200 TERMINAL

TROUBLESHOOTING GUIDE

June, 1971

DISPLAY UNIT PROBLEMS

If you believe that you have a Display Unit problem, here are a few things you might check:

1. Hit clear key; can you enter data and do functions on the display, and does it stay there?

   YES. Good, that's what you want.

   NO. Do you have a marker line on the Display after hitting the clear key?

   YES. Skip to 5.

   NO. Do you have anything on the CRT?

   YES. Skip to 4.

   NO. Do you have +12 volts and +16 volts?

   YES. Skip to 3.

   NO. Do you have 120 AC voltage between pins 1 and 2 of the transformer?

   YES. Skip to 2.

   NO. You either have the unit unplugged, faulty switch, blown fulse, or capacitor C3 is bad.

2. Do you have 6.3 volts AC between pins 11 and 13 on transformer, 8.6 volts AC between pins 8 and 9, also between pins 10 and 9? Do you have 18 volts AC between pins 5 and 6 and between 6 and 7? If you don't have all of the above, change transformer.

3. You need both +12 and +16 volts to get the high voltage from the high voltage power supply. Therefore, look into the high voltage power supply or CRT for a possible failure.

4. Now you have to figure out what you don't have. Do you have the proper amount of lines going across?

   NO. Possibly your vertical counter in the controller or vertical amplifier or vertical coil in the display or even the horizontal amplifier.

   YES. Do you have the proper length of each line?

   NO. Check your Horizontal Counter in the controller, and the horizontal and vertical amp cards and horizontal coil in the display.

   YES. Do you have normal diddle pulses on the screen?

   NO. Check your diddle F/F on card located at A2 in the controller. Also diddle amplifier and phasing in display; you have an adjustment for both.

   YES. Is your raster square?

   NO. Try adjusting the pots on the card located at A8 in the controller; also your centering adjustment and your yoke in the display.

5. You have diddle pulses and the raster but no marker. Do you see a marker flash on display tube after pushing clear key?

   YES. Try adjusting or swapping delay line.

   NO. Try swapping delay line, thumb pots on A4 card, video amp in monitor, circuit 18 on A11 card, the card at A4, W300 on video generator, window card A10, or display register at location A9.

6. Since you got a marker, half the battle is won. Can you enter characters on the screen will stay?

   YES. Great, you have most of the first 13 cards in the main controller working.

   NO. Try doing a reader test.

7. Did you get characters to stay on the screen when doing a reader test?

   YES. That eliminates your character generator, delay line, display register, and the window card. The only things that could hold you out from entering by keyboard is; the card at A11, the two plugs on your keyboard P1 and P2, or the plug in back of the display.

   NO. Try grounding out TP2 on card A10, you should end up with a marker and a semi-colon in every display position. This should stay when you remove the grounded TP. If not, you have trouble in circulating your data through your delay line, window, and etc.

B3

LINE PRINTER PROBLEMS

To break down the problems of a printer in three major categories; the first is Paper Motion, the second is Printing, and the third is getting the proper status.

A. Paper Motion

1. Can't do a Page Eject by the button on the printer.
   - a. Circuit breaker blown
   - b. Printer is always ready
   - c. The fifth card in the printer controller
   - d. Card at location A6 of print head electronics
   - e. +29 volts
   - f. Paper Motion Drive Motor
   - g. Paper Motion Clutch and Brake Assembly
   - h. Paper Status Micro Switches

2. No paper motion by Local or Terminal mode, but you can do a Page Eject by the button on the printer.
   - a. Either card located at 0, 1, or 4 in the Printer Controller
   - b. Bad cable between Terminal Controller and Printer
   - c. Bad card in Printer Adapter
   - d. Bad Delay Line

3.	Paper Motion won't stop	a. Bad format tape b. Bad brush on Format Reader c. Bad Magnetic pick-up located by paper motion motor d. Bad Brake on clutch and brake assembly e. Circuit breaker blown f. Bad electronic component in Relay Chassis g. Circuit card at location A6 in Print Head electronics h. Bad card at location 04 in Printer Controller
B.	Ribbon Motion	
1.	Prints but ribbon won't move	a. Bad card in location 04 in Printer Controller b. Bad card at location A6 of Print Head electronics c. Bad relay or component in Relay Chassis d. Bad AC Motor or DC Motor e. Bad ribbon guide
C.	Printing	
1.	Prints right character in proper column, but smeared	a. Check hammer and bank alignment b. Check adjustment of paper stop delay on Printer Controller card at location 04

2.	Drops characters always in same columns	a. Bad hammers b. Bad strikers c. Bad hammer drive cards d. Bad cards in Printer Controller, most likely the one located in positions 06, 08, 09, or 10 e. Memory Drive and Inhibit adjustments not right
3.	Drops the same characters throughout the line of print	a. Bad Delay line b. Bad card in Printer Adapter c. Bad cards in Printer Controller, most likely the cards located at 00, 01, 05, 08, 09, or 10
4.	Drops characters and adds zeros or spaces from where it dropped these characters	a. Bad Delay Line b. Bad card in Printer Adapter c. Picking up bit 2^6 somewhere d. Bad cards in Printer Controller, most likely the ones located at 00, 01, 05, 07, 08, 09
5.	Printing the wrong characters	a. DRP Pulse out of adjustment b. Look for a particular bit that is being picked up or lost. Look in both Internal BCD and External BCD c. Bad Delay Line d. Card bad in printer adapter

e. Card in Printer Controller

f. Drum Drive Belt slipping

g. Magnet on end of Drum was put in upside down

h. Bad Magnetic pick up

b. Printing the wrong data in Local Mode but not in Terminal Mode

a. The one thing that causes this is that the wire bundle going from the Capacitor Bank to the hammer drivers shorts to the frame of the printer. That gives you 20V on the ground feeding back to the Terminal Controller. On the 8CSD card there is an input labeled 136 column Line Printer. This is tied to ground on the printer and with 20V on this it blows a chip or chips on the 8CSD card and also the 8JDD card in Reader Adapter.

b. Mode F/F, saying that the wrong mode has been selected, there by giving a paper motion or decompress operation when it shouldn't.

224 CARD READER

TROUBLESHOOTING GUIDE

This is only for the 224-2 Card Reader.

A. You believe your problem is with the Card Reader. I have never found or know of any problems that were found to be Card Reader problems that could not, in some way, be duplicated with an off-line list operation, or reader test.

B. There are several different decks that I have found to be very useful in testing the Card Reader. Below are a couple.

1. Make up a deck of about 200 cards with all characters on a card.
2. Make up a deck of about 200 cards with the letter "I" punched in column 1 and column 80 only.
3. Make up a deck of about 50 cards with a 4 punch in column 80 only.
4. Before using this deck you made run a bunch of new blank cards through and watch for card damage. You can usually see what is causing this damage by running the card through by hand. If there is no damage, continue.
5. By doing a list with the mentioned decks and by doing it over about 4 times you should see a print in column 80 all the way through. This should show that your Card Reader, mechanically, is in pretty good shape.

C. What are CHECK & ERROR conditions

1. When your Check light comes on it usually means your input hopper is empty, output stacker is full, failed to feed a card, got a card jam, photo diode or lamp at the read ready station bad, photo diode or lamp at the routing station bad, clutch maladjusted, reed switches around dial indicator bad, or card reader logic in the reader bad.

2. When you get the Error light it means you have a light or dark error. This means that when the edge of the card covers the photo diode past the read diodes the edge of the card should also cover the read diodes and this is the dark check. Where all diodes should be dark or you get an error. When the card goes past and uncovers this diode you have a light check where all diodes should see light or you get an error.

D. Mechanical Problems

Most problems with the Card Reader are mechanical. Here are a few of the things to watch for. Some of these were taken from a Tech Tip.

1. Fail to Feed (picker arm does not operate)
   a. Hopper Empty Switch
   b. Broken Belt
   c. Broken Pully
   d. Adjustment Linkage Slipping

2. Check Condition (trying to feed cards)
   a. Lamp or Photo Cell bad in Read Ready Station
   b. Picker Knife Timing
   c. Drive Rollers Slipping on Shaft
   d. Picker Knife Bad
   e. Throat-adjustment
   f. Card Deck
   g. Card Weight
   h. Plastic Picker Guard set to Close Holding Cards Up
   i. Broken or loose belt
   j. Broken or loose pully
   k. Nudge pawls, (especially these) Make sure they are not hanging up. See Tech Tip 5 Nov. 1970 Page 430-9.
   l. Access door open or too tight
   m. Inject roller out of adjustment
   n. Card guide out of adjustment

3.	Extra Feed	a. Clutch-solenoid gap
4.	Jam or Damaged Cards	a. Throat knife adjustment
		b. Nudge pawls
		c. Drive Rollers
		d. Access door clearances
		e. Inject roller
		f. Card guides
		g. Card path roller and gaps
		h. Read station setting too high
		i. Pusher arms
		j. Burs and foreign objects in card path
5.	Skew	a. Nudge pawls
		b. Drive rollers
		c. Access door clearances
		d. Inject rollers
		e. Guide rails
		f. Read station drive wheel
		g. Skip through roller
		h. Anti back up springs
6.	Fail to Eject	a. Skip out wheel
		b. Pusher arms
		c. Drive rollers
		d. Broken belt or pulleys
		e. Loose belts or pulleys
7.	Read Errors	a. Lamp contact
		b. Read head alignment

c. Loose Timing Disk

d. Bad Photo diode behind Timing Disk

e. Read drive roller

f. Carborundum wheel

g. Access doors too tight

h. +5V adjustment

8. A few other things to think about

a. Drive rollers between the input hopper and read ready station. These tend to come loose on shaft, causing intermittent checks.

b. Input roller in the read ready station not adjusted right.

c. Read station roller worn or tending to drive card at an angle. The top roller can be adjusted up or down, or sideways, so watch this especially if you're skewing the back half of your card. Maybe you'll have to adjust this roller sideways if the carborundum wheel below it is worn on one side.

d. The skip through roller is also something to watch for. When adjusting this, the long nut on the rod driving this roller is <u>not</u> a turnbuckle.

e. The skip out roller, if too tight, will tend to bend the top of a card. In fact, all rollers will if they are too tight.

f. Watch the pusher pads in the routing station. They should push evenly. Also watch to be sure they are back far enough when a card is coming into this station.

g. The drive rollers between the routing station and output stacker tend to come loose. This could cause a card to come out skewed or tilted and end up causing a jam.

h. The output stacker assembly has a flap, that when cards get jammed in this area, causes the flap to activate a micro switch, which also brings up a check conditon. Watch the little pivots on this flap for when they come loose it can cause intermittent check conditions.

i. The picker knives should be checked so you can see through the alignment hole at 350 degrees, but before you check this turn on the reader, cycle it one time

and check the dial indicator; make sure the pointer is pointing at $0^{0} \pm 2^{0}$. Now shut the reader off and manually cycle the reader until you have 350 degrees and then check the above adjustment.

E. I want you to know about the noise that some card readers put out when the motor is first turned on. I have seen this do different things in different parts of the 200 UT, such as:

a. Overprint line 12 and 13 when doing a list.

b. Setting the mode F/F making the terminal think it is connected to the computer.

c. Shooting paper out of line printer when the card reader motor starts.

d. Setting the check F/F in the card reader causing it to power off again.

e. It could do about anything, so check for this.

There is a fix for the above and that is FCO PB5807. This is Triac which is mounted next to the starting relay on the motor. It looks like a little box about 2" x 1" square with a few wires going to starting a relay. As far as I know this has always cured this noise problem.

F. Here are some problems and possible corrections that you might have when doing a list operation.

1. The last column printed (with correct data) seems to jump between column 80 and 82 on the line printer. This is usually the card reader mechanical adjustment, for your card is going through the read station too slow or your

column counter is strobing too fast.

Check your rollers that drive your card to and through the read station. Check the gates so that you can slide the thickness of 4 cards under all the flaps of the individual stations.

Also check the rails so that they don't bind the card.

2. The last column printed is around 73 to 78. Your card is going through too fast or your electronics is too slow. If you have just put on a new carborundum wheel under the read station roller, you most likely put on the wrong size, for there was a batch of the wrong size wheels sent out.

3. You're printing all the way across the printer. This is most likely a logic problem in either the card reader or card reader adapter logic in the controller. It could also be reed switch 305.

4. You're printing the wrong data. See if you can figure a pattern. There are quite a few things that could cause this, such as:

   Card skewing

   Read station skewed

   +5V on card reader

   Card reader logic

   Adapter logic - remember the Hollerith decoder

   Delay Line

   Bad cable going from card reader and controller

I always tend to look for mechanical adjustments first. Then maybe swap the card reader delay line with the display delay line, since you're not using the display delay line in a list operation. Maybe only the information on the last half of the card is bad. I then would especially say you're skewing the card relative of the read station. If it's only a few cards that are real bad, maybe they're punched badly. Another thing to keep in mind if you get check errors, is both read ready photo diode and output station photo diode <u>cannot</u> be covered at the same time.

G. Once you have used your gauges to set up your input hopper and read station, they should be OK unless you have a bad card jam or replace a component. This still needs to be checked at P.M.

3. You need both +12 and +16 volts to get the high voltage from the high voltage power supply. Therefore, look into the high voltage power supply or CRT for a possible failure.

4. Now you have to figure out what you don't have. Do you have the proper amount of lines going across?

   NO. Possibly your vertical counter in the controller or vertical amplifier or vertical coil in the display or even the horizontal amplifier

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3. Paper Motion won't stop	a. Bad format tape b. Bad brush on Format Reader c. Bad Magnetic pick-up located by paper motion motor d. Bad Brake on clutch and brake assembly e. Circuit breaker blown f. Bad electronic component in Relay Chassis g. Circuit card at location A6 in Print Head electronics h. Bad card at location 04 in Printer Controller
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224 Card Reader
Trouble-shooting Guide

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1. When your Check light comes on it usually means your input hopper is empty, output stacker is full, failed to feed a card, got a card jam, photo diode or lamp at the read ready station bad, photo diode or lamp at the routing station bad, clutch maladjusted, reed switches around dial indicator bad, or card reader logic in the reader bad.

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c. Loose Timing Disk

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2D3 USER

HANDOUTS

September 1969

200 USER HANDOUTS

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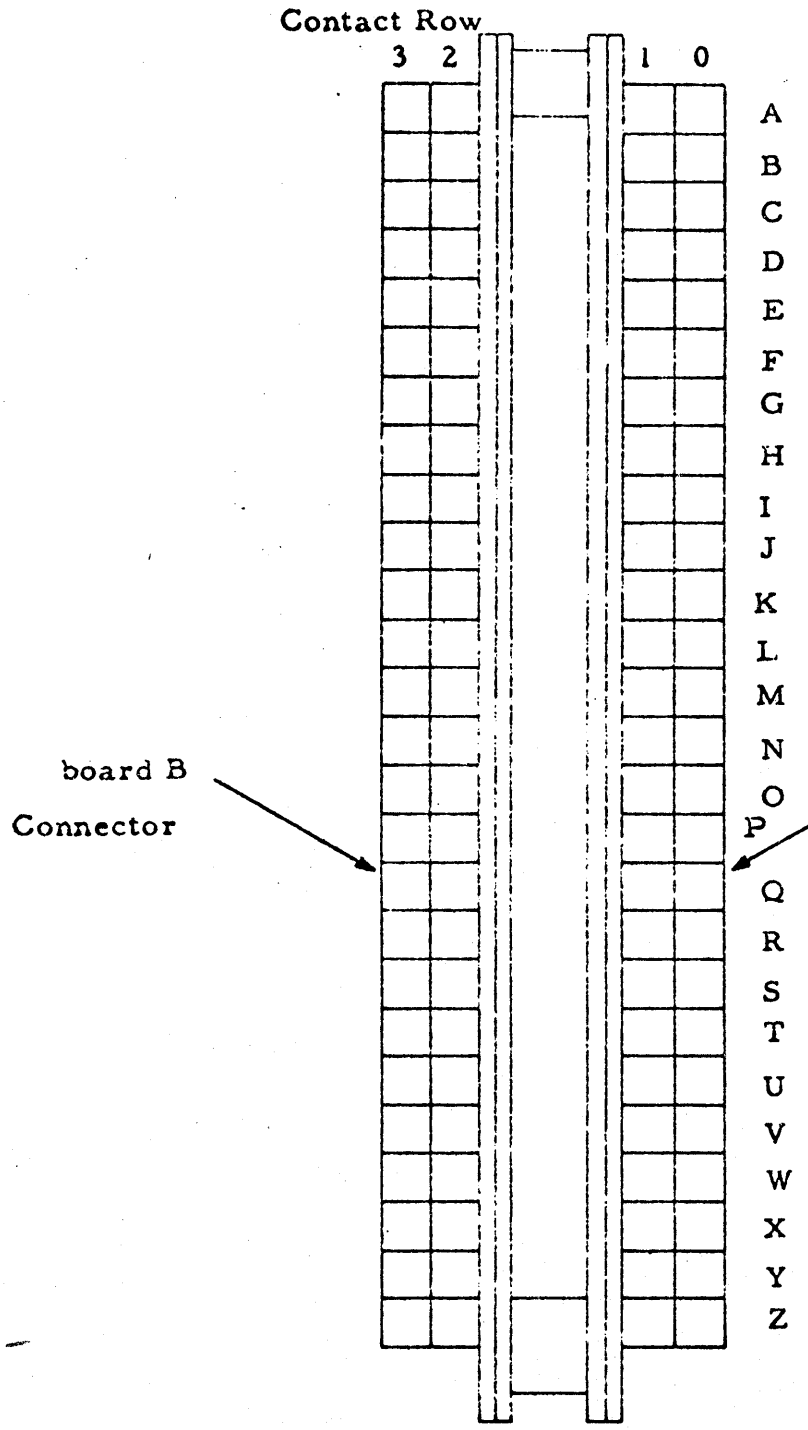
Sept. 1969



POWER CONNECTIONS

		board A	board B
	GND	A1	A2
	GND	Z1	Z2
-	6 VDC	Y1	Y2
+	6 VDC	Y0	Y3
-	2 VDC	Z0	Z3

CKG-

REAR VIEW OF 50 PACK

TECH TIP
{Submitted by Technical Liaison}

SUBJECT: FROZEN PARTICLE BRAKE CLUTCH

EQUIPMENT: 222, P-613, 1742, 3010, 3254

The following procedure is recommended by Rochester Division Engineering to free a frozen particle brake or clutch.

A. If clutch is frozen:

1. Open circuit breaker CB06.
2. Remove sprocket cog belt.
3. Turn on power.
4. Work flywheel back and forth until it is free.
5. Install sprocket cog belt, activate CB06.
6. Check format tape and paper strobe synchronization.

B. If brake is frozen:

1. Open circuit breaker CB06.
2. Remove sprocket cog belt.
3. Switch clutch coil leads with brake coil leads at LTB-13 and LTB-14.
4. Turn on power.
5. Work flywheel back and forth until it is free.
6. Turn off power.
7. Restore clutch/brake coil wiring at LTB-13 and LTB-14, install sprocket cog belt, activate CB06.
8. Check format tape and paper strobe synchronization.

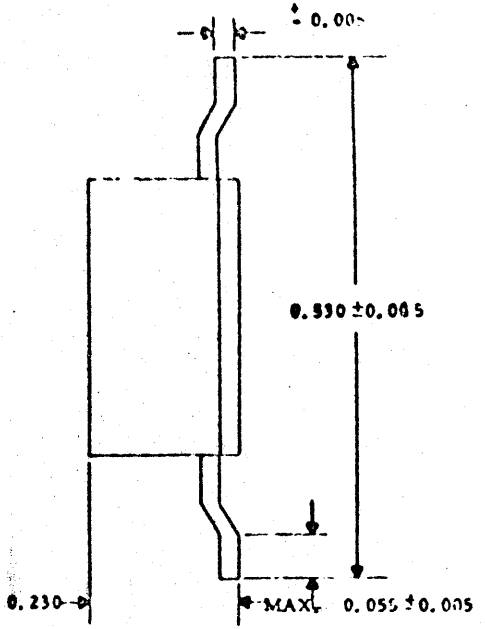
TECH TIP 1500 Series
(Submitted by Technical Liaison)

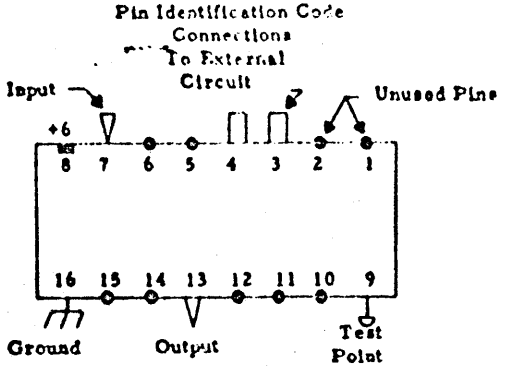
PIN DESIGNATION FOR DTL CHIPS

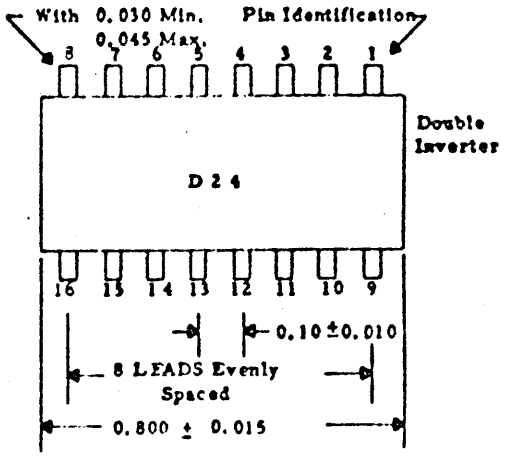
The following table gives pin designations for the DTL chips used in the 1500 series I/O equipment. The shaded pins indicate there are two separate inverters in the chip. The white pins go with one inverter; the black with the other.

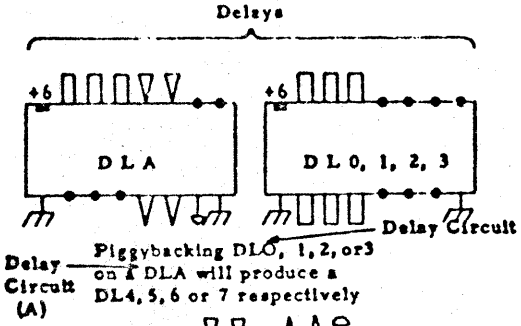
The black bar on the F24 and F34 chips indicates internal feedback between black and white inverters, forming a flip-flop.

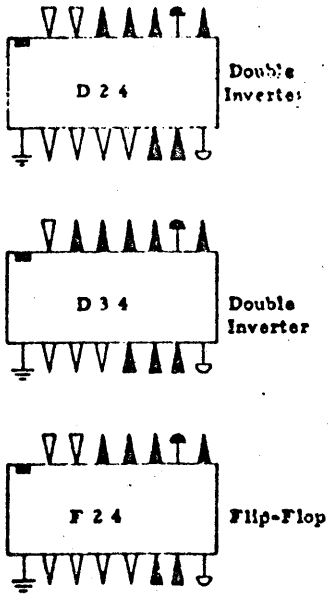
INTEBRID CIRCUIT PIN ASSIGNMENTS and DIMENSIONS FOR 222 PRINTER

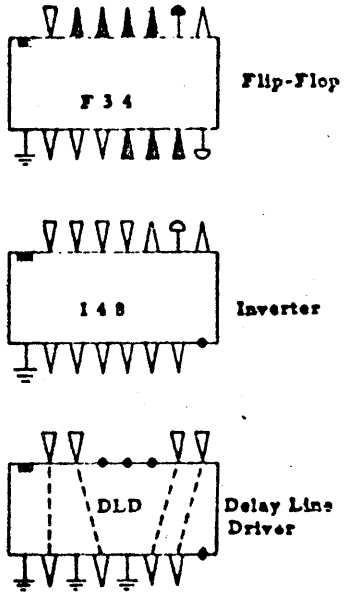


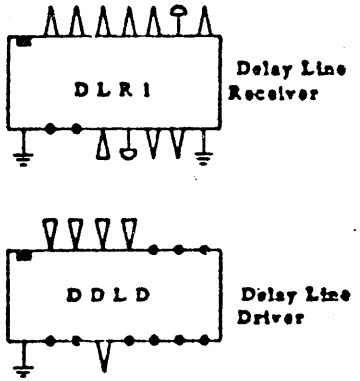


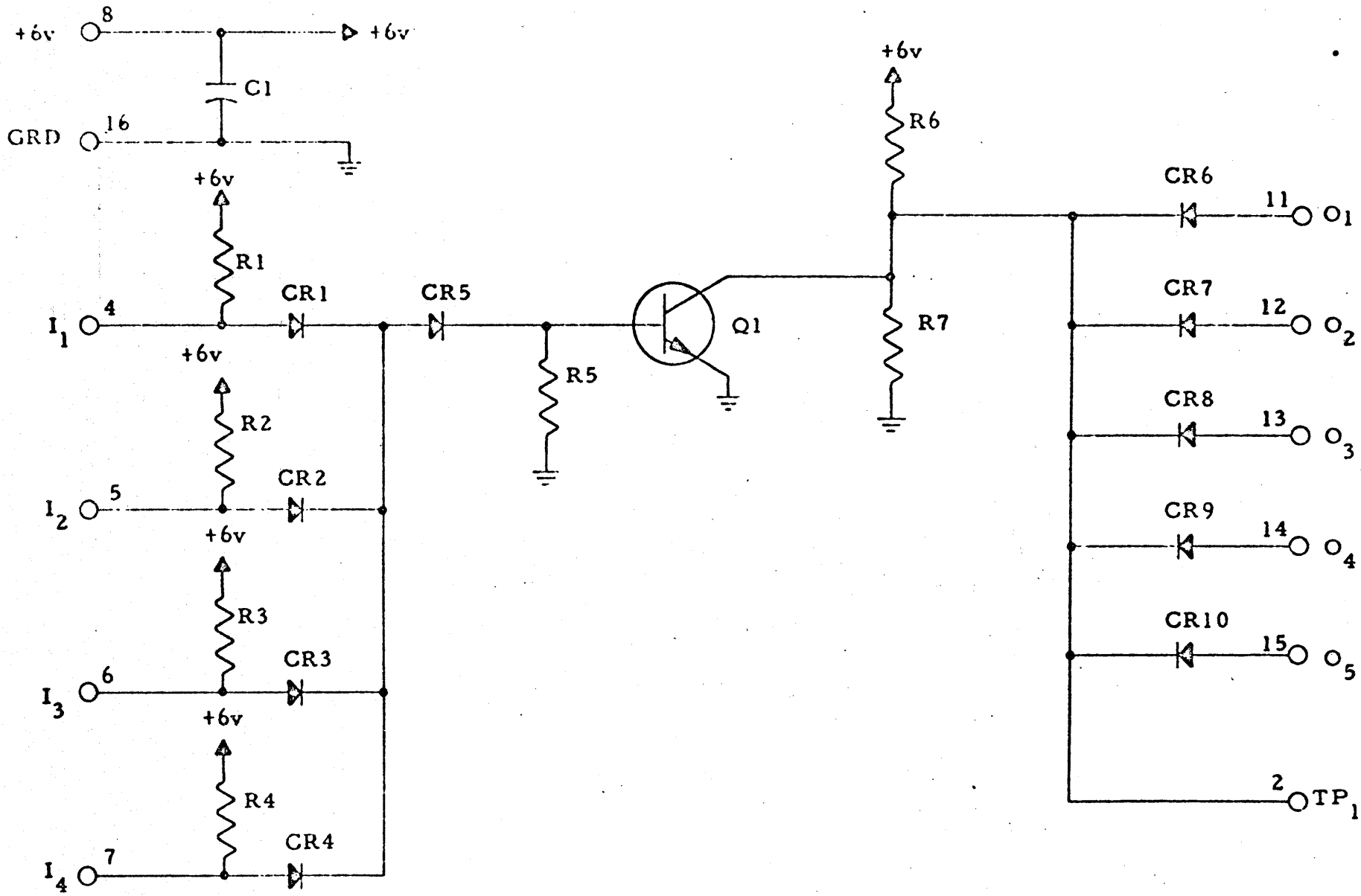












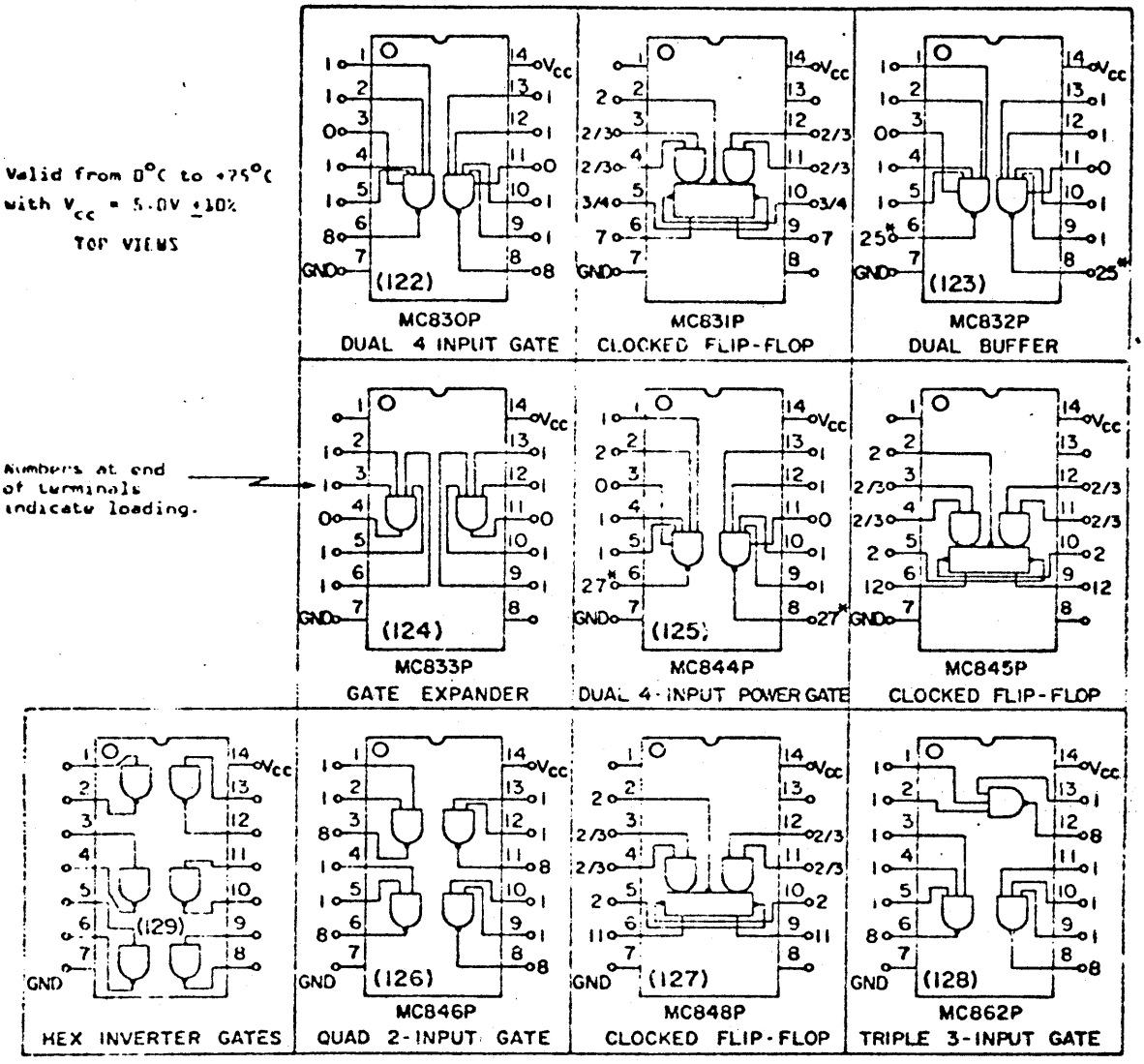
DTL. INVERTER, TYPE I45

INTEBRID CIRCUIT PIN ASSIGNMENTS
for 217 EQUIPMENT CONTROLLER

Valid from 0°C to +75°C with V_{cc} = 5.0V ±10%

TOP VIEWS

Numbers at end of terminals indicate loading.

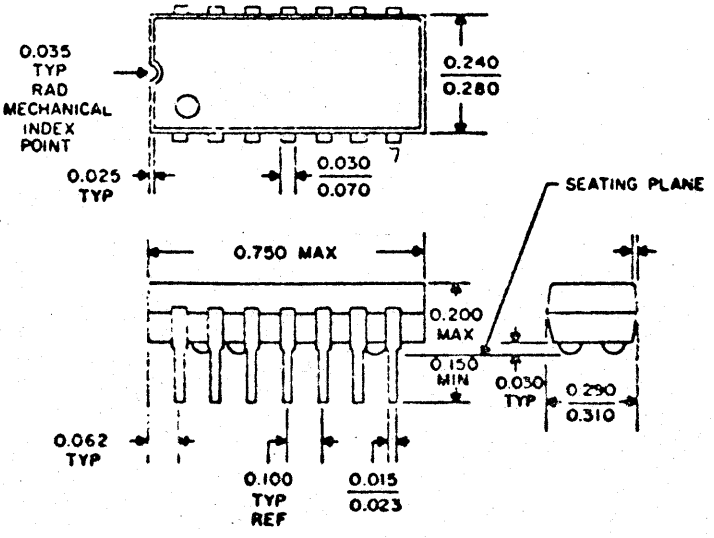


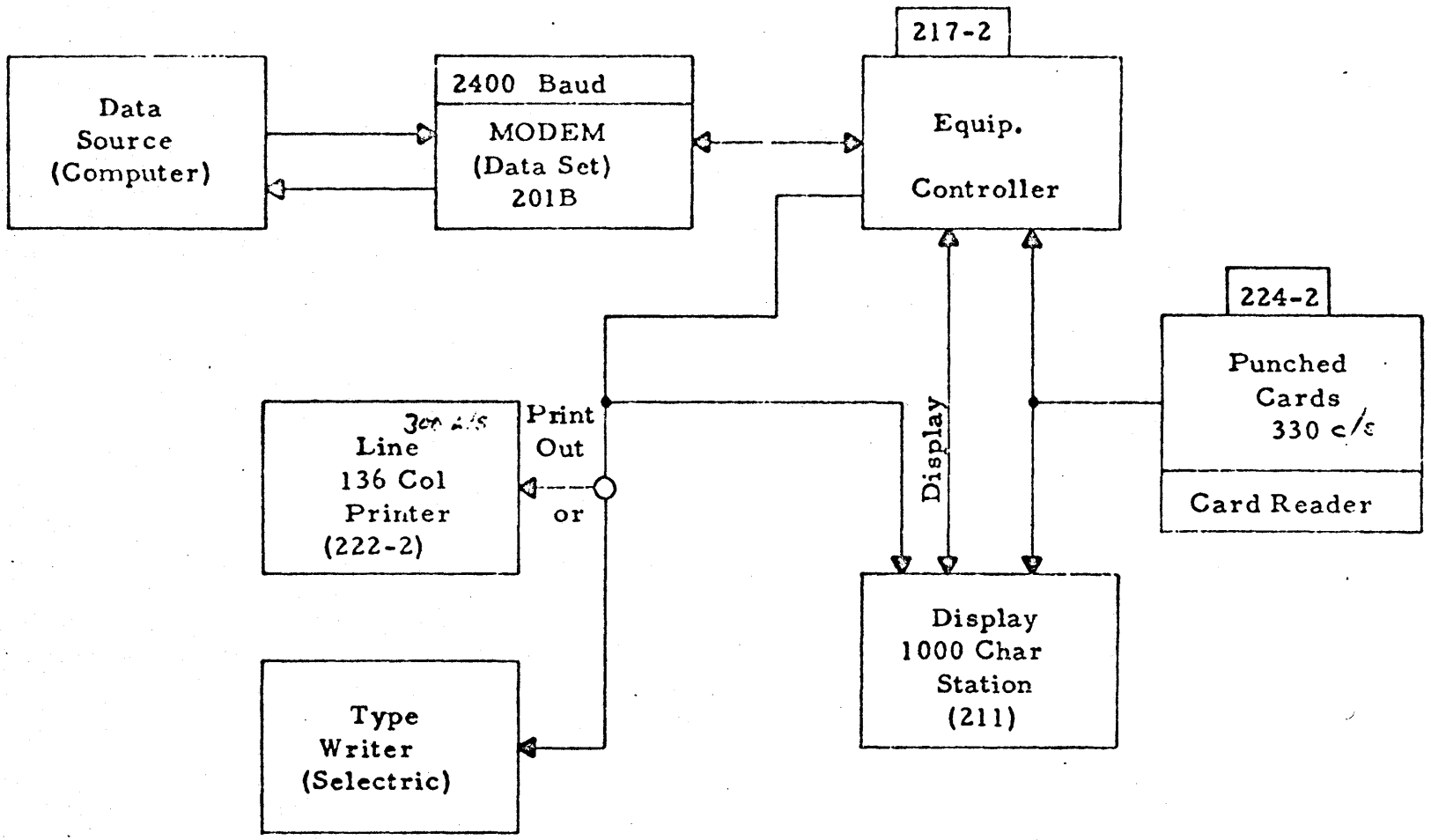
* SEE GENERAL RULES

- The number of load circuits that may be driven from an output is determined by the input loading factor. The summation of input loading should not exceed the drive capability of the output.
- The outputs of the Dual 4-input gate may be tied together to perform the wired-collector OR function. For each added gate subtract 1 unit fan-out. For six added gates only 5 unit loads need be subtracted.
- The outputs of the Dual Buffer may not be tied together.
- The outputs of the Dual Power Gate may be tied together to perform the wired-collector OR function.
- An external load resistor should be utilized with the Dual Power Gate. At Vcc = 5.0 ±0.5V, subtract the following output loads.

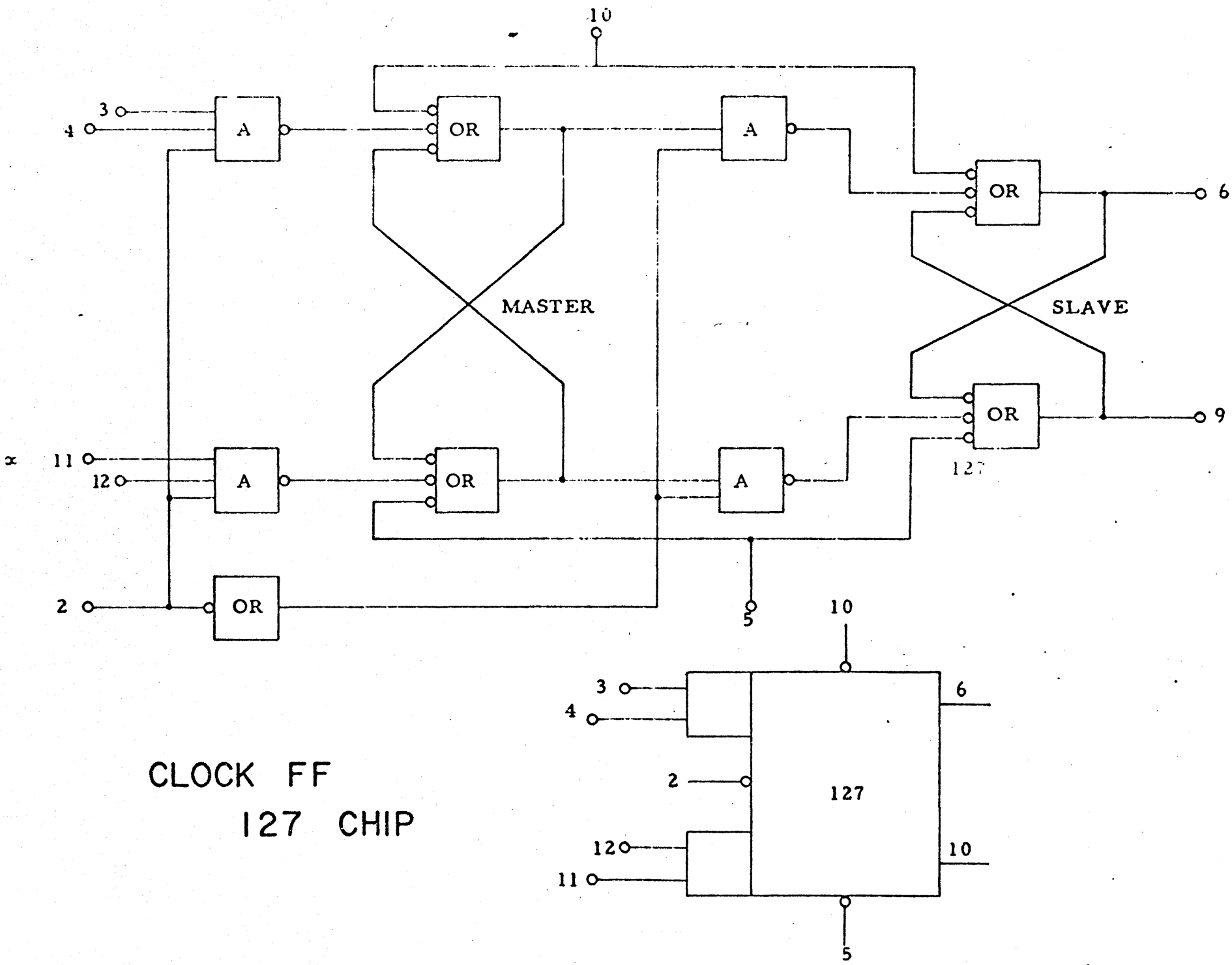
R	
2 kΩ	– 2 loads
1 kΩ	4 loads
510 Ω	8 loads

- For increased current capability, the inputs and outputs of ½ MC845P and ½ MC844P can be paralleled (up to and including 4 common outputs). The combined output will equal 100 loads while each combined input will equal 4 loads.

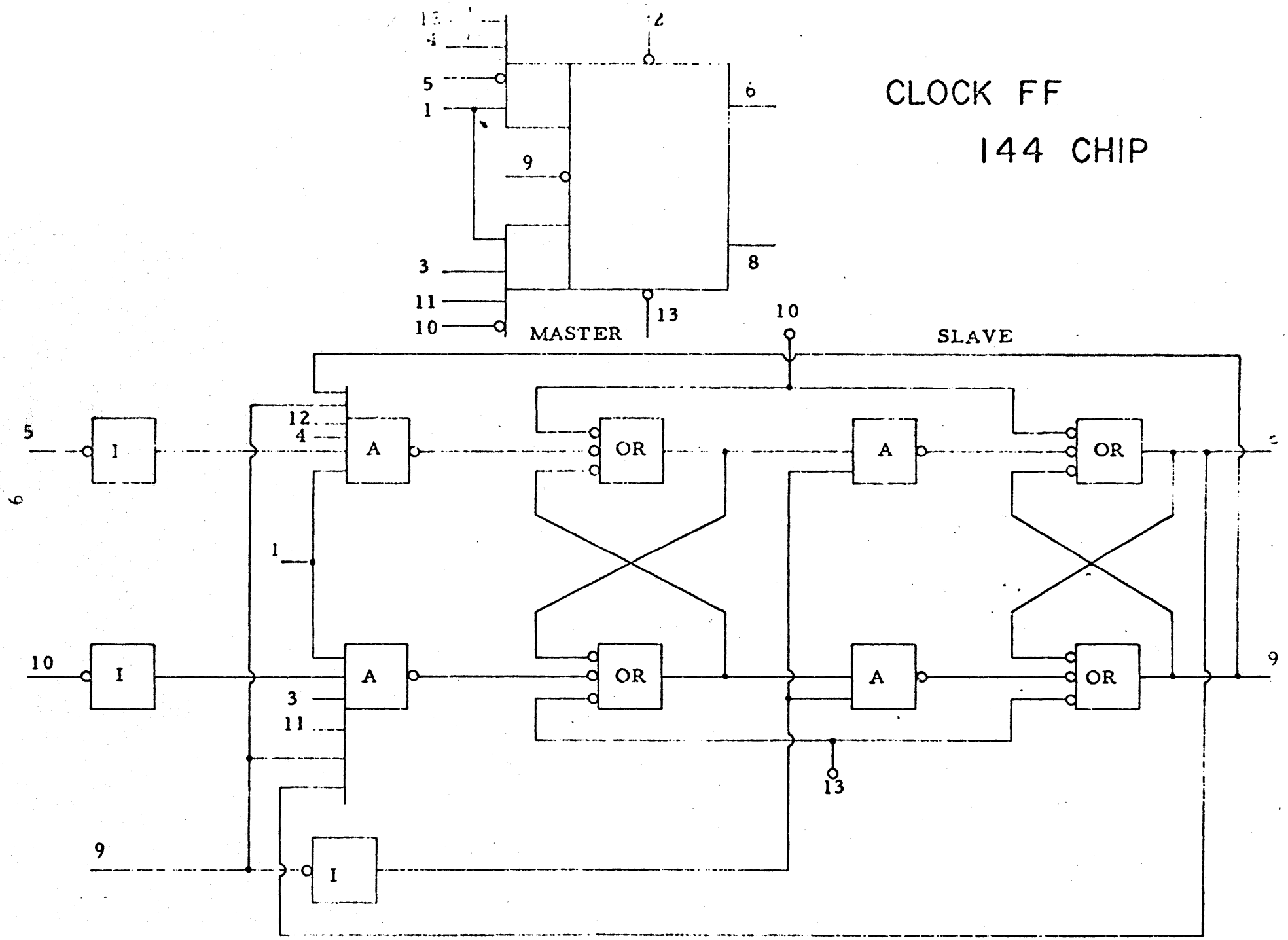


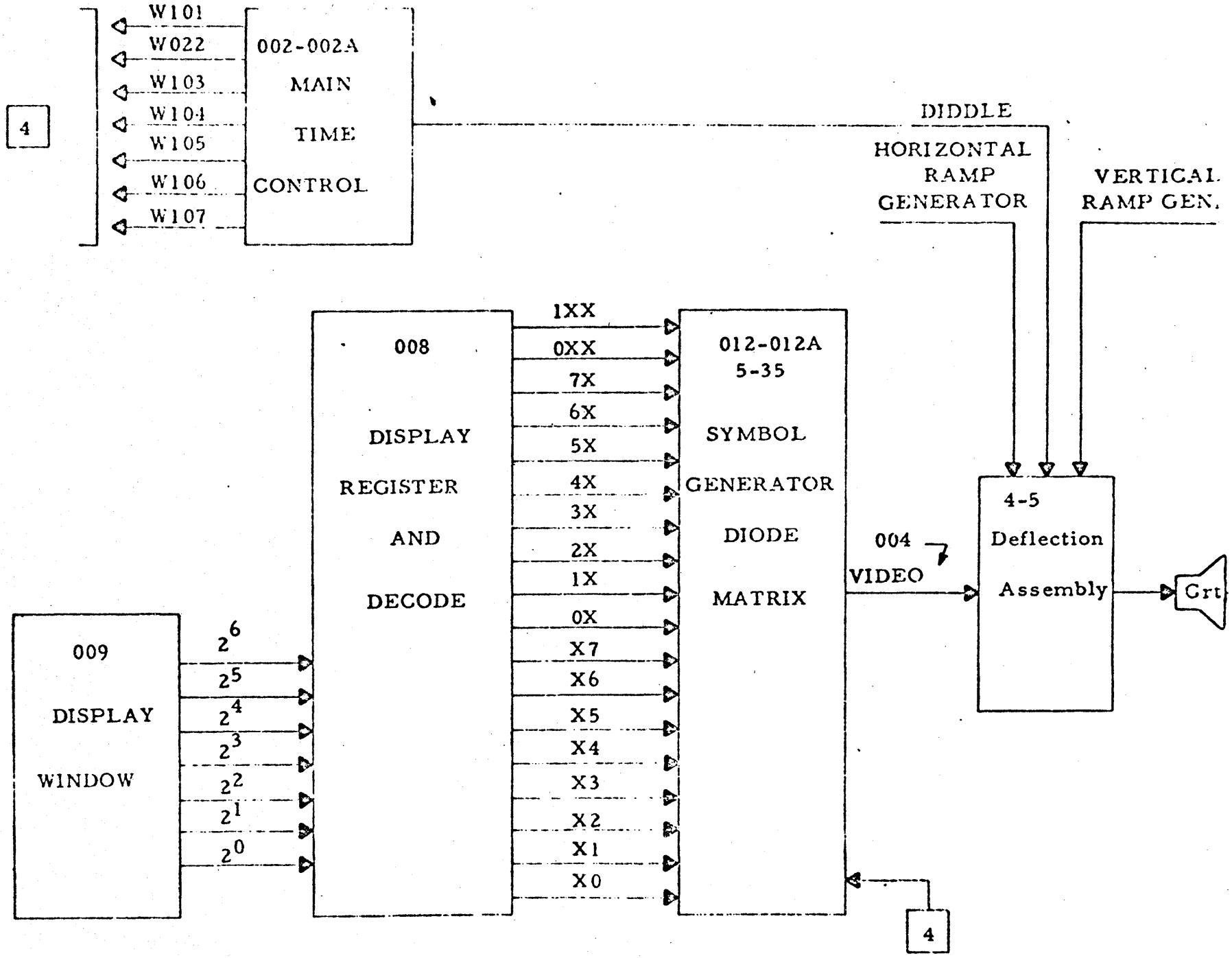


SYSTEM BLOCK DIAGRAM



CLOCK FF
127 CHIP


CLOCK FF
144 CHIP
MASTER
SLAVE
I
A
OR
5
10
9
6
12
4
1
3
11
13



CHARACTER GENERATION BLOCK DIAGRAM

HIGH VOLTAGE DESCRIPTION

The DD211 high voltage power supply is a DC to DC converter. The octal power consumption of the supply is approximately twelve watts. The input power is supplied by two low voltage supplies (positive 12 volts and positive 16 volts) which are located within the 211 cabinet. The low DC voltage is converted to a high AC potential which is rectified to supply a DC value of 10,000 volts to the picture tube.

The high voltage power supply can be divided into four basic circuits:

1. Jensen Inverter
2. High Voltage Doubler
3. Low Voltage Boost
4. Regulator

The Jensen Inverter (commonly referred to as a chopper) is the circuit consisting of transformer T1, transistors Q1 and Q2, and the primary of the high voltage transformer T2.

This circuit provides power to the high voltage transformer and received its power from the positive potential stored in capacitor C2. The potential is maintained near +8 volts by the conduction of transistor Q3. This voltage is felt on the collector of transistor Q1 and Q2 thru the primary of the high voltage transformer. There will also be a positive voltage supplied to the bases of these transistors thru R_4, R_2, and T_1. (R_4 and C_1 are referred to as the chopper starting network) The transistors are now forward biased and one will start conducting (for example assume Q1). The resulting current flow will be felt by the saturable transformer T1. This transformer is wired in a positive feed-back manner. When saturation is attained, the collapsing field will result in a positive voltage on the base of Q2 (drive Q2 into conduction) and a negative voltage on the base of Q1 (cut Q1 off).

This oscillation will continued until the removal of power from C2.

Each time Q1 or Q2 conduct, current will pass thru the primary of T2 the high voltage transformer. This current will induce a voltage of 5,000 volts in the 2000 turn winding. This voltage is then rectified by the voltage doubler circuit V1 and V2 and filtered by C7, R19 and the capacitance of the CRT day coating to ground. The high voltage at the post accelerator should be 10,000 volts with 4 volts of ripple.

The one turn winding of transformer T2 supplies the filament voltage to V1 and V2. The voltage induced in this winding is higher than required by the tubes with makes it necessary to add R12 and R13.

The 2000 turn winding of T2 is tapped at 200 turns which provides 500 volts to the half wave rectifier circuit CR6 and C6. The DC voltage developed is +500 volts which is used for CRT control.

The remaining winding on T2 is a 3 turn winding used for sensing the flux of the transformer. The flux will vary as the load on the supply is changed. This change induces a voltage in the 3 turn winding which feeds the regulator portion of the power supply. The regulator will then try to compensate for the flux change by either increasing or decreasing the supply voltage thus maintaining a constant 10,000 volts output.

The induced voltage of the 3 turn winding is approximately 14 volts PP. This voltage is half wave rectified by CR5 and filtered by C4. The DC value across C4 should be near +8 volts. Potentiometer R11 varies the base voltage of Q6. This potentiometer is the high voltage adjustment.

Transistors Q5 and Q6 form a differential amplifier. The base voltage of Q5 is maintained at +2.6 volts by zenner diode CR4. The emitter voltage of Q5 is dependent upon the amount of conduction by Q6. As Q6 conducts more, the voltage drop across R10 increases thus increasing the emitter/base bias of Q5. The resulting decrease in conduction of Q5 reduces the voltage drop across R9.

It can now be seen that the voltage across R9 will be determined by the voltage induced in the 3 turn winding of T2.

The voltage developed across R9 controls the amount of conduction of transistor Q4. As the voltage of R9 increases, the base of transistor Q4 goes positive and Q4 conducts more. The collector of Q4 now becomes less positive which reduces the forward bias of Q3. The conduction of Q3 decreases which results in a less positive potential being on C2.

The reduced voltage now feeding the chopper will result in a lower conduction of Q1 and Q2 which will decrease the voltage induced into T2. The end result is a decrease in the high voltage output.

In the event that horizontal sweep were lost and high voltage was maintained, the face of the picture tube would be damaged by the consentration of electron bombardment in a very small area.

To prevent this, the high voltage should be turned off if the sweep is lost. This is accomplished by the introduction of R6, R7, C3, CR2 and CR3 to the circuit.

The input to CR3 is a negative signal produced by the horizontal amplifier. The amplitude of this signal is sufficient to charge C3 negatively. The negative voltage will then maintain a reverse bias condition of diode CR2.

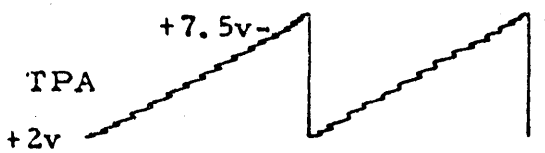
Diode CR2 will remain reverse biased until the removal of the horizontal signal from CR3. Capacitor C3 will now discharge, and diode CR2 will be forward biased by the positive voltage of the +12 volt supply. The positive voltage will drive transistor Q4 into saturation which will then cut off transistor Q3. Power will now be removed from the chopper and high voltage operation will cease.

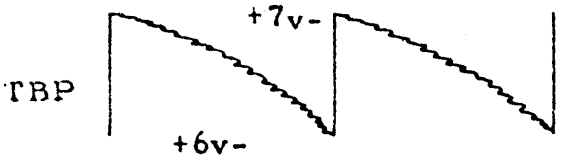
The maximum allowable voltage of the emitter/base junction of Q3 is near 4.5 volts. Exceeding this amount would destroy the junction. If transistor Q4 suddenly went into saturation (loss of horizontal) the base of Q3 would be drawn very near to ground potential. Capacitor C2 would still be charged to +8 volts which would now exceed the maximum junction voltage. To prevent junction damage diode CR1 is placed from emitter to base. This diode will discharge capacitor C2 thru transistor Q4 and prevent any damage to transistor Q3 junction.

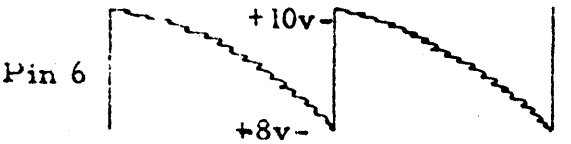
211 DISPLAY STATION WAVE FORMS

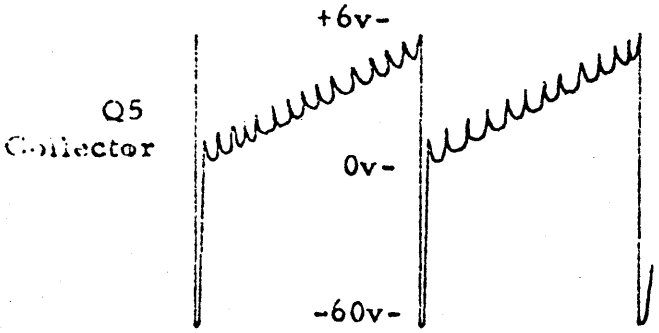
(Voltages Approx.)

Vertical

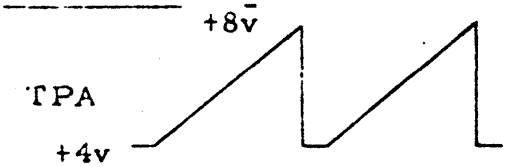


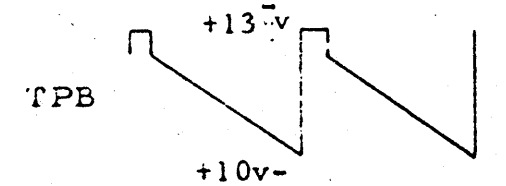


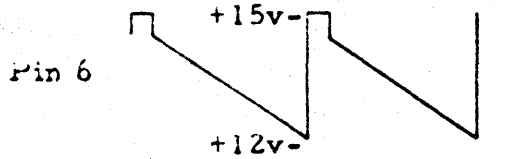


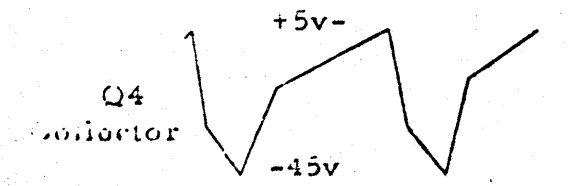


Horitontal

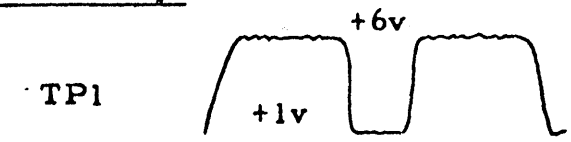


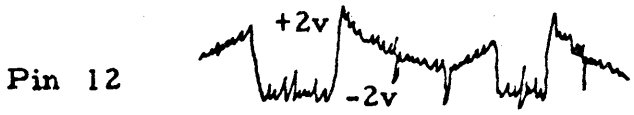


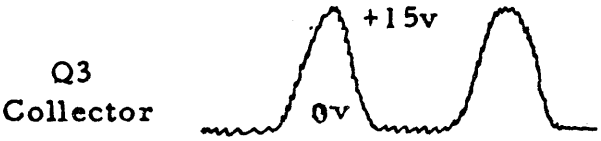




Diddle Amp

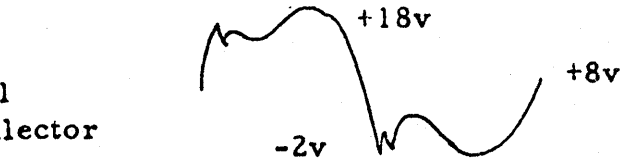




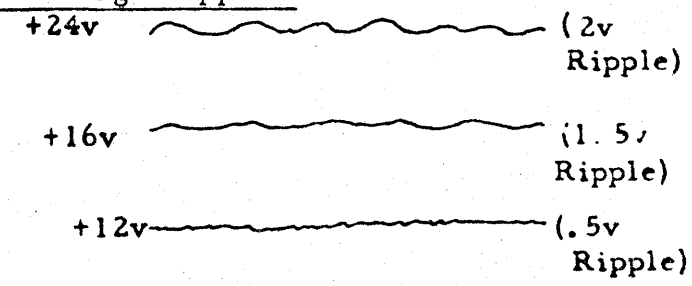


Video

H.V. OSC.

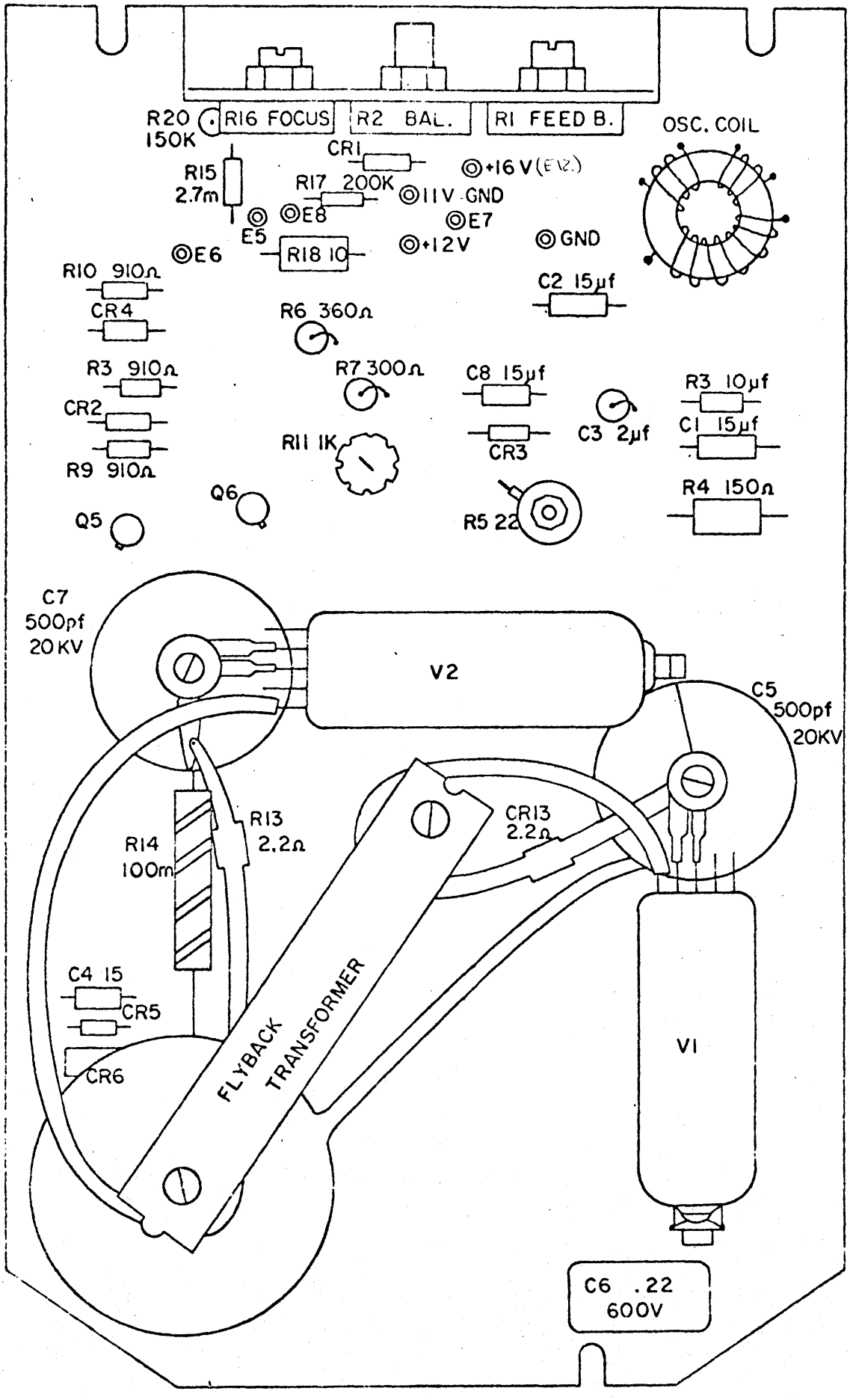


Low Voltage Supplies



H.V. OSC. Control ckts

C2	15µf	20v	9v with VOM
C3	2µf	200v	-30 with VOM



210 SERIES DISPLAY H.V. SECTION

MEMO

DATE: November 12, 1971

TO: L. V. Daigle LOCATION: TORRCE

FROM: K. E. Fenton LOCATION: GCYDS0

SUBJECT: CE304 Card Reader Adjustments

Vince, I will pass along some good information on adjusting 200 UT Readers which I picked up from George Roepe on his recent support trip to Calgary. You may wish to put it in CE News.

1. Adjust guide rails by the manual. That is, they must be parallel and of specified clearances. Do not attempt to steer the card by tweeking at rails to compensate for card skew.

2. Steer the card so that it does not skew or fish-tail by lateral adjustment of the pressure roller at the read station, and by the inject assembly. The sping post on the inject assembly should be formed so that the spring is positioned vertically and not at a sharp angle. Form the spring post by "fine tuning" to steer the card in a straight line. If the inject assembly, the pressure-roll assembly are adjusted by observing card movement, and if the Pre-Read Station - Card Step clearances are correct, the card will not skew.

3. To position the lamp at the Fibre Optics, disregard the manual. With power on, place a sheet of paper over the optics and check the 14 levels visually for dark patches or shadows. Move the lamp until no shadows are visible or at least for most optimum position. The lamp may be as much as 1/4 inch plus away from the optics.

4. Have infinite patience when making adjustments. Use flat guages instead of eye-balling. When setting clearances between doors and card bed (4 cards), use strips of cards for more accurate adjustment, not the whole card.

Further, a recent fault whereby the reader would go into CHECK mode if more than half full of cards, was traced to insufficient clearance between the hopper white drive rollers and the notches in the pre-read casting. Most readers have 25 to 30 mills measured with a wire guage. The casting had to be removed and the notches filed back. This operation showed that it is not necessary to pull the input hopper to replace rollers as is called out in PB7140 FCO. Re-installing the hopper is a tedious process, and access to hopper rollers and

... con't

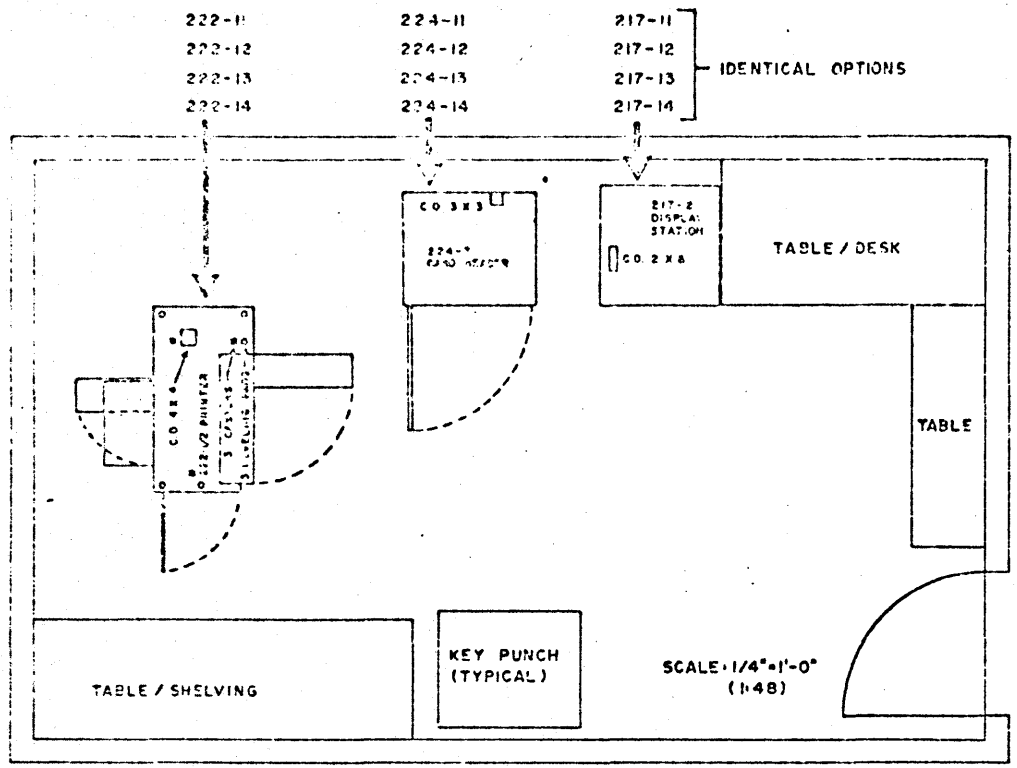
Card Step is available by removing the Pre-Read station which is mounted with 3 screws and locating pins.

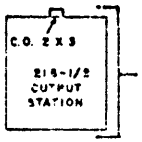
Keith E. Fenton

KEF/kg

c.c. - J. Pike GCYDS0

REV	DESCRIPTION	
A	UPDATED TO LATEST DATA & CONFIGURATION	F.M. 5-25





POSSIBLE OPTION FOR PRINTER

20A preferred

CABINET	QTY.	MODEL NO.	PHYSICAL PROPERTIES								HEAT DISSIPATION		KVA	CIRCUIT BREAKER REQUIREMENTS			
			WIDTH		DEPTH		HEIGHT		WEIGHT					60HZ. 120V-1P OR	50 HZ. 220V-1P	60HZ. CONNECTION	50 HZ. CONNECTION
			IN.	M.	IN.	M.	IN.	M.	LBS.	KG.	BTU/H	KCAL/H					
REMOTE ENTRY/DISPLAY STATION	1	217-2	30	0.76	30	0.76	43-1/2	1.10	210	95	950	240	0.3	15A *	15 A	STANDARD WALL OUTLET	TERMINAL STRIP
OUTPUT STATION	X	218-1 OR 218-2	25	0.64	28	0.71	34	0.86	160	73	800	200	0.3				
LINE PRINTER	1	222-1 OR 222-2	46	1.17	26	0.66	44	1.02	850	360	3000	750	1.1				
CARD READER	1	224-2	33	0.84	28	0.71	48-1/2	1.23	400	180	1440	360	0.6				
KEY PUNCH	X	SEE NOTE 9	30	0.92	29	0.74	38	0.97	230	105	525	130	0.4				

NOTES:

1. ALL SPECIFICATIONS ARE ON A PER UNIT BASIS.
2. ALL WIRING SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL AND NATIONAL CODES.
3. THE CIRCUIT BREAKER PANELS, CIRCUIT BREAKERS, MAGNETIC CONTACTORS, MAIN POWER DISCONNECT SWITCHES, JUNCTION BOXES AND ALL WIRING SHALL BE FURNISHED BY THE CUSTOMER PRIOR TO COMPUTER EQUIPMENT INSTALLATION.
4. CUSTOMER SHOULD ALLOW FOR CIRCUIT BREAKER ADDITIONS COMMENSURATE WITH SYSTEM EXPANSION PLANS.
5. CUSTOMER SHOULD ALLOW 4 FEET EXTRA POWER CORD FOR CONNECTION OF CONNECTOR.
6. SOLID LINES ON FLOOR PLAN INDICATE FLOOR CUTOUTS FOR PASSAGE OF LOGIC AND POWER CABLES.
7. AMBIENT ROOM TEMPERATURE RANGE: 60°-85° F RELATIVE HUMIDITY RANGE: 30-80%.
8. FOR SPECIFICATIONS ON EQUIPMENT NOT SHOWN, CONTACT CONTROL DATA'S COMPUTER SYSTEMS ENGINEERING REPRESENTATIVE.
9. TYPICAL, ESTIMATES FOR INFORMATION ONLY.

DRAFTSMAN	DATE
DC Mosher	5-25-72
APPROVED	DATE
	6-28-72
	DATE

CONTROL DATA

TITLE: 200 USER TERMINAL TYPICAL SYSTEM SITE REQUIREMENTS

SYSTEM: 200 UT

SIZE: A | DRAWING NO.: PS-2003 | REV.: A

IRS REMOTE TERMINAL SYSTEM TEST PROCEDURE

RESPONSIBILITY	ACTION
Customer Engineer, IDRS Site	1. Receives notification from IRS Operations personnel of an existing Remote Terminal problem via EOR.
	2. Contacts customer on Remote Site via phone and determines nature of malfunction.
	3. If problem is such that corrective action is not immediately apparent, the DMRTT will be put on line at the Central Site. This maintenance action must be coordinated with IRS operations personnel.
	4. The Central Site C.E. conducting the test will refer to the attached configuration sheet, to determine the applicable data set and the Remote Site Address chart to establish the proper tester addressing.
	5. Testing will commence with the Customer and all references will be made to IRS. TUID numbers only while conversing with the customer.
	6. Testing of the Remote terminals will start at Equipment address °0° and continue sequentially through all terminals.
	7. If during this test, it is determined that any Remote Displays cannot be addressed or Data being transmitted is not acknowledged at the DMRTT, testing should continue throughout the Daisy Chain until access to all Remotes has been attempted.

RESPONSIBILITY		ACTION
Customer Engineer, IDRS Site (continued)	8.	The results of the Remote Terminal Test will be determined by the operator of the DMRTT, who will then determine if the Remote C.E. is required on site.
	9.	The Remote site C.E. will be notified immediately, if the above requirement exists. At this time, the Central Site C.E. should discuss the problems encountered and make necessary arrangements for coordinating and resolving the problem. Results of this test are to be documented in the Remote System's Activity Log.
Remote Site C.E.	1.	Provides necessary testing locally of Remote Terminals ASAP after notification from the Central Site C.E. (A terminal tester will be taken to the site when notified of a problem.
	2.	Upon completion of the local test, coordination will be affected with the Central Site C.E. to indicate action taken and/or action required, to restore the Terminal to Operation.
	3.	If "Real Time" is down, and additional tests are required, coordinates with Central Site C.E. to schedule such test.
	4.	Verifies data received is correct and is at the Display address indicated by the person operating the DMRTT at the Central Site.
	5.	Notifies the Central Site C.E. of existing requirements for sub-assemblies controlled by the Austin Repair Center. Provides Central Site C.E. with specific shipping address.

RESPONSIBILITY	ACTION
Central Site C.E.	1. Upon receipt of a request from a Remote Site for sub-assemblies required to return a terminal to operation, the following information will be provided: a) Availability of Component. b) Date component can be shipped. c) Waybill number. d) Airline and flight number, if available. 2. Enter the above information in the Remote Terminal shipping status log.
Remote Site C.E.	1. Upon receipt of necessary components and completion of installation, the unit should be tested locally with a tester prior to returning it to an "on line" status. 2. Maintain close coordination with the Central Site C.E. during problem periods, to insure current status is maintained.

AUSTIN SERVICE CENTER

I.D.R.S.

REMOTE ADDRESS CHART
CHANNEL 7 - EQUIPMENT 5

CITY	CONTROLLER ADDRESS	CRT/KEYBD. ADDRESS	I.R.S. I.D. NO.	DMRTT ADDRESS
HOUSTON	160	0	EB01	141
HOUSTON		1	EB02	142
HOUSTON		2	EB03	143
HOUSTON		3	EB04	144
HOUSTON		4	EB05	145
SHREVEPORT	161	0	CA20	141
LITTLE ROCK	162	0	BA01	141
LITTLE ROCK		1	BA02	142
LITTLE ROCK		2	BA03	143
LITTLE ROCK		3	BA04	144
LITTLE ROCK		4	BA05	145
ODESSA	160	0	FB20	141
LUBBOCK	161	0	FB30	141
AMARILLO	162	0	FB40	141
SAN ANTONIO	163	0	EC01	141
SAN ANTONIO		1	EC02	142
SAN ANTONIO		2	EC03	143
SAN ANTONIO		3	EC04	144
SAN ANTONIO		4	EC05	145
CORPUS CHRISTI	164	0	EC30	141
NEW ORLEANS	160	0	CA01	141
NEW ORLEANS		1	CA06	142
NEW ORLEANS		2	CA04	143
NEW ORLEANS	161	0	CA02	141
NEW ORLEANS		1	CA03	142
NEW ORLEANS		2	CA05	143
AUSTIN	162	0	EA01	141
AUSTIN		1	EA02	142
AUSTIN		2	EA03	143
AUSTIN		3	EA04	144

RESPONSIBILITY	ACTION
Central Site C.E.	1. Upon receipt of a request from a Remote Site for sub-assemblies required to return a terminal to operation, the following information will be provided: a) Availability of Component. b) Date component can be shipped. c) Waybill number. d) Airline and flight number, if available. 2. Enter the above information in the Remote Terminal shipping status log.
Remote Site C.E.	1. Upon receipt of necessary components and completion of installation, the unit should be tested locally with a tester prior to returning it to an "on line" status. 2. Maintain close coordination with the Central Site C.E. during problem periods, to insure current status is maintained.

CHANNEL 7 - EQUIPMENT 3

FT. WORTH	160	0	FB01	141
FT. WORTH		1	FB02	142
FT. WORTH		2	FB03	143
FT. WORTH		3	FB04	144
FT. WORTH		4	FB05	145
TULSA	161	0	DA20	141
WICHITA	162	0	AA01	141
WICHITA		1	AA02	142
WICHITA		2	AA03	143
WICHITA		3	AA04	144
KANSAS CITY	163	0	AA20	141
DALLAS	160	0	FA01	141
DALLAS		1	FA02	142
DALLAS		2	FA06	143
DALLAS	161	0	FA04	141
DALLAS		1	FA03	142
DALLAS		3	FA05	144
OKLAHOMA CITY	162	0	DA01	141
OKLAHOMA CITY		1	DA02	142
OKLAHOMA CITY		2	DA03	143
OKLAHOMA CITY		3	DA04	144
OKLAHOMA CITY		4	DA05	145
ALBUQUERQUE	160	0	GA01	141
ALBUQUERQUE		1	GA02	142
ALBUQUERQUE		2	GA03	143
EL PASO	161	0	EC20	141

Figure 1-6 shows the front interconnection cable configuration.

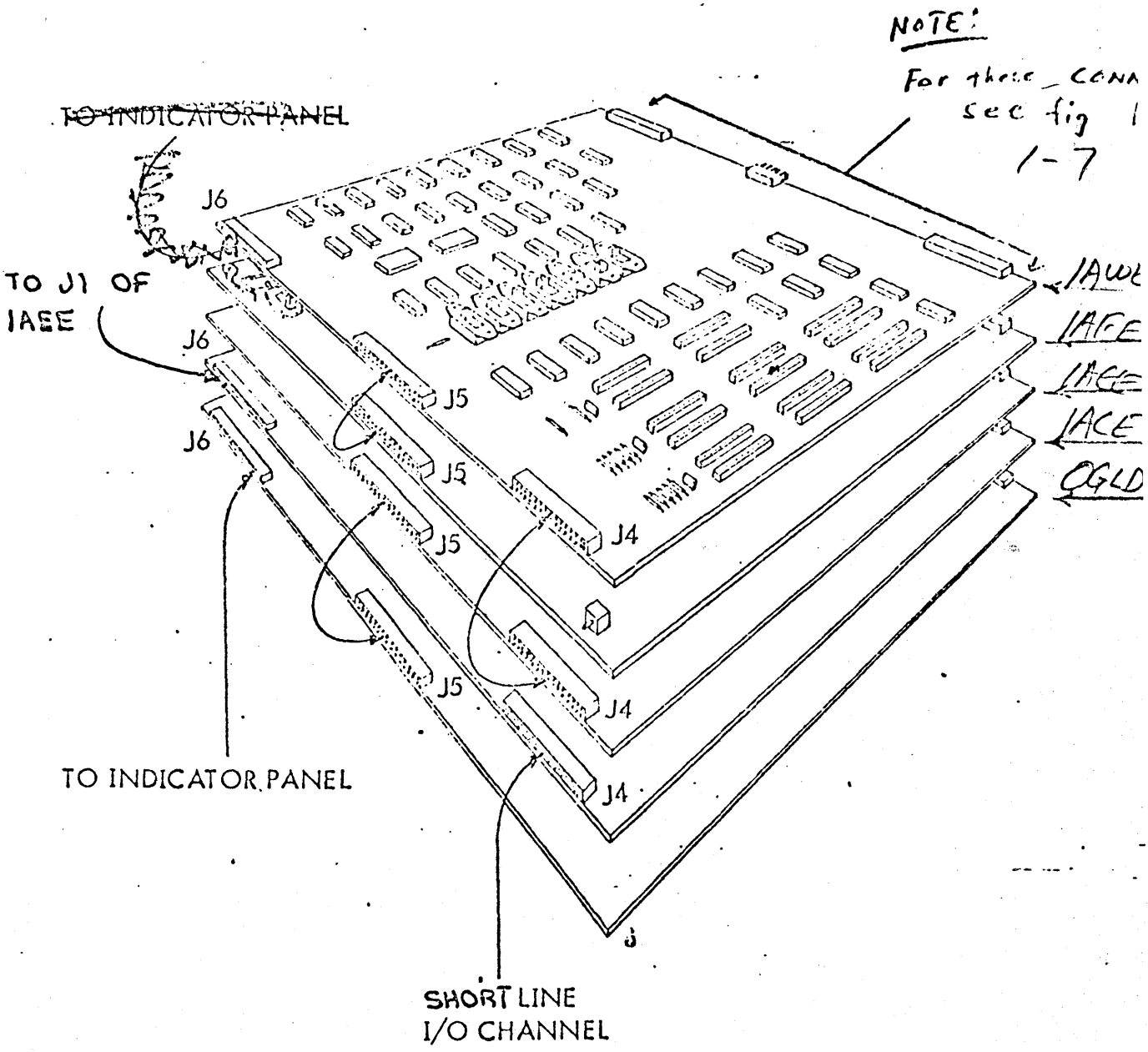


Figure 1-6. Cable Connections (Front View)

SECTION I

GENERAL DESCRIPTION

The buffered controller module, figure 1-1, contains the main control logic for a communications terminal. A terminal consists of the buffered controller and an input/output device (Display/Keyboard Station, Printer/Keyboard Station, etc.). The terminal communicates with a central processing site via an RS232 compatible modem. The buffered controller module processes data within the terminal and coordinates data flow between the terminal and the central processing site.

The buffered controller is usually mounted inside the cabinet of the associated input/output device.

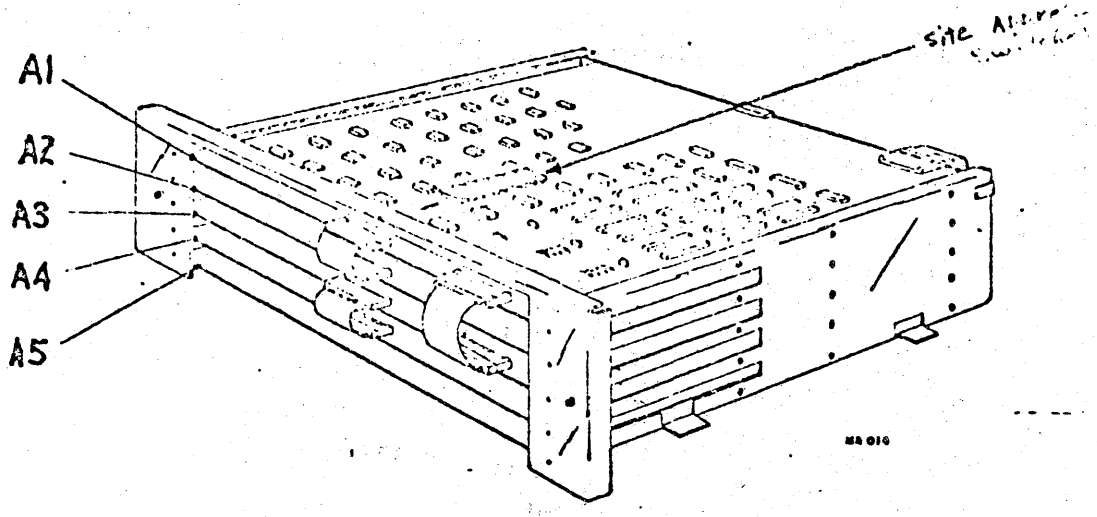


Figure 1-1. Buffered Controller