 *	72561 MODULE(PRELIM 9" MONITOR)		1.00
320 0057	DEFLECTION YOKE FOR 9" MONITOR		1.00
336 0032	250K OHM POT (BRIGHTNESS)		1.00
336 0035	250.OHM CONTRAST CONTROL		1.00
340 0102	CATHODE RAY TUBE 9" CE219E-M9P31TE		1.00
350 0008	30 PIN PC CONN.SOLDER TYPE (CJ/AMP)		1.00
350 2073	ANODE CONNECTOR (125-29)		1.00
350 2084	CRT SOCKET FOR 9" MONITOR		1.00
380 3011	H-617 20000V RECTIFIER		1.00
410 1008	FLYBACK TRANSFORMER EF-4203	EC6529	1.00
446 0029	FILT.CONTRAST PANEL 9" MON 6835-504		1.00
451 1109	CHASSIS (9" MONITOR)		1.00
451 3861	PANEL,SIDE LH C6835-500		1.00
451 3862	PANEL,SIDE RH C6835-500		1.00
451 4513	BRKT.,NECK SAVER C6835-502		1.00
451 4519	BRACKET,SUPPORT B6835-503	EC6471	1.00
452 4042	GUIDE,CARD RCG-2 4"		2.00
462 0293	SPCR,DELRIN 3/8DIA 4-40TAPB6835-505	EC6471	2.00
465 1643	SPRING,GROUNDING(12"MON)B6836-105		1.00
650 2120	4-40 X 3/8 PAN HD PHL MS SS SEMS		2.00
650 4126	8-32 X 3/8 FILISTER HD PHL MS SS		6.00
651 0024	#8X1/4 HEX HD SLOT TAP SCR TYPE-B	EC6471	5.00
651 0030	SCREW,SELF TAP T-B #4X1/2"L PNHD PH	EC6471	2.00
651 0438	RIVET,CHERRY Q SSPQ52	EC6471	4.00
651 1006	STUD SELF CLINCH PEM FHS 632-6		1.00
652 0067	#8 EDGE NUT,INSERT SHEET		6.00

BILL OF MATERIALS

FOR POWER SUPPLY

WL#:		DESCRIPTION:	QUANTITY:
210 7255	*	7255 MODULE (12" MONITOR)	1.00
220 1107		12" CRT POWER SUPLY CABLE B6482-141 EC6389	1.00
300 3073		6000 UF 25V ELECTROLYTIC CAP	1.00
300 9009		CAP CLAMP 1 1/4 INCH 2 LUG CMC-22 EC6207	1.00
325 2112		SLIDE SW.115/230 VAC	1.00
360 0008		FUSE BLOCK.SING(LITTLEFUSE)350-218 EC6690	1.00
360 1006	SB	6/10 AMP FUSE SLO BLO 250 V EC6690	1.00
375 1008		40251 / MJ2801 TRANSISTOR	1.00
375 9014		INSULATOR XTOR MOUNT WECKESSER IM-1 EC6207	1.00
380 5001		250 VOLT VARISTOR V250LA20	1.00
410 0110	C	MMC 5793 XFMR(WANG CRT)C5068-108	1.00
420 1000	*	CORD POWER 3 COND	1.00
451 1107		CHASSIS.PWR SUPPLY(12"M)D6836-106	1.00
510 6749		6749 PRINTED CIRCUIT BOARD	1.00
651 0021		SCR.#8X1/2 SELF TAP TRUSS HD T-B	2.00
651 0024		#8X1/4 HEX HD SLOT TAP SCR TYPE-B	2.00
651 0411		RIVET USMC SD43-BS	2.00
652 2000		4-40 HEX NUT SS	4.00
653 2002		NO. 4 INT T LK WASHER	2.00
654 1004		#4 GROUND LUG 1414-4	1.00
654 1238		HEYCO STRAIN RELIEF SR5P-4	1.00
654 1246		PLAST1-GROMMET ITW#212-170602240101	2.00

5. OPERATION

See Integrated Circuit descriptions and associated Wang Display (7256, 7255) schematics provided herein.

VIDEO AMPLIFIER 592

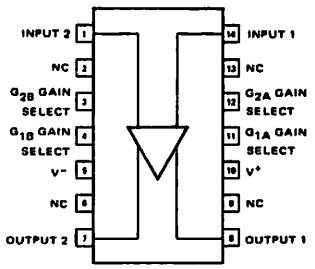
FEATURES
- 120 MHz BANDWIDTH
- ADJUSTABLE GAINS FROM 0 TO 400
- ADJUSTABLE PASS BAND
- NO FREQUENCY COMPENSATION REQUIRED

ABSOLUTE MAXIMUM RATINGS

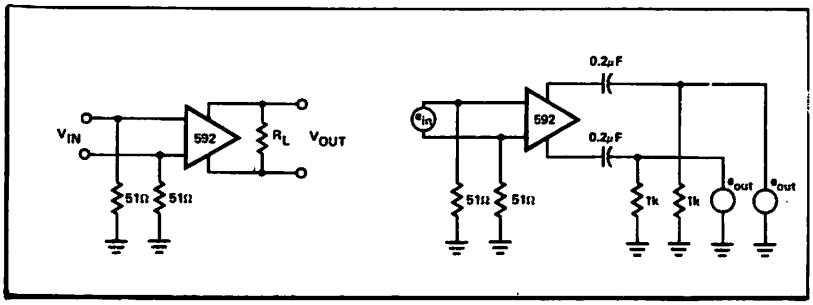
Supply Voltage	±8V
Differential Input Voltage	±5V
Common Mode Input Voltage	±6V
Output Current	10mA
Operating Temperature Range	
SE592K	−55°C to +125°C
NE592K	0°C to+ 70°C
Storage Temperature Range	−65°C to +150°C

PIN CONFIGURATION

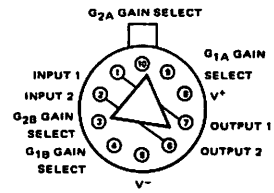
A PACKAGE



TEST CIRCUITS (T_A = 25°C unless otherwise specified)



K PACKAGE

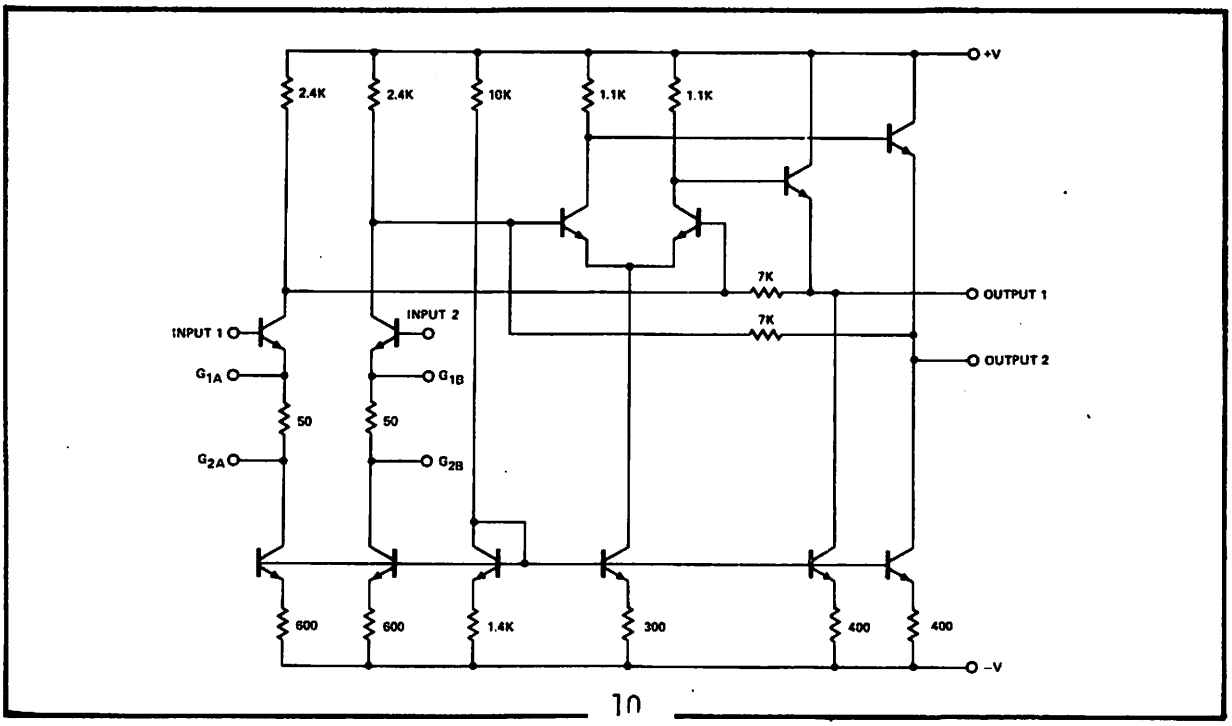


NOTE:
Pin 5 connected to case.

Thermal Resistance (θ_{J-A}, Junction to Ambient for each package):

A Package	0.16°C/mW
K Package	0.145°C/mW
Power Dissipation	500mW

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS Standard Conditions (T_A = +25°C, V_S = ±6V, V_{CM} = 0 unless otherwise specified)

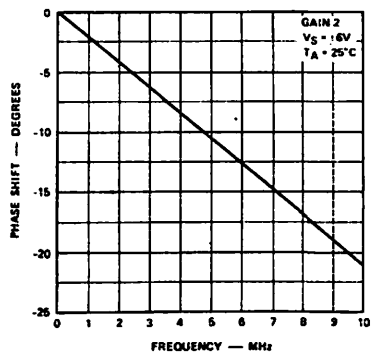
PARAMETER	TEST CONDITIONS	NE 592			SE 592			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Differential Voltage Gain								
Gain 1	Note 1 R_L = 2KΩ, V_{OUT} = 3V p-p	250	400	600	300	400	500	
Gain 2	Note 2	80	100	120	90	100	110	
Bandwidth								
Gain 1	Note 1		40			40		MHz
Gain 2	Note 2		90			90		MHz
Rise Time								
Gain 1	Note 1 V_{OUT} = 1V p-p		10.5			10.5		ns
Gain 2	Note 2		4.5	12		4.5	10	ns
Propagation Delay								
Gain 1	Note 1 V_{OUT} = 1V i-p		7.5			7.5		ns
Gain 2	Note 2		6.0	10		6.0	10	ns
Input Resistance								
Gain 1	Note 1		4.0			4.0		KΩ
Gain 2	Note 2	10	30		20	30		KΩ
Input Capacitance	Gain 2, Note 2		2.0			2.0		pF
Input Offset Current			0.4	5.0		0.4	3.0	μA
Input Bias Current			9.0	30		9.0	20	μA
Input Noise Voltage	BW 1 kHz to 10 kHz		12			12		μV rms
Input Voltage Range				±1.0			±1.0	V
Common Mode Rejection Ratio								
Gain 2	VCM ±1V,F < 100 kHz	60	86		60	86		dB
Gain 2	VCM ±1V,F = 5 MHz		60			60		dB
Supply Voltage Rejection Ratio								
Gain 2	ΔVS = ±0.5V	50	70		50	70		dB
Output Offset Voltage								
Gain 3	R_L = ∞, Note 3		0.35	0.75		0.35	0.75	V
Output Common Mode Voltage	R_L = ∞	2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing	R_L = 2K	3.0	4.0		3.0	4.0		
Output Resistance			20			20		Ω
Power Supply Current	R_L = ∞		18	24		18	24	mA

Recommended Operating Supply Voltages (V_S = ±6.0V)

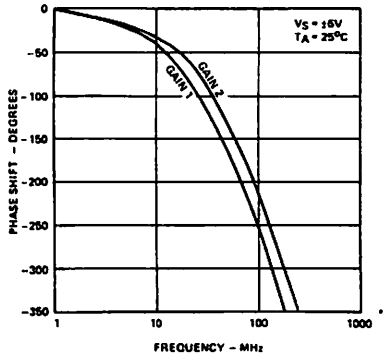
NOTES:
1. Gain select pins G_{1A} and G_{1B} connected together.
2. Gain select pins G_{2A} and G_{2B} connected together.
3. All gain select pins open.

TYPICAL CHARACTERISTICS

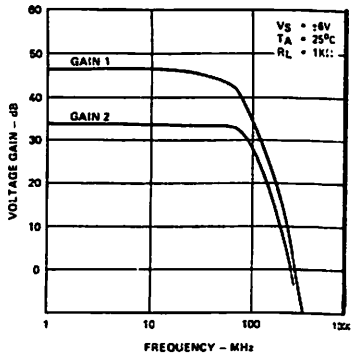
PHASE SHIFT AS A FUNCTION OF FREQUENCY



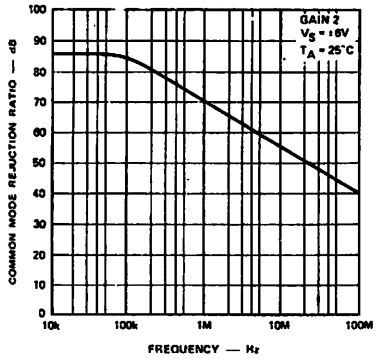
PHASE SHIFT AS A FUNCTION OF FREQUENCY



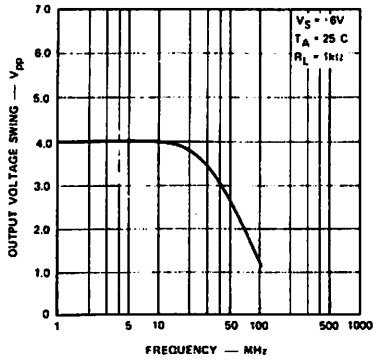
VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



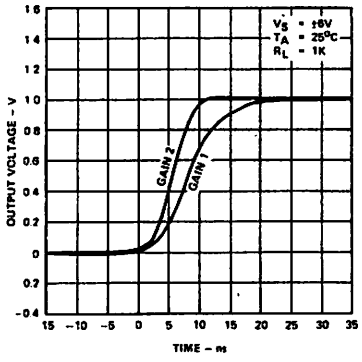
COMMON MODE REJECTION RATIO AS A FUNCTION OF FREQUENCY



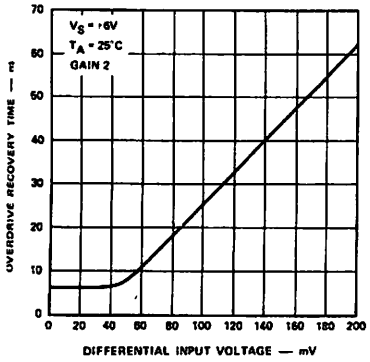
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



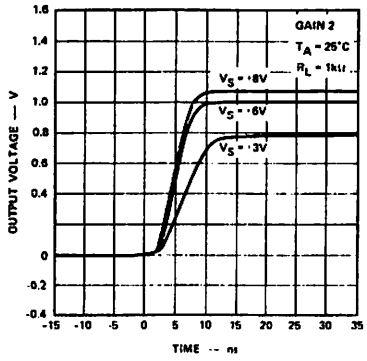
PULSE RESPONSE



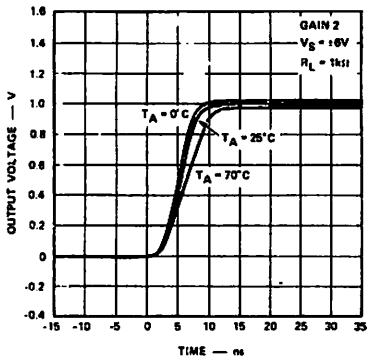
DIFFERENTIAL OVERDRIVE RECOVERY TIME



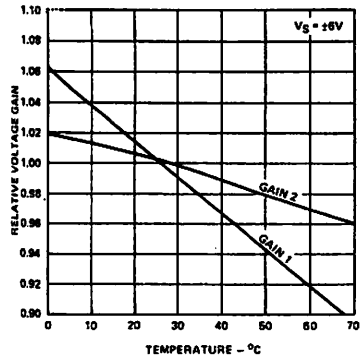
PULSE RESPONSE AS A FUNCTION OF SUPPLY VOLTAGE



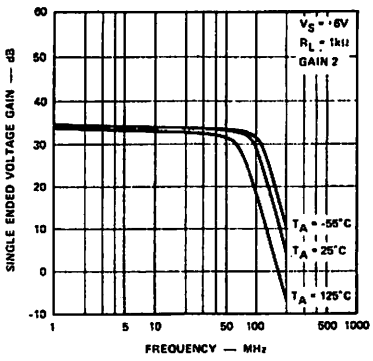
PULSE RESPONSE AS A FUNCTION OF TEMPERATURE



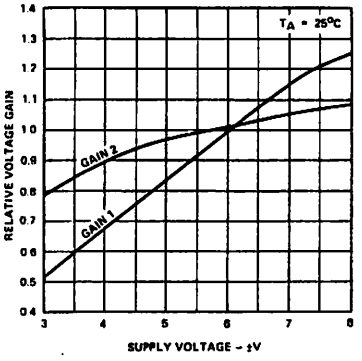
VOLTAGE GAIN AS A FUNCTION OF TEMPERATURE



GAIN VS FREQUENCY AS A FUNCTION OF TEMPERATURE

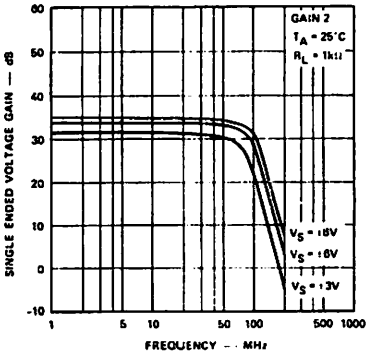


VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE

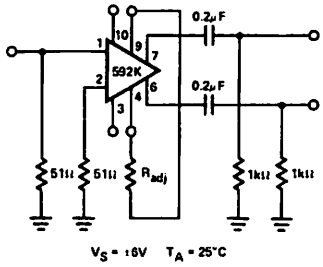


TYPICAL CHARACTERISTICS (Cont'd)

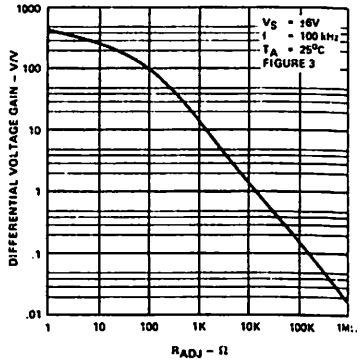
GAIN VS FREQUENCY AS A FUNCTION OF SUPPLY VOLTAGE



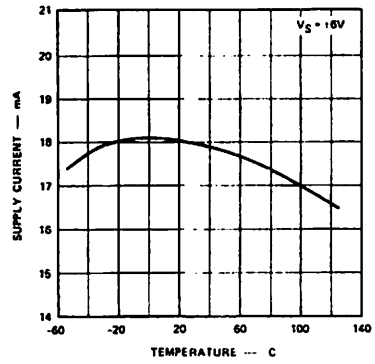
VOLTAGE GAIN ADJUST CIRCUIT



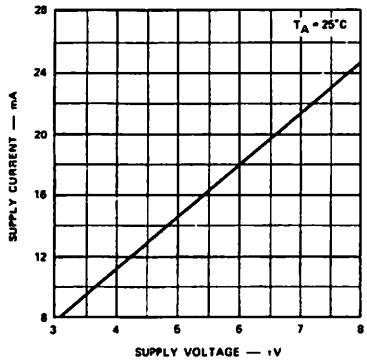
VOLTAGE GAIN AS A FUNCTION OF RADJ (FIGURE 3)



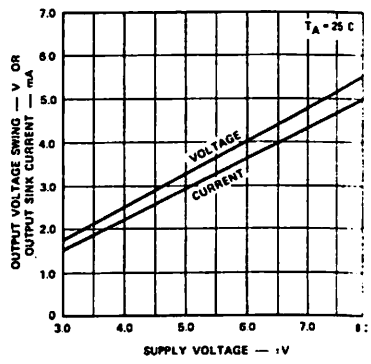
SUPPLY CURRENT AS A FUNCTION OF TEMPERATURE



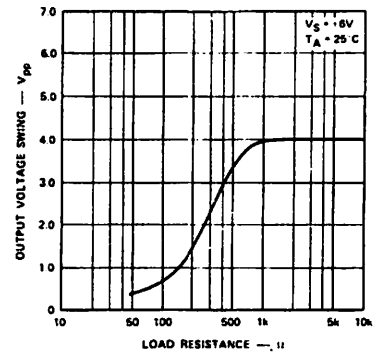
SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



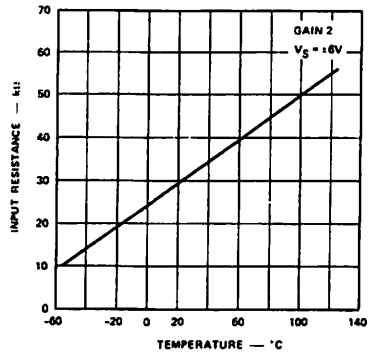
OUTPUT VOLTAGE AND CURRENT SWING AS A FUNCTION OF SUPPLY VOLTAGE



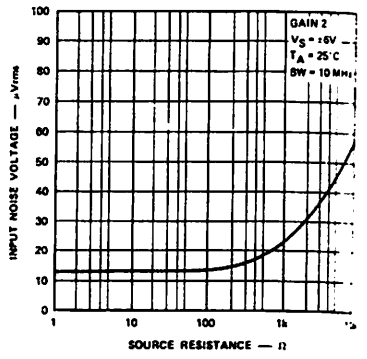
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



INPUT RESISTANCT AS A FUNCTION OF TEMPERATURE

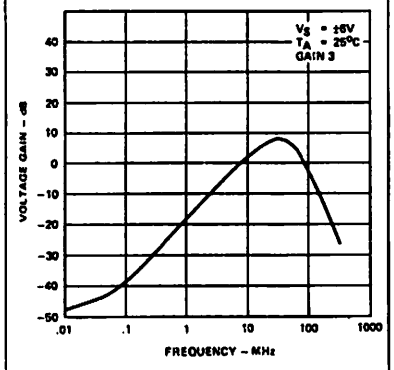


INPUT NOISE VOLTAGE AS A FUNCTION OF SOURCE RESISTANCE



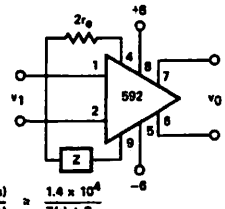
TYPICAL CHARACTERISTICS (Cont'd)

VOLTAGE GAIN AS A FUNCTION OF FREQUENCY (ALL GAIN SELECT PINS OPEN)



TYPICAL APPLICATIONS

FILTER NETWORKS



$$\frac{v_0(s)}{v_1(s)} \approx \frac{1.4 \times 10^4}{Z(s) + 2r_e}$$

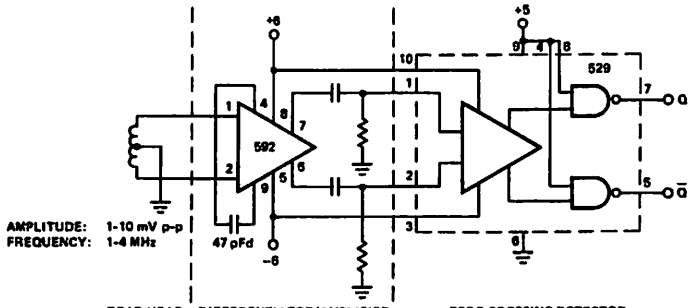
$$\approx \frac{1.4 \times 10^4}{Z(s) + 32}$$

BASIC CONFIGURATION

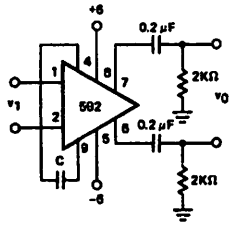
Z NETWORK	FILTER TYPE	$v_0(s)$ / $v_1(s)$ TRANSFER FUNCTION
R L	LOW PASS	$\frac{1.4 \times 10^4}{L}\left[\frac{1}{s + R/L}\right]$
R C	HIGH PASS	$\frac{1.4 \times 10^4}{R}\left[\frac{s}{s + 1/RC}\right]$
R L C	BAND PASS	$\frac{1.4 \times 10^4}{L}\left[\frac{s}{s^2 + R/L\,s + 1/LC}\right]$
L R C	BAND REJECT	$\frac{1.4 \times 10^4}{R}\left[\frac{s^2 + 1/LC}{s^2 + 1/LC + s/RC}\right]$

NOTE:
In the networks above, the R value used is assumed to include $2r_e$, or approximately 32 OHMS.

DISC/TAPE PHASE MODULATED READBACK SYSTEMS



DIFFERENTIATION WITH HIGH COMMON MODE NOISE REJECTION



FOR FREQUENCY $F_1 << 1/2\,\pi\,(32)\,C$

$v_0 \cong 1.4 \times 10^4 C \frac{dv_i}{dT}$

Controlled Pulse Generators for Transistor Line Output Stages

Monolithic integrated circuit for pulse separation and line synchronization in TV receivers with transistor line output stage.

The TBA 950 is an advanced version of the TAA 790. It comprises the sync separator with noise suppression, the frame pulse integrator, the phase comparator, a switching stage for automatic changeover of noise immunity, the line oscillator with frequency range limiter, a phase control circuit and the output stage.

It delivers prepared frame sync pulses for triggering the frame oscillator. The phase comparator may be switched for video recording operation. Due to the large scale of integration few external components are needed.

The 950 is delivered in two groups having different output pulse durations. The TBA 950:F is designed for TV receivers according to the French standard.

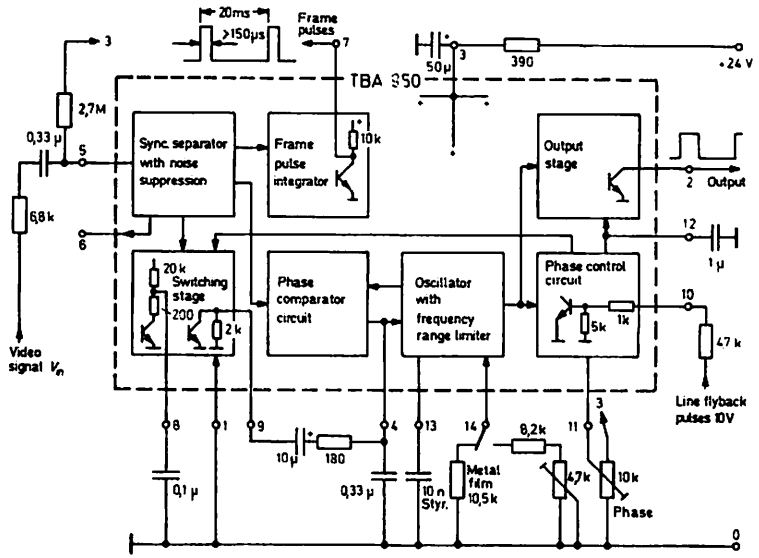
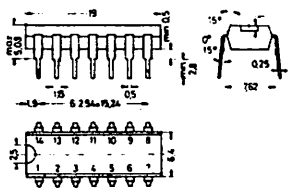


Fig. 1: Block diagram and test circuit for the TBA 950

Fig. 2:
TBA 950 in dual in-line (Dil) plastic TO-116 package
20 A 14 according to DIN 41 866

Weight approx. 1.1 g
Dimensions in mm



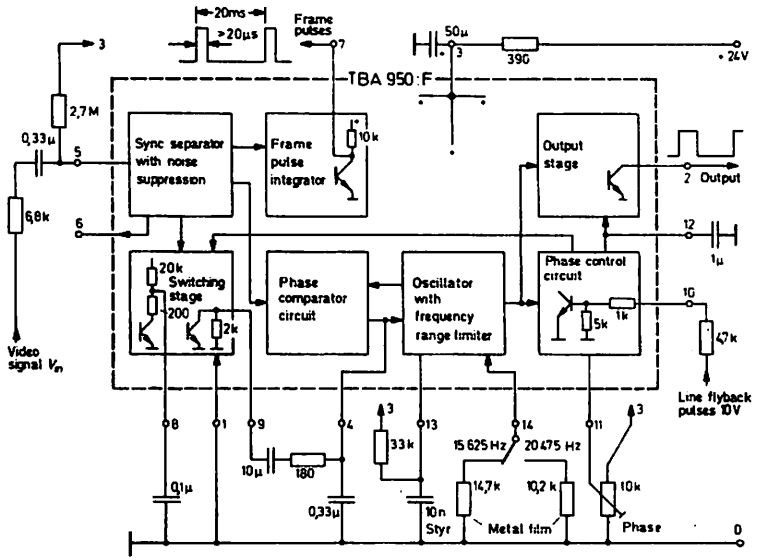


Fig. 3: Block diagram and test circuit for the TBA 950:F

All voltages are referred to pin 1.

Maximum Ratings

Supply current (see Fig. 8)	I_3	45	mA
Input current	I_5	2	mA
Input voltage	V_5	−6	V
Output current	I_2	22	mA
Output voltage	V_2	12	V
Switch-over current for video recording operation	I_8	5	mA
Flyback peak pulse current	I_{10}	5	mA
Phase correction voltage	V_{11}	0 . . . V_3	
Ambient temperature	T_{amb}	60	°C

Recommended Operating Conditions for operating circuits Figs. 5 to 7

Input current during the sync pulse	I_5	> 5	µA
BAS input signal	$V_{in\,pp}$	3 (1 . . . 6)	V
Input current during the line flyback pulse	I_{10}	0.2 . . . 2	mA

TBA 950

Switch-over current	I_8	> 2	mA
Time difference between the output pulse at pin 2 and the line flyback pulse at pin 10	t_d	< 20	µs
Current consumption (see Fig. 8)	I_3	≤ 45	mA
Ambient operating temp. range	T_{amb}	0 . . . 60	°C

Characteristics
for $T_{amb} = 25$ °C, $f_o = 15\,625$ Hz [1]) in the test circuits Figs. 1 and 3

Amplitude of the frame pulse	V_7	> 8	V
Frame pulse duration			
TBA 950	t_7	> 150	µs
TBA 950:F	t_7	> 20	µs
Output resistance at pin 7 (high state)	$R_{out\,7}$	10 (7.5 . . . 13)	kΩ
Amplitude of the complete sync signal	V_6	> 8	V
Output resistance at pin 6	$R_{out\,6}$	2.5 . . . 4.5	kΩ
Output pulse duration			
TBA 950:1	t_2	22 . . . 26	µs
TBA 950:2	t_2	25 . . . 28	µs
TBA 950:F	t_2	25 . . . 30	µs
Residual output voltage at $I_2 = 20$ mA	$V_{2\,res}$	< 0.55	V
Oscillator frequency for $C_{13/1} = 10$ nF, $R_{14/1} = 10.5$ kΩ	f_o	15 625 ± 1562	Hz
Frequency pull-in range	$\pm \Delta f_F$	400 . . . 1000	Hz
Frequency holding range	$\pm \Delta f_H$	400 . . . 1000	Hz
Slope of phase comparator control loop	df_o/dt_d	2	kHz/µs
Gain of phase control	dt_d/dt_p	20	
Phase shift between leading edge of BAS signal and line flyback pulse [2]) at $t_5 = 4.7$ µs, $t_{10} = 12$ µs, $t_s = 5$ µs, pin 11 open circuit, see Fig. 4	t_v	$-1 . . . +3.5$	µs

[1]) By modification of the frequency determining network at pins 13 and 14 these integrated circuits can also be used for other line frequencies.

[2]) The limited flyback pulse should overlap the BAS signal sync pulse on both edges.

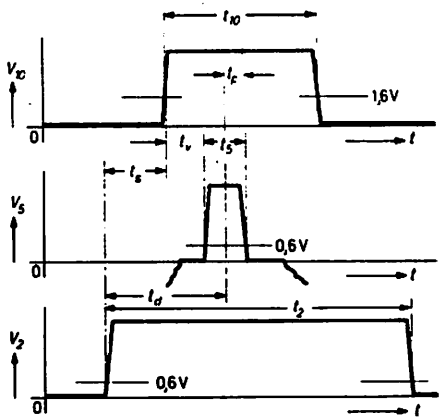


Fig. 4: Phase relations of the TBA 950.

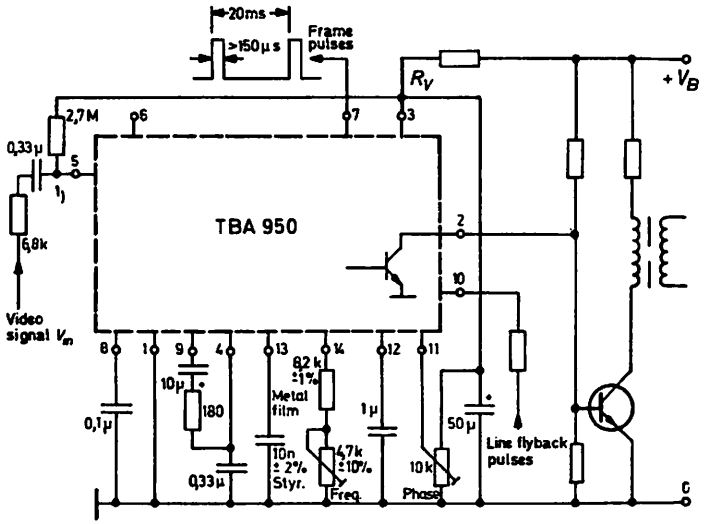


Fig. 5: Operating circuit

[1]) Input circuitry must be optimized.

TBA 950

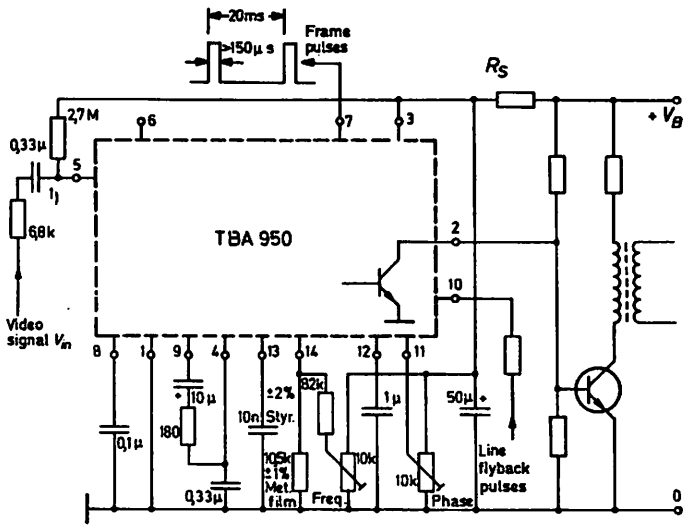


Fig. 6: Another possibility for line frequency adjustment for the TBA 950

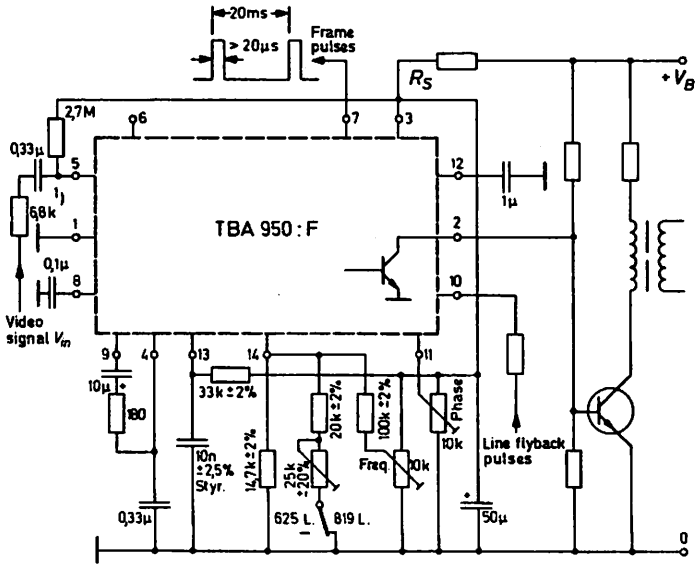


Fig. 7: Operating circuit of the TBA 950:F with line frequency changeover from 625 lines to 819 lines

[1]) Input circuitry must be optimized.

Design and Operation Mode

The sync separator separates the synchronizing pulses from the composite video signal (BAS signal). The noise inverter circuit, which needs no external components, in connection with an integrating and differentiating network frees the synchronizing signal from distortion and noise.

The frame sync pulse is obtained by multiple integration and limitation of the synchronizing signal, and is available at pin 7. The *RC* network hitherto required between sync separator and frame oscillator is no longer needed. Since the frame sync pulse duration at pin 7 is subject to production spreads it is recommended to use the leading edge of this pulse for triggering.

The frequency of the line oscillator is determined by a 10 nF Styroflex capacitor at pin 13 which is charged and discharged periodically by two internal current sources. The external resistor at pin 14 defines the charging current and consequently in conjunction with the oscillator capacitor the line frequency.

The phase comparator compares the sawtooth voltage of the oscillator with the line sync pulses. Simultaneously an AFC voltage is generated which influences the oscillator frequency. A frequency range limiter restricts the frequency holding range.

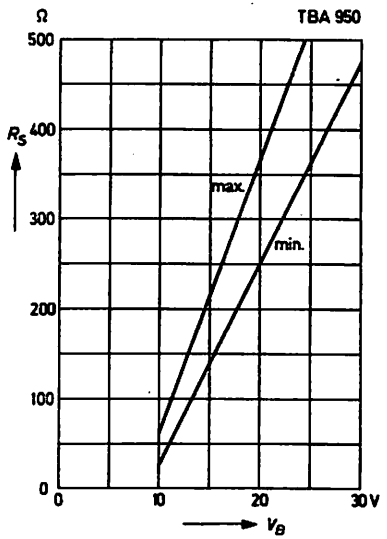
The oscillator sawtooth voltage, which is in a fixed ratio to the line sync pulses, is compared with the flyback pulse in the phase control circuit, in this way compensating all drift of delay times in driver and line output stage. The correct phase position and hence the horizontal position of the picture can be adjusted by the 10 kΩ potentiometer connected to pin 11. Within the adjustable range the output pulse duration (pin 2) is constant. Any larger displacements of the picture, e. g. due to non-symmetrical picture tube, should not be corrected by the phase potentiometer, since in all cases the flyback pulse must overlap the sync pulse on both edges (see Fig. 4).

The switching stage has an auxiliary function. When the two signals supplied by the sync separator and the phase control circuit respectively are in synchronism a saturated transistor is in parallel with the integrated 2 kΩ resistor at pin 9. Thus the time constant of the filter network at pin 4 increases and consequently reduces the pull-in range of the phase comparator circuit for the synchronized state to approximately 50 Hz. This arrangement ensures disturbance-free operation.

For video recording operation this automatic switchover can be blocked by a positive current fed into pin 8, e. g. via a resistor connected to pin 3. It may also be useful to connect a resistor of about 680 Ω or 1 kΩ between pin 9 and ground. The capacitor at pin 4 may be lowered, e. g. to 0.1 µF. This alterations do not significantly influence the normal operation of the IC and thus do not need to be switched.

The output stage delivers at pin 2 output pulses of duration and polarity suitable for driving the line driver stage. If the supply voltage goes down (e.g. by switching off the mains) a built-in protection circuit ensures defined line frequency pulses down to $V_3 = 4$ V and shuts off when V_3 falls below 4 V, thus preventing pulses of undefined duration and frequency. Conversely, if the supply voltage rises, pulses defined in duration and frequency will appear at the output pin as soon as V_3 reaches 4.5 V. In the range between $V_3 = 4.5$ V and full supply the shape and frequency of the output pulses are practically constant.

Fig. 8:
Graph for determining the supply series resistor R_S



TDA 1044

Frame Scan Circuit for TV Receivers

The TDA 1044 is a monolithic integrated circuit containing all stages necessary for the vertical deflection of 110° black and white TV receivers.

As can be gathered from Figs. 3 and 4 the TDA 1044 requires only few external components. It comprises a linear sawtooth generator that can be synchronized with positive or negative pulses. The sawtooth generator receives its supply voltage separately via pin 12. By varying this supply voltage the amplitude of the sawtooth may be altered, so that a frame height control, e. g. coupled with the line width amplitude, may be realized. An internal geometric circuit, which can be matched to different screen radii by external resistors, does not require any external RC network and ensures tangential correction of the deflection current, the latter being generated by a power stage.

A flyback booster circuit keeps dissipation in the IC low. The frame height is kept constant by the deflection current with the aid of a current-dependent negative feedback arrangement, so that the thermistor hitherto connected in series with the deflection coil can now be omitted. The maximum amplitude of the deflection current may be as high as 2 A peak-to-peak.

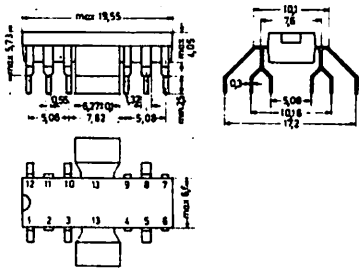
The TDA 1044 operates within a supply voltage range of 11 . . . 27 V. When operating in colour TV receivers two additional power transistors are required due to the higher deflection current. The supply voltage may in this case be raised to 54 V.

If used in black and white TV receivers (see Fig. 3) pin 6 supplies positive blanking pulses with an amplitude of max. 20 V. In colour TV receivers (see Fig. 4) pin 6 supplies positive and pin 7 negative blanking pulses.

The TDA 1044 is contained in a plastic package similar to the TO-116, but 13 connection pins which are shaped and arranged in such a way that automatic insertion of the device in suitably punched printed circuit boards can be carried out without difficulty. The cooling tabs projecting from the case on either side must be soldered to sufficiently large copper-clad area on the printed board in order to ensure adequate cooling.

Fig. 1:
TDA 1044 in plastic package

Weight approximately 1.5 g
Dimensions in mm



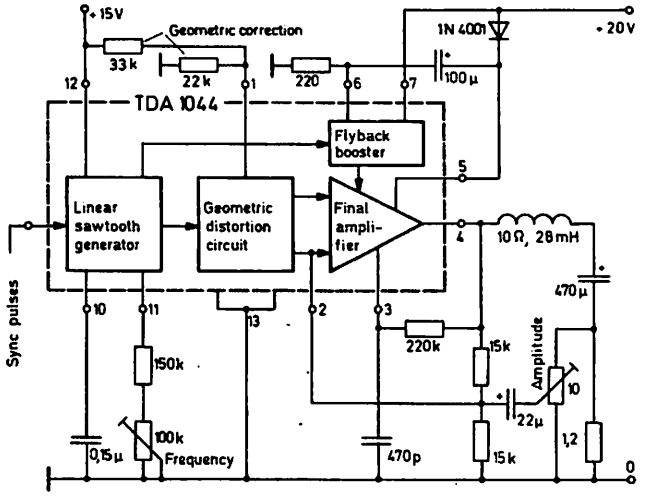


Fig. 2: Block diagram and test circuit of the TDA 1044

All voltages are referred to pin 13 (cooling tabs).

Maximum Ratings

Supply voltages	V_{12}	22	V
operated without flyback booster	V_5	54	V
	V_7	54	V
operated with flyback booster	V_5	27 [1]	V
	V_7	27 [1]	V
Input voltage	V_8	−6	V
Input current	I_8	2	mA
Output current	I_{4pp}	±1	A
Flyback current	I_6	1	A
Current consumption	I_7	300	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_S	−25 . . . +100	°C

[1]) during flyback pulse: 58 V

TDA 1044

Characteristics at $T_{amb} = 25\ °C$ in the test circuit Fig. 2, deflection unit 10 Ω, 28 mH

Current consumption	I_7	140	mA
	I_{12}	12	mA
Adjustment range of deflection current	I_{4pp}	0.8 . . . 1.5	A
Flyback duration	t_{fly}	> 200	µs
Input impedance	$r_{8/13}$	10	kΩ
Frequency of the sawtooth generator at $R_{11/13} > 50$ kΩ	f_8	$\frac{1.6}{R_{11/13} \cdot C_{10/13}}$	
Adjustment range of the sawtooth generator	$\Delta f_8/f_8$	10	%
DC voltage at pin 11	V_{11}	9.7	V
DC current at pin 11 at $C_{10/13} = 0.15\ \mu F$, $f_8 = 50$ Hz	$-I_{11}$	45	µA
Required sync pulse amplitude at pin 8 with positive sync signal	V_8	1 . . . 10	V
with negative sync signal	V_8	−1.3 . . . −6	V
Geometric distortion related to standard picture tube and standard deflection unit [1]	$\Delta l/l$	3	%

Recommended Operating Conditions
for the circuit shown in Fig. 3, deflection unit 10 Ω, 28 mH

Supply voltages	V_7	22	V
	V_{12}	15	V
Amplitude of positive sync pulses	V_8	8	V
Operating ambient temperature range	T_{amb}	0 . . . 60	°C
Thermal resistance of the copper-clad area soldered to the cooling tabs	R_{thS}	10	°C/W

[1]) Tangent correction can be made adjustable by potentiometers. The curvature of the deflection current S-curve may be changed by a series resistor connected to pin 1. The DC voltage at pin 1 is responsible for the up/down correction. This voltage derives from the supply voltage V_{12} and the divider ratio of the voltage divider between pin 12 and pin 1. If fixed resistors are used a ratio of approximately 1.45 for $R_{12.1}$ to $R_{1\ 13}$ should be observed.

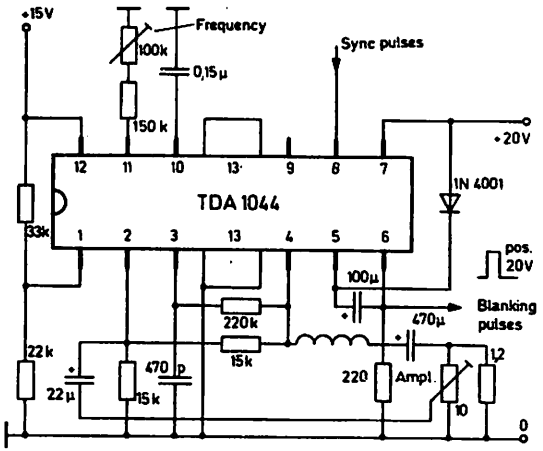


Fig. 3: Application circuit for black and white TV receivers

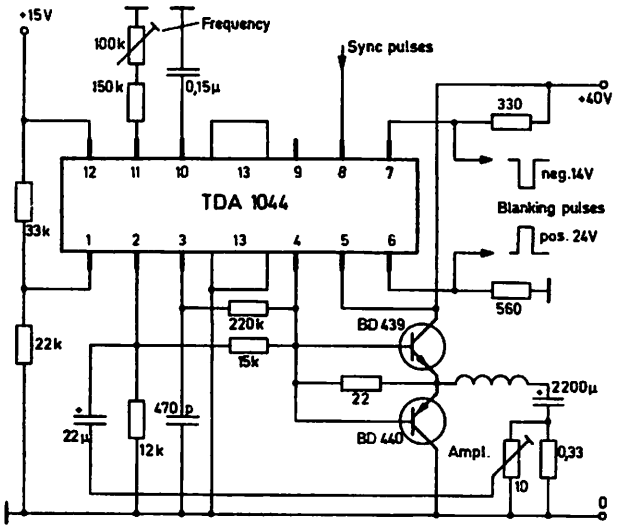
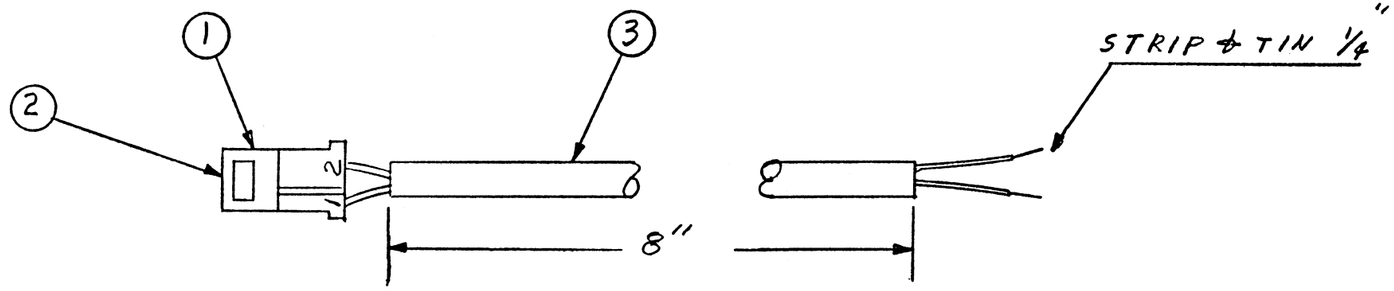


Fig. 4: Application circuit for colour TV receivers

DO NOT SCALE



SIGNAL	PIN NO	WIRE COLOR	GA	LENGTH
± 0V	1	BLACK	#22	10"
+12V R	2	RED	#22	10"

} TWIST APPROX. 3 TURNS/INCH

HOLE LEGEND

	HOLE DIA.	TOL.
DRILLED OR PUNCHED HOLE TOLERANCES:	.0135 to .125	+.003 −.001
	.126 to .250	+.004 −.001
	.251 to .500	+.005 −.001

IDENT.	DESCRIPTION	QTY.
A		

B 6482-141

NO.	REVISION	BY	DATE
C	ORG PER DWR E297		1/7

WANG PART NO.	ITEM	QTY.	NAME	MATERIAL	DESCRIPTION
600-1002		A/R	WIRE		#22 GA RED
600-1000		A/R	WIRE		#22 GA BLACK
605-.0014	3	1	TUBING		#5 TUBING 8" LONG
654-1165R	2	2	MATE-LOCK SOCKET		22-30 GA
654-1148	1	1	SOCKET HOUSING 2 POS		

Qty. Per Unit	FIRST USED ON	ASSY USED ON

WANG LABORATORIES, INC.
TEWKSBURY, MASS. U. S. A.

MATERIAL

FINISH

MODEL NO. 12" CRT

SEE ENGRG SPECIFICATIONS No.

TOL. EX. AS NOTED
.XX ± .010 FRAC. ± 1/64
.XXX ± .005 ANG. ± 1°30' FINISH 128 √

SCALE — SHT 1 OF 1

BY	DATE	APPROVED BY	DATE
DWN	1-14-77	E ENGR	
CHK		M ENGR	
E. C. CONTROL		MFG ENGR	2/3/77

TITLE 12" CRT POWER SUPPLY CABLE

WANG PART NUMBER	SIZE	DRAWING NUMBER	REV.
220-1107	B	6482-141	0

25

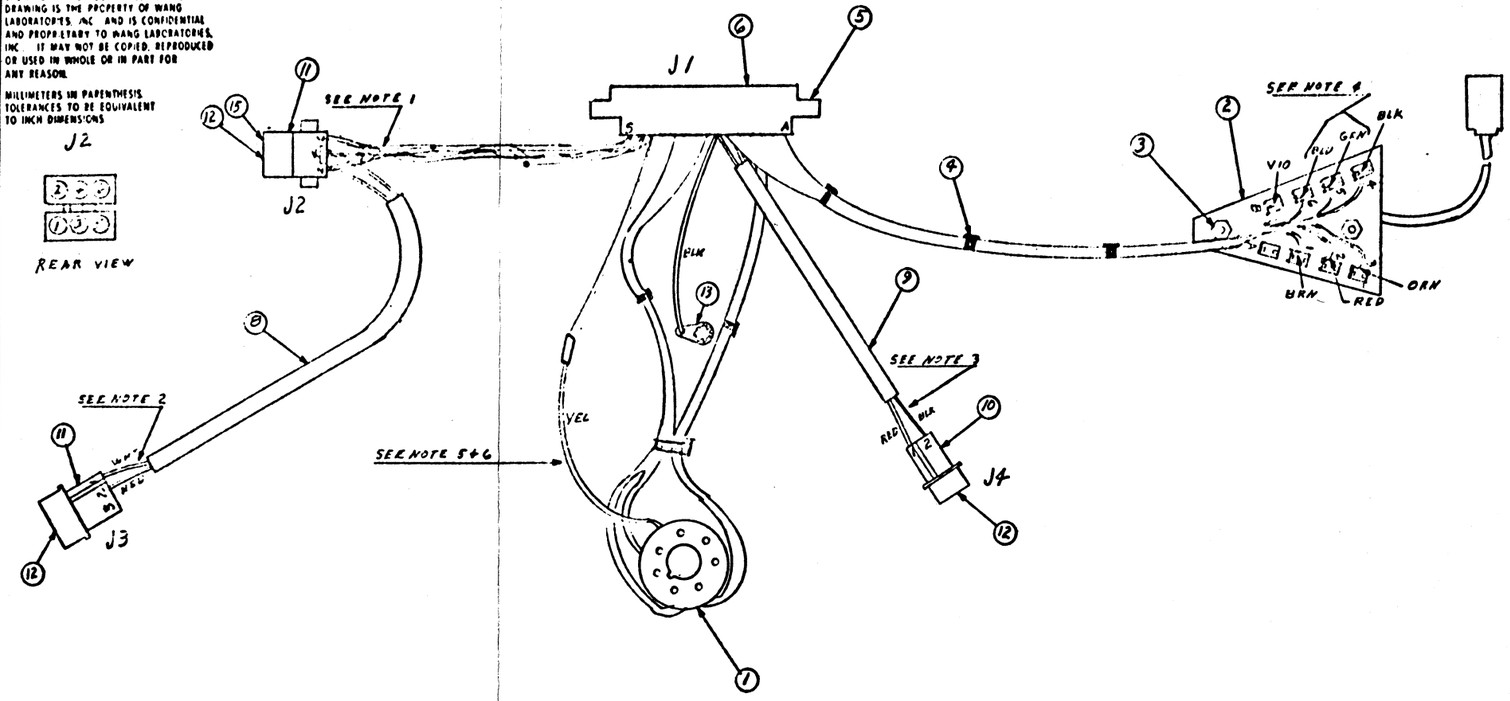
DO NOT SCALE

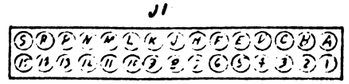
MILLIMETERS ARE PARENTHESIS. TOLERANCES TO BE EQUIVALENT TO INCH DIMENSIONS

HOLE LEGEND & TOLERANCES

HOLE DIA	TOLERANCE
.0135 - .125	+ .003 - .001
.126 - .250	+ .004 - .001
.251 - .500	+ .005 - .001

SYM	DESCRIPTION	DTE
A		





NOTE:-

1. BLACK, YELLOW, WHITE 22GA WIRES TWISTED APPROX. 2 TURNS/INCH.
2. WHITE, RED 22 GA WIRES TWISTED APPROX. 3 TURNS/INCH.
3. RED, BLACK 22 GA WIRES TWISTED APPROX. 3 TURNS/INCH.
4. SOLDER WIRE TO LONG TAB AND TRIM TO APPROX. LENGTH OF SHORT TAB.
5. WIRES ALREADY ATTACHED TO ITEM 1.
6. DO NOT TIE THIS WIRE WITH MAIN BUNDLE.
7. REF ONLY THIS ITEM (350-0052) ATTACHED AT NEXT ASSEMBLY LEVEL.

J2	FROM	SIGNAL	WIRE COLOR	GAUGE	LENGTH
1	J1-K & J3-1	VIDEO GND	WHT & WHT	#22, #22	6"
2	J1-13	BRIGHT BOTTOM	BLACK	#22	
3	J1-5	VIDEO IN	RED	#22	
4	J1-14	BRIGHT CENTER	YELLOW	#22	
5	J3-2		RED	#22	6"
6	J1-15	BRIGHT TOP	WHITE	#22	

J1

SIGNAL	PIN NO.	WIRE COLOR	GA	CUT LENGTH	FROM
FB-5	1	GREEN	#20	10½"	ITEM 2 - 5
—	2	—	—	—	—
FB-6	3	BLUE	#20	10"	ITEM 2 - 6
FB-8	4	VIOLET	#20	10"	ITEM 2 - 8
FB-3	5	ORANGE	#22	11"	ITEM 2 - 3
FB-1	6	BROWN	#20	10½"	ITEM 2 - 1
FB-2	7	RED	#22	10½"	ITEM 2 - 2
+12VR	8	RED	#22	4½" *	ITEM 10-1 SEE NOTE 3
+12VR	9	BROWN	#22	7 3/8"	ITEM 1 SEE NOTE 5
TP3	10				
TP2	11				
TP1	12				
BRIGHT BOTTOM	13	BLACK	#22	4" *	ITEM 11-2 SEE NOTE 1
BRIGHT CENTER	14	YELLOW	#22	4" *	ITEM 11-4 SEE NOTE 1
BRIGHT TOP	15	WHITE	#22	4" *	ITEM 11-6 SEE NOTE 1

* LENGHT AFTER TWISTING

J1

SIGNAL	PIN NO	WIRE COLOR	GA	CUT LENGTH	FROM
—	A	—	—	—	—
G2	B	RED	#22	8"	ITEM 1 SEE NOTE 5
—	C	—	—	—	—
CH GND	D	BLK	#22	7 3/8"	ITEM 1 SEE NOTE 5
CH GND	E	BLK	#20	11"	ITEM 2- 4
CH GND	F	BLK BLK	#22 #22	3" * 4½" *	ITEM 13 ITEM 10-2 SEE NOTE 3
H-YOKE RED	H	RED	#20	7"	SEE NOTE 7
H-YOKE BLACK	J	BLACK	#20	7"	SEE NOTE 7
V-YOKE BLUE	K	BLUE	#20	7"	SEE NOTE 7
V-YOKE YELLOW	L	YELLOW	#20	7"	SEE NOTE 7
FOCUS	M	ORANGE	#22	8"	ITEM 1 SEE NOTE 5
G1	N	GREEN	#22	8"	ITEM 1 SEE NOTE 5
VIDEO OUT	P	YELLOW	#22	7 3/8"	ITEM 1 SEE NOTE 5&6
VIDEO GND	K	WHITE	#22	4" *	ITEM 11-1 SEE NOTE 2
VIDEO IN	S	RED	#22	4" *	ITEM 11-3 SEE NOTE 2

QTY	ITEM	WANG PART NO	DRAWING NO	DESCRIPTION
1	15	654-1164P		MATE & LOCK PIN 14-20 GA
1	14	654-1149		PIN HOUSING 3 POS AMP
A/R		600-1009		WIRE #22 GA WHITE
A/R		600-1004		WIRE #22 GA YELLOW
A/R		600-1002		WIRE #22 GA RED
A/R		600-1006		WIRE #22 GA BLACK
A/R		600-0507		WIRE #20 GA VIOLET
A/R		600-0506		WIRE #20 GA BLUE
A/R		600-0505		WIRE #20 GA GREEN
A/R		600-0503		WIRE #20 GA ORANGE
A/R		600-0502		WIRE #20 GA RED
A/R		600-0501		WIRE #20 GA BROWN
A/R		600-0500		WIRE #20 GA BLACK
1	13	654-1004		GROUND LUG #4
9	12	654-1156P		MATE & LOCK PIN 22-20GA AMP
1	11	654-1156		PIN HOUSING 6 POS AMP
1	10	654-1149		PIN HOUSING 2 POS AMP
1	9	605-0019		#5 TUBING 4" LONG
1	8	605-0014		#5 TUBING 4½" LONG
20	6	654-0101R		TERMINAL, CARD EDGE MOLEX
1	5	654-0100		CONNECTOR 3CPOS CRIMP SNAP-IN
6	4	605-1004		TY RAP
2	3	962-0023		1/2L HEX 4-40 SPACER SMITH 2332
1	2	719-1007		FLYBACK TRANSFORMER EX4002
1	1	711-2072		110 DEG CRT SOCKET

NEXT ASSY

WANG LABORATORIES, INC. TEWKSBURY MASS. U.S.A.

	BY	DATE	APPROVED BY	DATE
DWN	[illegible]	1-11-77	E ENGR	
CHK			M ENGR	
			MFG ENGR	

MATERIAL

MODEL NO 12" CRT

SEE ENGRG SPECIFICATIONS No.

FINISH

TOL EX AS NOTED
.XX ± FRAC ±
.XXX ± ANG ± ° FINISH

TITLE 12" CRT HARNESS ASSEMBLY

270-3068 | D | 6782-139 | 0

WANG PART NUMBER | SIZE | DRAWING NUMBER | REV

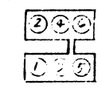
REVISION	ECO NO	DATE
ORIGINAL RELEASE		

DO NOT SCALE

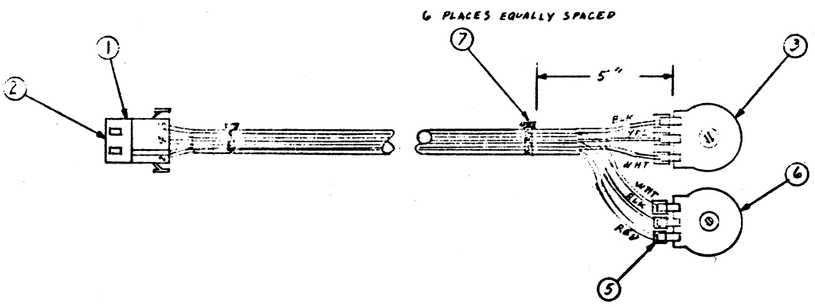
HOLE LEGEND		
DRILLED OR PUNCHED HOLE TOLERANCES:	HOLE DIA	TOL.
	.0135 to .125	± .001
	.126 to .250	± .001
	.251 to .500	± .001

IDENT.	DESCRIPTION	QTY.
A		

CONN.



REAR VIEW



SIGNAL	PIN NO.	WIRE COLOR	GA	LENGTH	
BRIGHT BOTTOM	2	BLACK	#22	36"	TWISTED APPROX 2 TURNS/INCH
BRIGHT CENTER	4	YELLOW	#22	36"	
BRIGHT TOP	6	WHITE	#22	36"	
	1	WHITE	#22	36"	TWISTED APPROX 2 TURNS/INCH
	3	BLACK	#22	36"	
	5	RED	#22	36"	

WANG PART NO	ITEM	QTY	NAME	MATERIAL	DESCRIPTION
600-1008		A/R	WIRE		#22 GA WHITE
600-1004		A/R	WIRE		#22 GA YELLOW
600-1002		A/R	WIRE		#22 GA RED
600-1000		A/R	WIRE		#22 GA BLACK
605-1004	7	6	T/RAP		
336-0035	6	1	2 BC OHM POT		
605-0006	5	6	SLEEVE		#1" TUBING ½ LONG
	4				
336-0032	3	1	250K POT		
654-1165	2	6	MATE-N-LOK SOCKET		22-30 GA
659-1105	1	1	SOCKET HOUSING 6 PIN		

QTY PER	FIRST USED ON	ASSY USED ON

WANG LABORATORIES INC. TEWKSBURY, MASS. U.S.A.

BY	DATE	APPROVED BY	DATE
DWN		E ENGR	
CHK		M ENGR	
E C CONTROL		MFG ENGR	

MATERIAL

MODEL NO. 12 OKT

SEE ENGRG SPECIFICATIONS NO.

FINISH

TOL EX AS NOTED: .XX ± .010 FRAC ± 1/64, .XXX ± .005 ANG ± 1°30' FINISH 125

TITLE: FLIGHTASS POT CABLE ASSEMBLY

SCALE | SHT | OF

WANG PART NUMBER: 720-0160 | REV: C | DRAWING NUMBER: 6482-147 | REV:

REV	REVISION	DATE	BY
C	CHG PER ECO [illegible]	9/71	

MILLIMETERS IN PARENTHESIS. TOLERANCES TO BE EQUIVALENT TO INCH DIMENSIONS.

DO NOT SCALE

HOLE LEGEND & TOLERANCES

HOLE DIA	TOLERANCE
.0135 - .125	+ .003 - .001
.126 - .250	+ .004 - .001
.251 - .500	+ .005 - .001

SYM.	DESCRIPTION	QTY.
A		

CONTRAST — VIDEO IN — VIDEO ±0V — EXTERNAL — C1 10uF 16V — R1 100Ω ¼W — CW

R2 2.2K — R3 4.7K — R4 1.2K — 5.6V — D1 380-2056 — R5 680Ω — L2 NE 592 — ±0V

+12V — R8 150Ω — C2 35uF 15V — MPS-U09 Q2 — R9 47Ω — MPS-6512 Q1 — R12 1.2K 2W

C3 820PF — R10 820Ω — C4 100uF 25V — R11 56Ω

TP1 (12) — R19 1K — 9.1V D3 IN757 — VERT. HOLD — R15 100K — C5 0.15uF — R16 100K — L3 TDA 1074 — C6 1000uF 25V — R13 56Ω 2W — D2 IN4004 — R17 220Ω — C7 100uF 25V

R18 VERT. LINEARITY 50K — R19 SEE VARIATION CHART — R20 220K — R21 220Ω — C8 .02uF/600V — V YOKE YELLOW — EXTERNAL — YEL — V YOKE BLUE — BLU — VERT. YOKE

TP2 (11) — R23 15K — C9 470PF — VERT. SIZE — R22 22K — C10 35uF 15V — R24 20Ω — R25 2.2Ω ½W — C11 1000uF 25V

L1 TBA 950 — R30 6.8K — C21 .1uF 50V — R31 4.7K — C22 1uF/35V — C23 .1uF 20V

R37 4.7K — 2N3725 Q3 — T1 — BU124 Q4 — D9 — C28 5600PF — R39 47Ω — C29 .47uF 100V — R40 33Ω 1W — C30 SEE VARIATION CHART — R36 68Ω — C23 35uF 16V — R35 10K — PHASE

C24 10uF 15V — R32 180Ω — C26 .47uF MYLAR 100V — C25 .01uF 50V — R33 5K — HOR. HOLD — R34 47K 1% ½W @25K — R38 100K

D ±0V — E ±0V — F ±0V

+12V — R14 270Ω — VIDEO OUT — P — 8 — 9 — +12V — ±0V

EXTERNAL — * IN CRT SOCKET LEAD — 340-010 — * YEL 270Ω BRN BLK — GRN * 1K — RED * 1K — ORN * 1K — V1

G1 — FOCUS — TP3 — G2 — N — M — 10 — B — DYNAMIC FOCUS — Z1 40-80 MA .0003uF — C12 — C14 .1uF 400V — R27 100K — R28 2.5MEG CW — FOCUS — C15 — D4 — C16 5600PF — ±0V — R29 270K — BRIGHTNESS

R26 470K — VG1 X — D5 — C13 .02uF 1400V — FB-5 — 5 — 1 — 410-1007 — HG17 — 4 — ±0V

BRIGHT BOTTOM — 13 — D6 SIF4 — FB-6 — 3 — 6 — C17 .02uF 600V — ±0V

BRIGHT CENTER — 14 — 250K — CW — EXTERNAL — C18 .47uF 100V — ±0V

BRIGHT TOP — 15 — D7 — VG1 X — FB-8 — 4 — B

FB-1 — 6 — 1

FB-3 — 5 — 3

C19 50uF 50V — ±0V

D8 — C20 1000uF 25V — ±0V — 3SIF2

H YOKE RED — H — 2 — FB-2 — 7

HOR. YOKE 320-0057 — J — H YOKE BLK

C31 — SEE VARIATION CHART — Z2 WIDTH — Z3 HOR. LINEARITY

SIGNAL DESIGNATIONS - VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

	A 1	FB-5
G2	B 2	
	C 3	FB-6
±0V	D 4	FB-8
±0V	E 5	FB-3
±0V	F 6	FB-1
H-YOKE-RED	H 7	FB-2
H-YOKE-BLK	J 8	+12VR
V-YOKE-BLU	K 9	+12VR
V-YOKE-YEL	L 10	TP3
FOCUS	M 11	TP2
G1	N 12	TP1
VIDEO OUT	P 13	BRIGHT BOTTOM
VIDEO ±0V	R 14	BRIGHT CENTER
VIDEO IN	S 15	BRIGHT TOP

COMP SIDE — WIRING SIDE

7256 R0 — VERT. HOLD — VERT. LINEARITY — VERT. SIZE — PHASE — HOR. HOLD — FOCUS R28 — Z2 WIDTH — HOR. LINEARITY — DYNAMIC FOCUS — L3 — L2 — Q2 — Q3 — Q4 — T1 — Q1 — L1 — R15 — R16 — R24 — R33 — R34 — Z1 — Z3

S R P N M L K J H F E D C B A

COMP.	W. L. PART No.
R1	381-2010
R 3,37	330-3047
R4	330-3012
R14	330-3010
R5	330-2068
R9,33,41	330-1047
R10	330-2082
R11	330-1056
R12	337-3012
R13	337-1056
R15	336-1019
R16,27,38	330-5010
R17,21	330-2022
R18	336-1017
R30	330-3068
R20	330-5022
R2	330-3027
R22	330-4022
R29	330-4015
R24	336-1021
R25	331-0022
R26	330-5047
R28	336-0031
R29	330-5027
R31	330-6047
R32	330-2018
R33	336-1020
R34	333-0067
R35	336-1015
R36	336-1068
R40	332-1033
D1	380-2056
D2	380-4000
D3	380-2091
D5,7	380-3009
D6,9	380-3010
D8	380-3012
D4	380-2062

COMP.	W.L. PART No.
C1, 24	300-3006
C2,10,27	300-3009
C3	300-1820
C4,7	300-3033
C5	300-2215
C6,11,20	300-3062
C8,17	300-1912
C9	300-1470
C12	300-2415
C13	300-1916
C18,26,29	300-2247
C14	300-2310
C16,28	300-1915
C19	300-3010
C21	300-1918
C22	300-4000
C23	300-1918
C25	300-2414
C15	300-2416
Q1	375-1012
Q2	375-1056
Q3	375-1027
Q4	375-1057
T1	410-1006
Z1	320-0054

IC. LOCATION	W. L. PART NO.	±0V
L1	376-0260	1
L2	376-0239	5
L3	376-0261	13

VARIATION CHART

COMP.	7256	7256-1
Z 2	320-0053	320-0056
C 31	300-2413	300-2418
C 30	300-2412	300-2417
R19	330-3068	330-4027
R8	330-2015	330-2015
Z 3	320-0051	320-0058
EXTERNAL POT	336-0035	336-0035

E-REV 7256: O — E-REV 7256-1: O

REVISION NO.	REVISION	BY	DATE
0	ORIGINATED PER ECN # 6047 APP'D:	ER	11-5-76
1	REVISED PER ECN # 6366 APP'D:	KC	2-4-77
2	REVISED PER ECN # 6326 APP'D:	KC	2-4-77
3	REVISED PER ECN # 6350 APP'D:	KC	2-4-77
4	REVISED PER ECN # 6433 APP'D:	KC	2-4-77
5	REVISED PER ECN # 6372 APP'D:	KC	2-4-77
6	REVISED PER ECN: 6089 APP'D:	JC	3-9-77

QTY.	ITEM	WANG PART NO.	DRAWING NO.	DESCRIPTION
NEXT ASSY.				

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

	BY	DATE	APPROVED BY	DATE
DWN		11-5-76	E ENGR	4/19/76
CHK		11-8-76	M ENGR	
			MFG ENGR	

MATERIAL — MODEL NO. 9" & 12" WANG MONITOR — SEE ENGRG. SPECIFICATIONS No. —

FINISH 21 — TOL. EX. AS NOTED XX ± FRAC ± XXX ± ANG ± FINISH √

TITLE ELECTRONICS FOR 9" AND 12" MONITOR

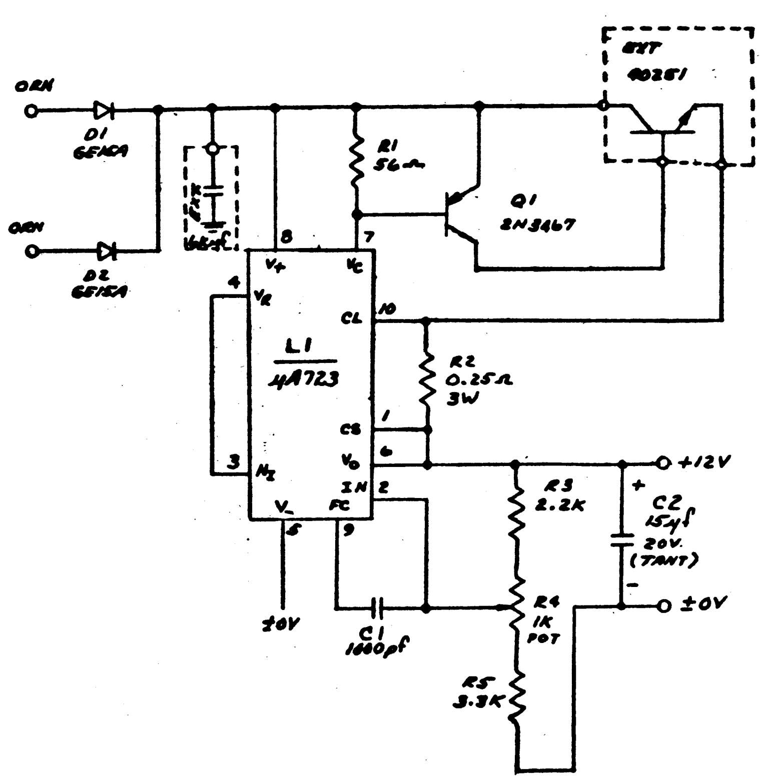
SCALE √√ — SHT 4 OF 5 — SEE CHART | D | 7256 | 6 — WANG PART NUMBER | SIZE | DRAWING NUMBER | REV.

D 7256

HOLE LEGEND		
DRILLED OR PUNCHED HOLE TOLERANCES	HOLE DIA.	TOL.
	.0135 to .125	±.001
	.126 to .250	±.001
	.251 to .500	±.001

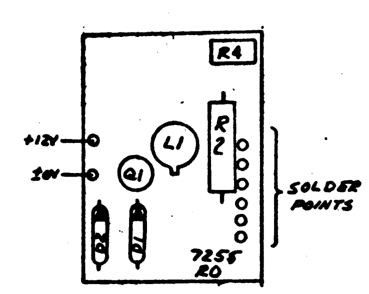
IDENT.	DESCRIPTION	QTY.
A		

DO NOT SCALE



LOCATION	W.L. PT NO.	GND PIN
L1	376-0066	5

COMPONENTS	
R1	330-1056
R2	334-0017
R3	330-3022
R4	336-1014
R5	330-3033
C1	300-5006
C2	300-4022
Q1	375-1026
D1,2	380-3004



E.REV 0

REVISION		
0	DRAWN PER DWF # 6306 APP'D	EBA 10-15-76
1	REVISED PER ECN # 6588 APP'D:	

WANG LABORATORIES, INC. TEWKSBURY MASS. U.S.A.

MODEL NO. 12" CRT

BY	DATE	APPROVED BY	DATE
DWN EBA	10-15-7?	E ENGR	
CHK G.D.	10-?-7?	M ENGR	
E C CONTROL		MFG ENGR	

TITLE SCHEMATIC FOR MONITOR REGULATOR

WANG PART NUMBER 210-7255 · SIZE C · DRAWING NUMBER 7255 · 1

SCALE ? · SHT 4 OF 5

TOL. EX. AS NOTED XX ± .010 FRAC ± 1/64 XXX ± .005 ANG ± 1°30' FINISH ✓