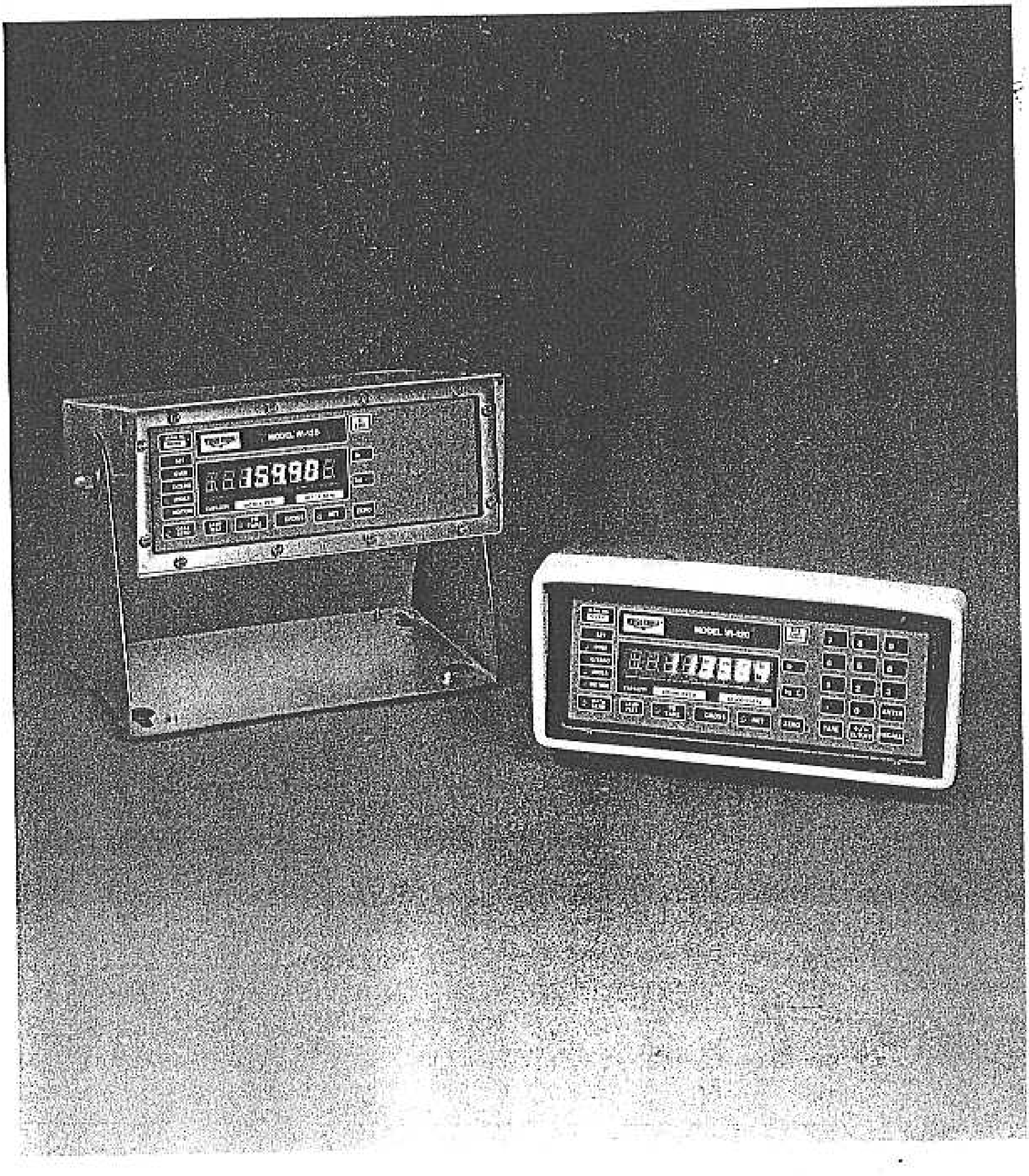
WEIGH-TRONIX®

Model WI-120
INDICATOR SERIES



Service Manual

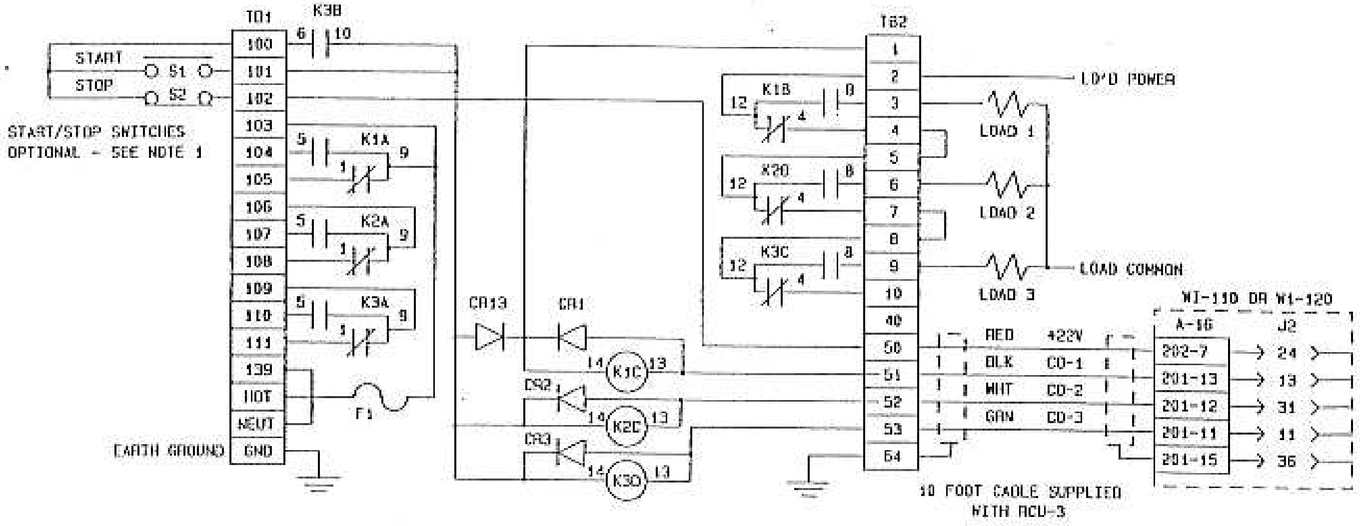
CHASSIS PARTS (NEMA IV ENCLOSURE) CONTINUED

Chassis	19556-0016
A-to-D Cover	19552-0010
Front Panel Mounting Bracket (Bottom)	19553-0019
Front Panel Mounting Bracket (Top)	27587-0012
Option Card Retainer Plate	27588-0011
Transformer Mounting Bracket	19555-0017
Cable Assembly, Terminal Block to A-1	21559-0019
Cable Assembly, Display Interface (A-1 to A-3)	19575-0013
½" Hole Plug	17730-0019
¾" Hole Plug	17730-0027
Plastic ½" Watertight Hub Assembly (0.50", Option Cable)	22380-0053
Plastic ½" Watertight Hub Assembly (0.37", Power Cables)	22380-0046
Plastic Watertight Hub Assembly (0.18" WP-230)	22380-0020
Plastic Hubs Require Nut	22381-0011
Metal ½" Watertight Hub (Power and Serial Cables)	15408-0014
Metal ¾" Watertight Hub (BCD and Cutoff Cables)	15408-0022
Metal ½" Hub Connector	15407-0031
Metal ¾" Hub Connector	15407-0098
Jumper for Interface Terminal Block	15887-0014
Power Cord	15318-0013
Power Cord Plug	17823-0012
Class III/III L Decal	24370-0010

WI-120 ASSEMBLIES

	DESCRIPTION	W-T PART NUMBER
A-1	Microprocessor/A-to-D PC Card (Specify Indicator Version)	24463-0018
A-1	Microprocessor/A-to-D PC Card with RFI (Specify Indicator Version)	24463-0026
A-1	Microprocessor/A-to-D PC Card (Specify Indicator Version) Old Style	24077-0016
A-2	Power Supply PC Card	22921-0018
A-2 DC	DC Power Supply PC Card	21770-0012
A-3	Display/Keyboard Interface PC Card	19532-0015
A-4	Parallel BCD Interface PC Card	20469-0010
A-5	Serial Interface PC Card	19496-0027
A-6	Cutoff Interface PC Card	20000-0016
	RS-422/485 PC Card	22514-0037
	Dual RS-422/485 PC Card	21962-0010
	Analog PC Card	23438-0020
	Analog PC Card (Old Style)	22696-0011
	RD 4000, 6000 PC Interface Card	22514-0029
	Front Panel (Without Keypad)	24246-0012 MTS
	Front Panel (With Keypad Tare and Cutoff)	24246-0020 MTS
	Front Panel (Accumulator With Keypad Tare & Cutoff)	24246-0038 MTS
	Front Panel (Gross, Tare, Net, Keypad)	24246-0046 MTS
A-14	Parallel Interface Terminal Card	19540-0015
A-15	Serial Interface Terminal Card	19544-0011
A-16	Cutoff Interface 32 Terminal Card	20164-0018
A-17	Cutoff Interface 16 Terminal Card	20160-0012
A-18	Remote Interface 9 Terminal Card	21947-0028
A-500	Power Module Assembly	19571-0017
A-500	Power Module Assembly with Heater Plate Connector	19571-0025
	Power Transformer Assembly	20042-0016
	Heater Plate Kit	20006-0010
	Analog Zero Kit	20315-0016
	Analog Zero Kit (NEMA IV)	20315-0024
	Tool Operated Analog Zero Kit	20315-0032
	Tool Operated Analog Zero Kit (NEMA IV)	20315-0040
	Tool Operated Digital Zero Kit	20315-0057
	Tool Operated Digital Zero Kit (NEMA IV)	20315-0065
	115 VAC Power Cord (Standard Enclosure)	17790-0016
	115 VAC Power Cord (NEMA IV)	15318-0013
	Requires: Plug (NEMA IV)	17823-0017

BASIC WIRING DIAGRAM



Notes: These notes are referenced in the drawings on this and following pages.

1. Terminals 101 and 102 are jumpered except when Start/Stop switches are used.
2. One or two outputs may be used - see Figures E and F of the Option Wiring Diagrams. Start and Stop switches must be used with this option. WI-110/WI-120 interface wiring is modified as shown.
3. External power is required to illuminate the lights. Lights will be for 115 VAC unless 230 VAC is specified with order.
4. The ground terminal must be connected to Earth Ground on **ALL** units.

OPTIONS

Options available with the RCU-3:

- Start/Stop Switches
- Individual Lights or Batching/Complete Lights
- NEMA 4 Carbon Steel Case or NEMA 4X Stainless Steel Case

<u>Start/Stop Switches</u>

Use start/stop switches when cutoff values are entered in ascending order, or descending order if negative cutoffs are used. If cutoff values are entered, relays are energized when the start switch is depressed. The relays remain energized until the stop switch is depressed or until the cutoff values are reached. As each cutoff is reached, the associated relay de-energizes. Relay K3 acts as a latching relay and should always be the last relay in a sequence. The start switch must be depressed again before the relays will re-energize.

WEIGH-TRONIX

BACK PANEL COVER PLATES

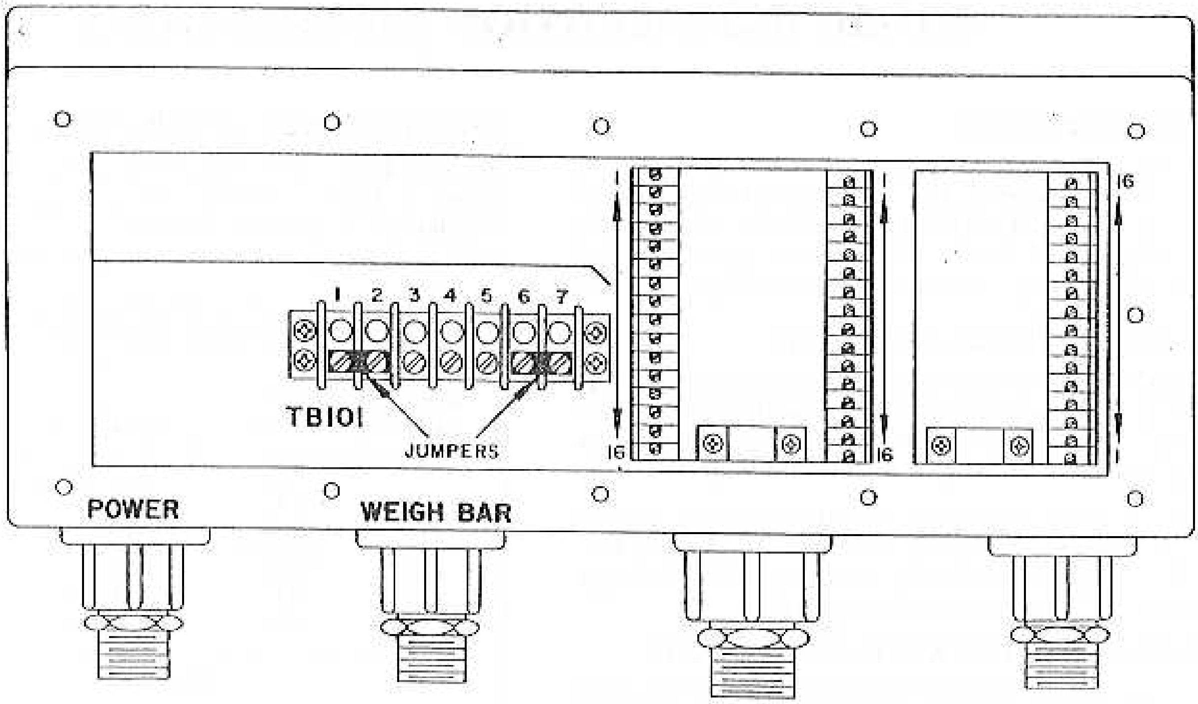
KEY

B=CUTOFF, BCD, OR ANALOG PCB
S=SERIAL (RS232/20MA) PCB
F=SINGLE RS422/485 PCB
D=MULTISCALE
C=DUAL RS422/485 PCB
E=RD 4000,6000 PCB
*=NO PORT

DATA CHART

PART NUMBER	LOCATION X-Y-Z
20072-0019	*-*-*
" -0027	B-*-*
" -0035	*-B-*
" -0043	*-*-B
" -0050	B-B-*
" -0068	*-B-B
" -0076	B-*-B
" -0084	B-B-B
" -0092	S-*-*
" -0100	*-S-*
" -0118	*-*-S
" -0126	S-S-*
" -0134	*-S-S
" -0142	S-*-S
" -0159	S-S-S
" -0167	B-S-*
" -0175	B-*-S
" [illegible]	B-*-S

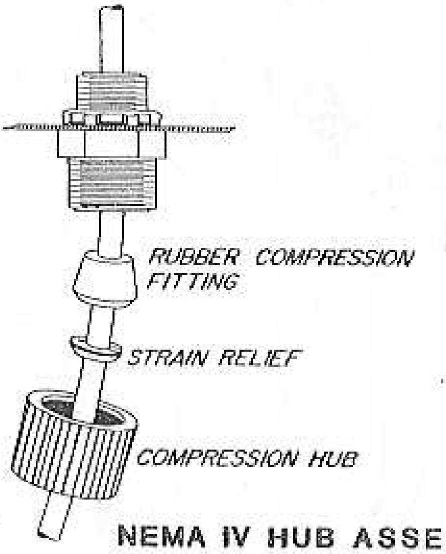
PART NUMBER	LOCATION X-Y-Z
20072-0274	S-B-B
" -0282	C-*-*
" -0290	S-*-C
" -0308	C-*-C
" -0316	D-*-*
" -0324	D-*-B
" -0332	D-*-S
" -0340	D-S-S
" -0357	D-B-S
" -0365	*-*-E
" -0373	B-*-E
" -0381	S-*-E
" -0399	D-*-E
" -0407	D-B-E
" -0415	D-E-S
" [illegible]	[illegible]



JUMPERS ARE INSTALLED WHEN "NO SENSE" LINES ARE INCLUDED IN THE SIGNAL CABLE.

NEMA IV CABLE CONNECTIONS
FIGURE 2

For the NEMA IV enclosure, remove the panel from the rear of the enclosure. Next, refer to Figure 2 and route cables through the various pieces of the appropriate water-tight hub assembly as shown in Figure 3.



NEMA IV HUB ASSEMBLY
FIGURE 3

Cable connections for panel-mounted units vary with each enclosure. In most cases, however, you can refer to either Figure 1 or Figure 2 to determine the type and location of the connectors used.

POWERING AN AC UNIT

Every AC unit can operate from any one of four operating voltages: 115/120 or 230/240 VAC. The operating voltage is selected by orienting the small PC card that is located in the A-500 power supply module. To select the proper input voltage for a particular application, procede as follows:

* Unplug the power cord and slide the plastic window over the power line jack.
* Remove the fuse by drawing the fuse release lever out and over.
* Remove the Voltage Selector PC Card by pulling it straight out.
* Find the appropriate voltage that is marked on the card and orient the card so that the voltage is on the left side.
* Replace the Voltage Selector PC Card and the fuse. Then slide the plastic window back over the fuse.

When the operating voltage has been selected, plug the power cord into the power line jack.

POWERING A DC UNIT

Every d.c. unit is designed so that it can be powered by a ± 12 to ± 48 volts d.c. power source. Unlike the a.c. units, no adjustments are needed. Simply plug the power cord into the power cord jack and the system is ready to be connected to a power source.

WI-120 INSTALLATION INFORMATION

INTRODUCTION

The following procedures explain how to unpack and set up a WEIGH-TRONIX WI-120 weight indicator. Though each system is fully tested, programmed and calibrated at the factory, a qualified scale technician should inspect all newly installed systems before they are put into operation.

UNPACKING INSTRUCTIONS

Unpack the WI-120 and inspect it carefully for signs of shipping damage. Make sure that IC's and option cards are properly seated in their sockets. Then, power up the system to make sure that there is no hidden damage.

If shipping damage is discovered, file a written inspection request with the carrier within 10 days of delivery and retain the shipping carton and packing material even though no signs of rough handling are apparent.

MOUNTING A NEMA IV ENCLOSURE

Use the mounting bracket from the NEMA IV enclosure as a template to mark the locations of mounting holes and use 5/16" hardware to permanently mount the unit in a particular location.

MAKING CABLE CONNECTIONS

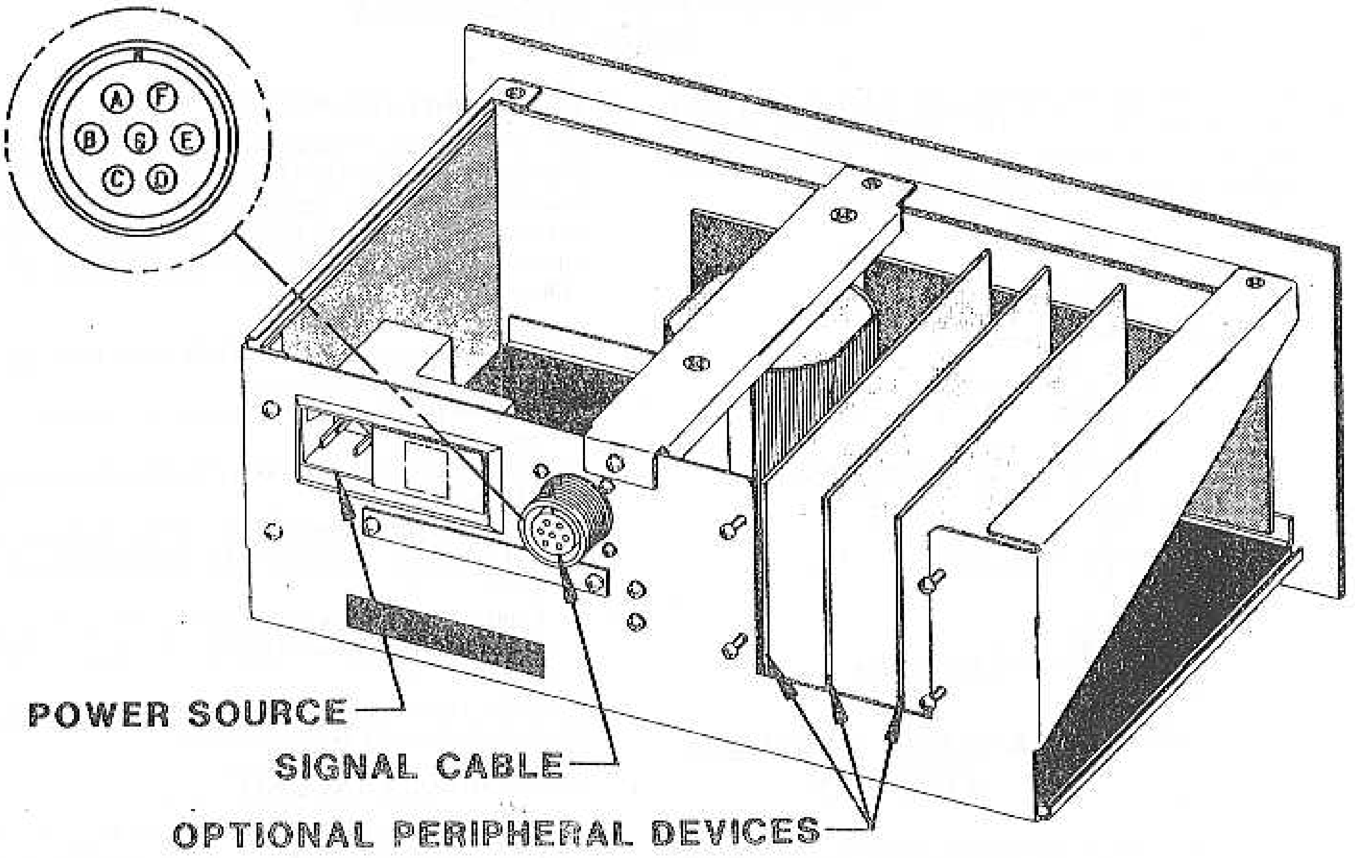
For desktop enclosures, refer to Figure 1 and plug the cable connector into the appropriate spot and use the appropriate device (screws on DIN-type connectors or locking rings on jack-type connectors) to secure the connection.

SIGNAL CABLE CONNECTIONS

TB101 TERMINAL (NEMA IV)	WIRE COLOR	DESCRIPTION	J101 PIN CONNECTIONS (DESKTOP)
1	GRN	+EXCITATION	B
2	YEL*	+SENSE	F
3	WHT	+OUTPUT	C
4	WHT/ORN	SHIELD (GND)	G
5	RED	-OUTPUT	A
6	BLU*	-SENSE	E
7	BLK	-EXCITATION	D

*NOTE

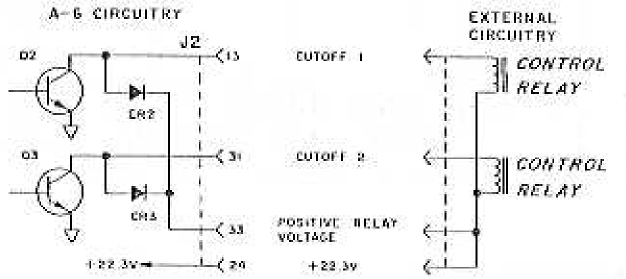
Pins 1 and 2, and pins 6 and 7 are jumpered together when connected to a Diamond Series Bench Scale.



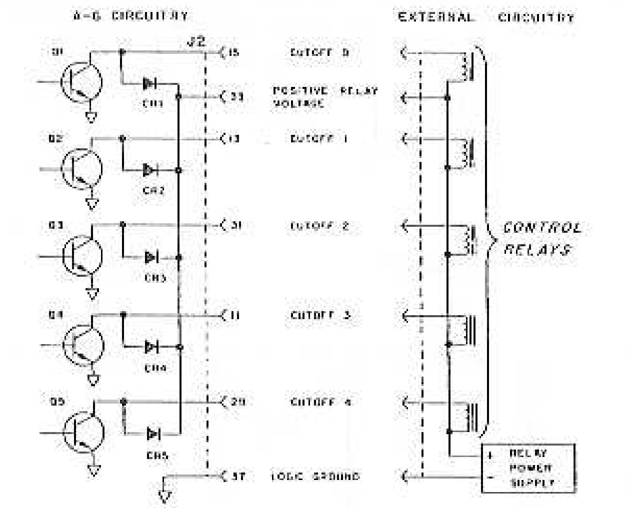
DESK-TOP CABLE CONNECTIONS
FIGURE 1

RELAY CONNECTIONS

To connect a relay to a cutoff transistor, refer to the following diagram. As shown, the card is capable of supplying +22 volts that can be used to power up to three relays if they draw less than 100 ma of current and have a coil resistance of 700 ohms or greater.



If the relays to be connected to the cutoff card draw more than 100 ma of current, the cutoff card can not be used to power the relays. They must be connected to an external power source. Refer to the following figure for installation instructions.



Notice that each relay has been connected so that it will be energized until a cutoff value is reached. This accomplishes two things. One, by connecting the positive relay voltage to the (+) terminal of the relay, a protection diode is, in effect, connected across the relay coil. This protects the transistor gate from any induced current that is developed when the cutoff gate is deenergized and the magnetic lines which surround the relay coil collapse. If the diode were not present, the induced current would be forced through the transistor gate, damaging the gate. Two, by connecting the positive relay voltage to the (+) terminal of the relay, a fail-safe method of controlling valves and gates during power failures is created. In other words, all valves and gates that are normally closed when a cutoff gate is de-energized, will close if power is removed from the WI-120.

If the positive relay voltage is supplied to the (-) terminal of the relay or the relay connection is some distance from the WI-120, 1N4004 protection diodes (WT/PN 15668-0043) must be connected directly across the relay coils to prevent transistor gate damage from induced currects.

For relay connections, WEIGH-TRONIX recommends the use of a 24 v, 700 ohm cutoff relay (WT/PN 15708-0011) whose contacts are rated for 5 amps of current.

SURGE SUPRESSION

If 120 VAC loads are being driven by the relays, install an RC-type surge supressor across the load to minimize arcing at relay contacts. This reduces Electro Magnetic Interference (EMI) which can cause the WI-120 to malfunction or lock up.

MODIFICATIONS

If a 16-terminal A-17 Cutoff Interconnect PC Card is used in a water-tight enclosure, only the 16 TB201 terminals are available for use without modifying the card.

If all 10 cutoff connections are not to be used, the positive relay voltage can be substituted for cutoff 9 connection by cutting the foil between P201, pin 25 and jumper hole C and installing a jumper wire between points A and C. This provides a connection point to the protection diodes at TB201, terminal 5.

If only one or two cutoff relays are to be used, perform the above modification and add another jumper between points D and A. This will connect the protection diodes to the +22 volt supply and provide a connection point for relay voltage at TB201, terminal 5.

If all 10 cutoffs are to be used with the A-17 card, install protection diodes across each relay coil and use an external source to power any relays used.

EXTERNAL SWITCH CONNECTIONS

As previously mentioned, remote switches can be used to simulate the commands provided to the WI-120 as if a key on the WI-120's front panel is pressed.

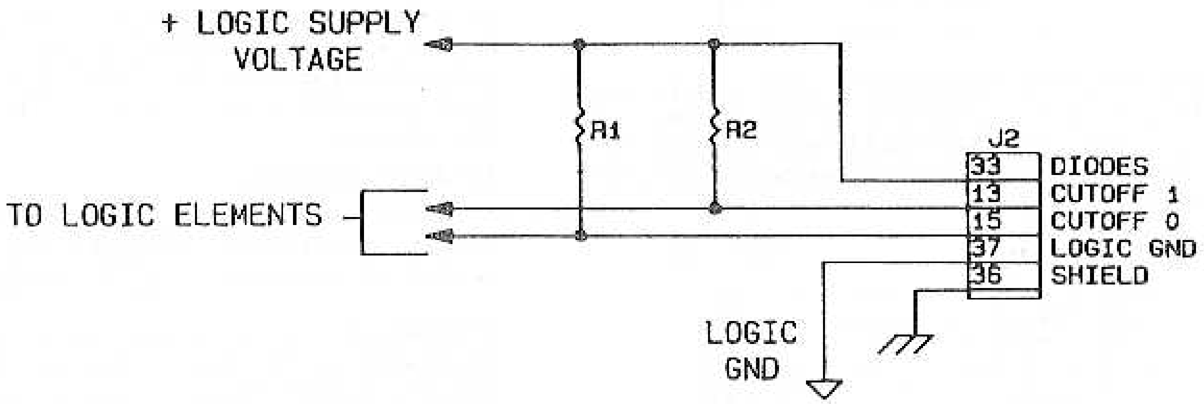
To connect one of these remote switches to the Cutoff Interface PC Card, install a momentary contact SPST switch between the desired pin and logic ground with a shielded cable. (The cable shield should be attached to chassis ground.)

LOGIC CIRCUIT CONNECTIONS

CMOS circuitry requires that an appropriate resistor be installed between the logic supply voltage and the appropriate cutoff gate.

TTL circuits require that the Cutoff Interface PC Card be modified slightly to change the saturation voltage of the output transistors to 0.2 volts at 8 milliamps. Two 100k ohm resistor networks (RN1 & RN2) should be replaced with 10k resistor networks (WT/PN 17852-0045) and 10 type 2N5308 transistors (Q1 - Q10) should be replaced with type 2N2222A (WT/PN 14468-0014) or type 2N3904 transistors (WT/PN 15665-0012).

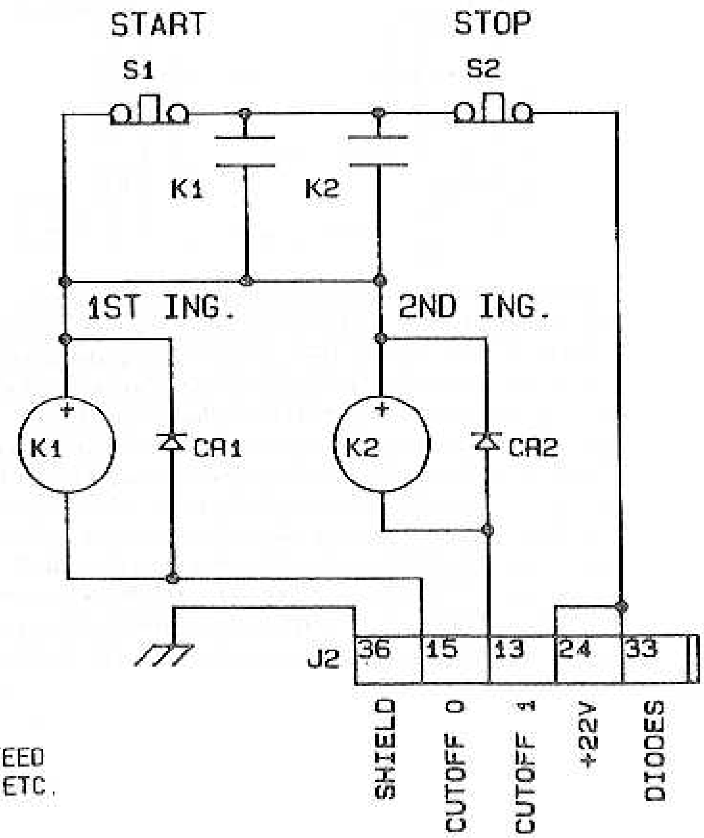
LOGIC SUPPLY VOLTAGE	R1, R2	
	TTL	CMOS
+5V	4.7K	47K
+10V	–	100K
+15V	–	150K
RN1, RN2 AND Q1 – Q10 MUST BE CHANGED PER INTRODUCTIONS		

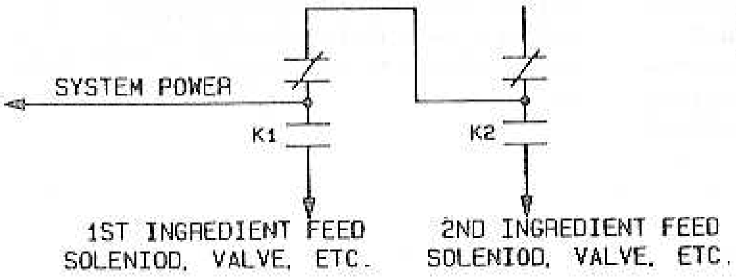


SEMI-AUTOMATIC BATCHING CONNECTIONS

If the cutoff ouputs are wired as shown in the following figure, the Indicator will be able to control a semi-automatic batching operation.

The batching cycle starts when S1, the START button, is pressed. This powers the fast feed controller for as long as weight on the scale is less than the programmed value for cutoff 0. When weight on the scale equals that value, the fast feed controller is turned off and power is supplied to the slow feed controller. The slow feed controller remains on until weight on the scale eqauls the value programmed for cutoff 1. When the slow feed is turned off, the system stops and waits for the START button to be pressed so it can begin a new batching cycle.

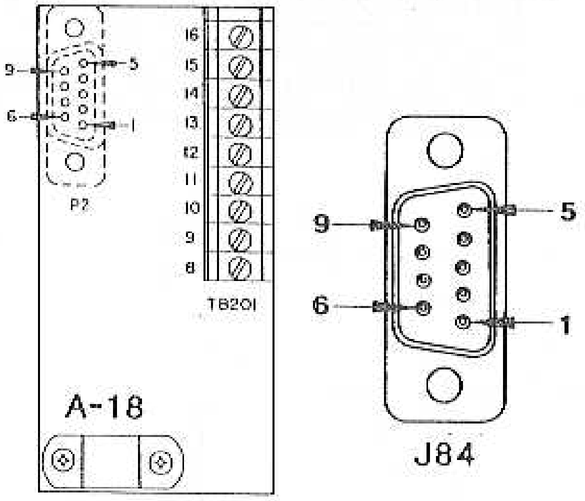




REMOTE DISPLAY CONNECTIONS

The Indicator can drive a WEIGH-TRONIX remote display models RD 4000 or RD 6000. To do so, install a Multiplexed Display Driver PC Card (WT/PN 22514- 0023) into anyone of the option slots. Prewired cables are available from WEIGH-TRONIX for this application. Otherwise, refer to the following table for interface information.

RD 4000 or RD 6000 INTERFACE CONNECTIONS

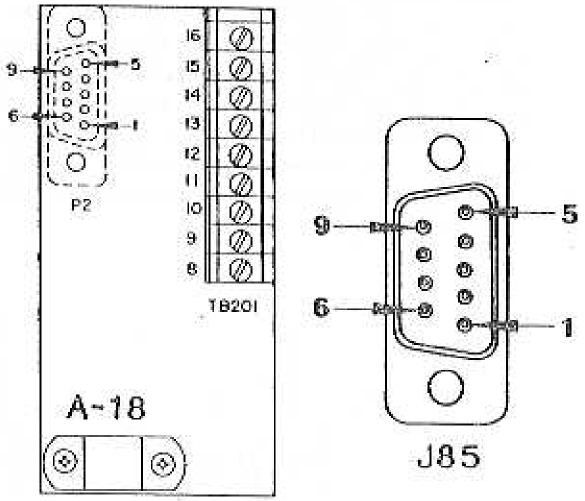


A-18 TB201 TERMINALS (NEMA IV)	WIRE COLOR	SIGNAL DESCRIPTION	J84 PIN NUMBERS (DESKTOP)
16	GRAY	SEG D/LAMP	–
15	BROWN	STROBE	–
14	GREEN	SEG C/DIG 4	–
13	ORANGE	SEG G/DEV 4	–
12	BLUE	SEG B/DIG 2	2
11	RED	SEG F/DEV 2	6
10	VIOLET	SEG A/DIG 1	3
9	YELLOW	SEG E/DEV 1	–
8	WHITE	GROUND	1
8	SHIELD	GROUND	10

SINGLE-DUAL RS422/RS485

Insert either Single RS422/RS485 PC Card (WT P/N 22514-0037) or Dual RS422/RS485 PC Card (WT P/N 21962-0010) into any one of the option slots. The software may need to be revised to provide the output desired.

RS-422/485 CONNECTIONS



A-18 TB201 TERMINALS (NEMA IV)	SIGNAL DESCRIPTION	J85 PIN NUMBERS (DESKTOP)
16	NC	5
15	NC	9
14	PRINT	4
13	LOGIC GRND	8
12	TRANSMIT DATA (A)	3
11	TRANSMIT DATA (B)	7
10	RECEIVE DATA (A)	2
9	RECEIVE DATA (B)	6
8	SHEILD	1

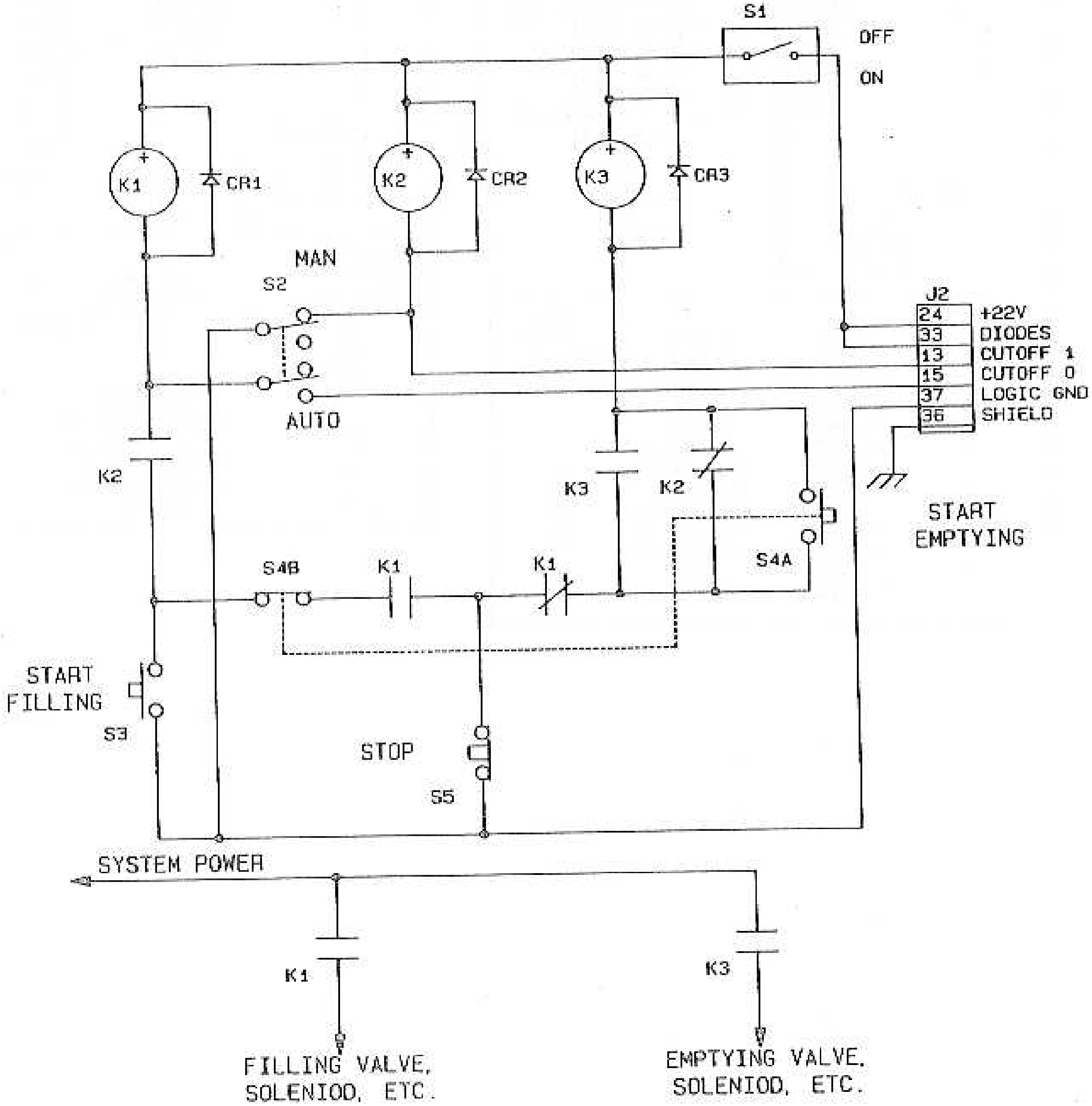
AUTO/MANUAL BATCHING CONNECTIONS

The batching system shown in the following figure features two modes of operation: an automatic mode and a manual mode.

When operating in the automatic mode, material is loaded on the scale until weight on the scale equals the value programmed for cutoff 1. Once this value is reached, the device that controls the filling valve or gate is turned off and the device that controls the emptying valve or gate is turned on. The scale is then emptied until weight on the scale equals the value programmed for cutoff 0. When this happens, the emptying device is turned off and a new batching cycle begins.

During manual operations, the filling and emptying dev[illegible] can be started and stopped at any weight reading.

Notice that when the interface is wired for this type of batching system, it will respond in one of three ways whe[illegible] the AUTO switch is thrown. If weight on the scale is les[illegible] than the programmed value for cutoff 0, the scale wil[illegible] begin to fill. If weight on the scale is between the values programmed for cutoffs 0 and 1, either the START FILLING or the START EMPTYING switch must be throw[illegible] before batching operations will begin. If the weight on th[illegible] scale is below the value programmed for cutoff 1, the scal[illegible] will begin to fill immediately after the AUTO switch i[illegible] thrown.



INSTALLATION INSTRUCTIONS
(For Analog Zero Kits)

ZERO KITS

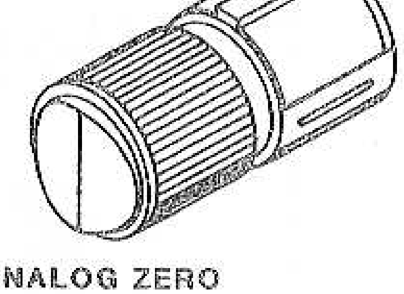
An analog zero kit is available from WEIGH-TRONIX for WI-120 indicators. To install one, use the following procedure.

Open the enclosure and remove the plastic plug in the rear of the WI-120's Chassis Assembly.

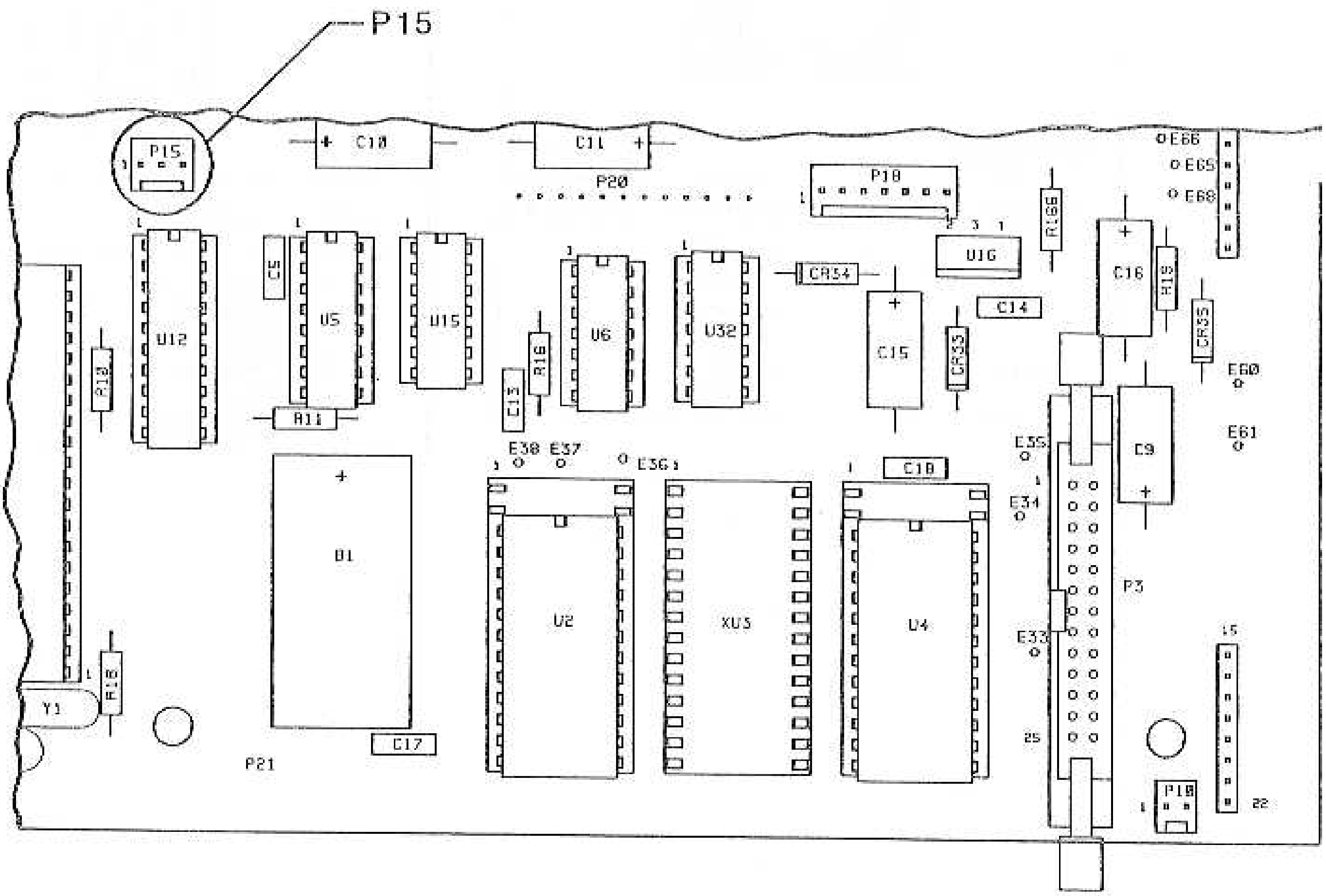
If your WI-120 is housed in a plastic desk top enclosure, install the zero control in the opening and secure it in place with the hardware provided.

If your WI-120 is housed in a NEMA IV enclosure, install the zero control in the replacement back panel that is provided with the kit.

Run the extension cable between the zero control and P15.



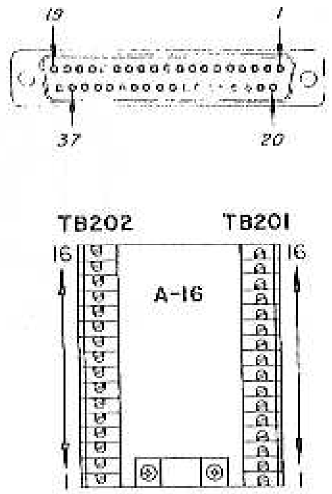
ANALOG ZERO



ANALOG OUTPUT CONNECTIONS

Insert an Analog PC Card (WT P/N 23438-0020) into any one of the option slots to make use of the unit's analog output capabilities. Prewired cables are available from WEIGH-TRONIX for this application. Otherwise refer to the following table for interface information.

ANALOG OUTPUT CONNECTIONS



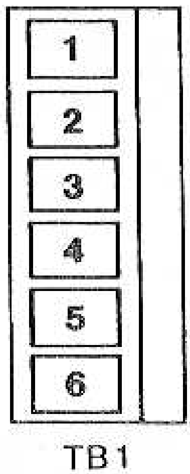
A-16 TERMINAL BOARD (NEMA IV)	LOCATION	SIGNAL DESCRIPTION	J2 PIN CONNECTIONS (DESKTOP)
TB202	2	VOLTAGE/ CURRENT	2
TB202	3	VOLTAGE/ RETURN	1
TB202	1	CURRENT/ RETURN	4

OLD STYLE ANALOG OUTPUT

Before an Analog PC Card (P/N 22696-0011) installed in a weight indicator, the A-1 Microproc... to-D PC Card must have a 12-pin connector installed in t terminal area reserved for the P25 connector.

Once the P25 connector has been soldered in place, ins the Analog PC Card in the Indicator and refer to the follo ing diagram to make connections to a peripheral devic

ANALOG INTERFACE CONNECTIONS



TB1 TERMINAL	SIGNAL DESCRIPTION
1	Milliamp Output
2	Milliamp Return
3	Voltage Output
4	Voltage Return
5	NC
6	Chassis Ground

CALIBRATION

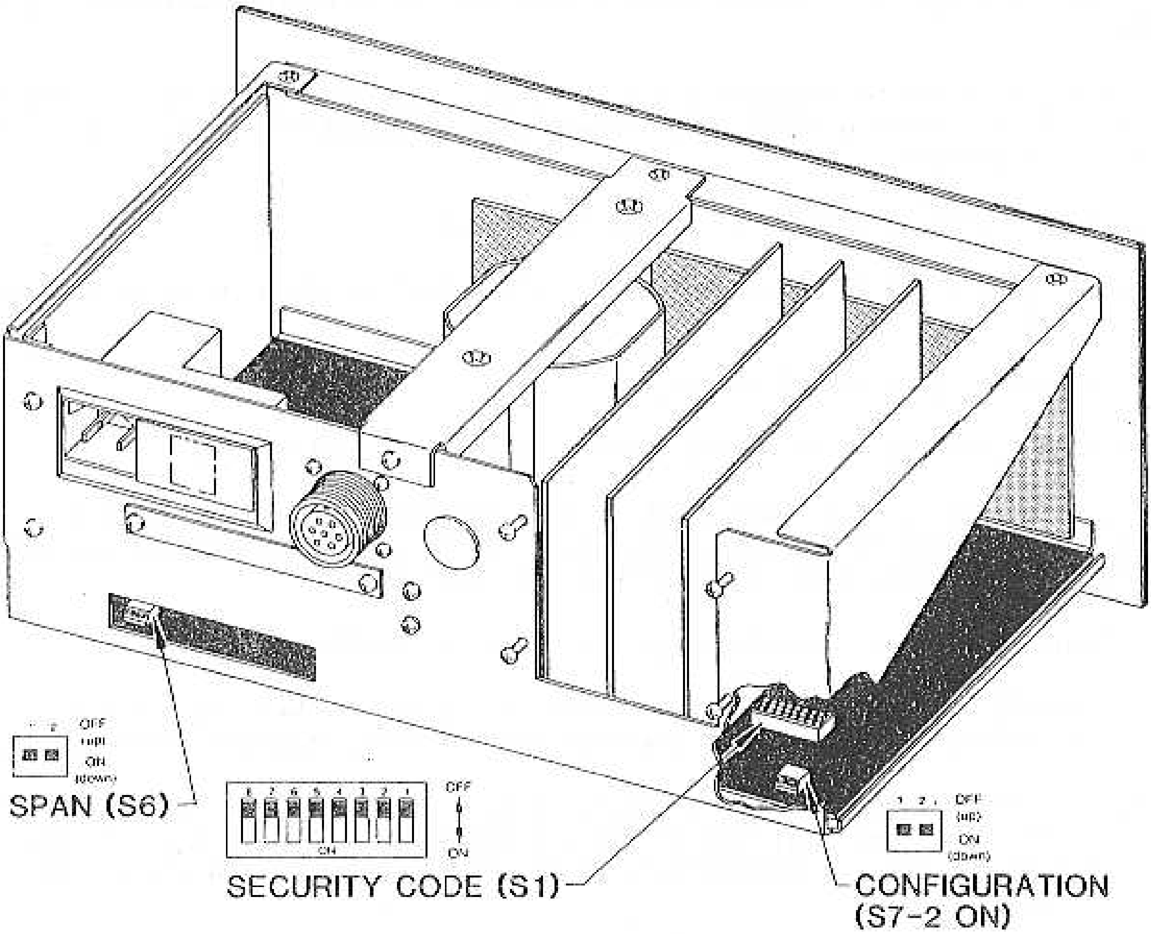


FIGURE 1: WI-120 Chassis Showing Locations of Switches Affecting Calibration

TESTING THE SCALE SYSTEM

Before starting the calibration procedure, system test your WI-120 and weight sensor(s) by making sure...

- that displayed value increases when weight is placed on the scale platform and that displayed value decreases when weight is removed;
- that the display on the WI-120 responds when you press the **ZERO** key; and
- that no zero shift occurs when you exercise the weight sensors.

If the display...

- fails to reflect weight value,
- fails to return to zero reasonably quickly, or
- appears to be unstable,

then the scale system is faulty and must be repaired before you can calibrate it.

CHECKING THE WEIGHING ACCURACY OF A SINGLE WEIGHT SENSOR SCALE

Use this procedure to compare displayed weight values read at each of the four corners of the scale platform. All four values should equal each other, within +/-1 scale division.

1. Empty the scale platform and zero the WI-120.

2. On one corner of the scale platform, place test weights equal to 1/2 scale capacity.

3. Record displayed weight value.

4. Remove test weights from this corner of the scale platform.

5. Repeat Steps 1, 2, 3, and 4 for each of the three remaining platform corners, making sure (A) to use identical weight values for all corners, and (B) to completely remove test weights from each corner.

6. Compare displayed weight values for the four platform corners:

   A. If all four displayed weight values equal each other, within +/-1 scale division, proceed now to instructions entitled ***SPANNING A SCALE SYSTEM***.

   B. However, if any displayed weight value varies from another by more than +/-1 scale division; and if you can determine no mechanical cause for the variance, such as misassembly or physical jamming, then the weight sensor is defective.

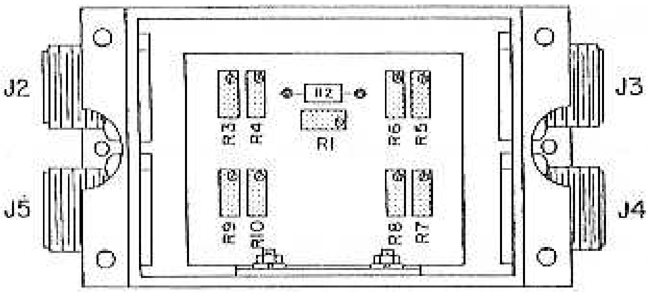
   Replace the defective weight sensor before continuing the calibration process. Install a weight sensor which can provide four displayed weight values which do equal each other, within +/-1 scale division.

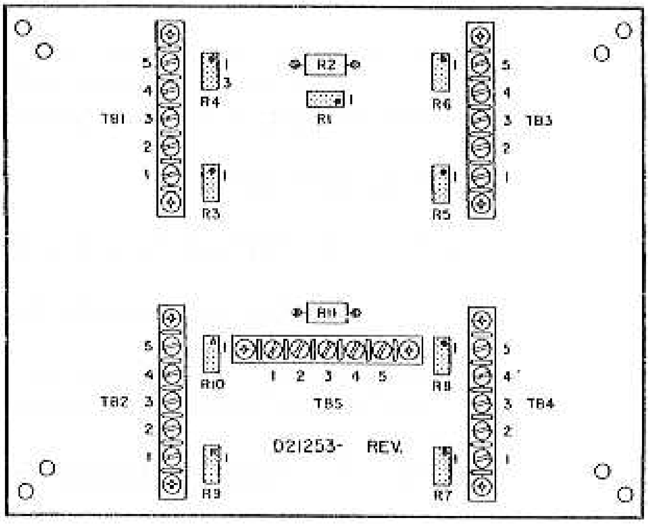
BALANCING WEIGHT SENSORS ROUTED THROUGH A JUNCTION BOX

Some scale systems are designed to utilize a ***junction box*** (J-box). This means that multiple weight sensors of matching capacities are coordinated at the J-box. The J-box then sends a single capacity signal to the WI-120.

Your system uses one of two J-boxes shown in **FIGURE 2**. In both J-Box layouts, each pair of potentiometers affects one weight sensor. Balance the weight sensors by adjusting potentiometers in the J-box, as follows. Turn both potentiometers the same number of turns and turn both potentiometers in the same direction.

R1:	Coarse Zero Potentiometer
R3 and R4:	Weight Sensor A
R5 and R6:	Weight Sensor B
R7 and R8:	Weight Sensor C
R9 and R10:	Weight Sensor D





3. Turn Coarse Zero Potentiometer **R1** in J-box until display reads as closely as possible to. **CA010000**
a count value of internal zero equaling 10,000 counts, +/-400 counts.

4. Press **ZERO** **00000**
Display is zeroed and Indicator returns to Weighing Mode.

> If *UndEr* is displayed, refer to *ADJUSTING DEADLOAD*.

5. Use test weights that do not exceed the capacity of one weight sensor, usually 1/4 scale division, and obtain a displayed weight value for test weights applied to each weight sensor in the scale system, like this:

   5a. Zero the WI-120.

   5b. Place certified test weights directly above first weight sensor.

   5c. Record displayed weight value.

   5d. Completely remove test weights and verify the display returns to zero before reloading above another weight sensor.

   5e. Repeat Steps 5a through 5d for each weight sensor in scale system.

6. If displayed weight values for all weight sensors

SPANNING A SCALE SYSTEM

Span a new scale system at time of installation to align it with certified standard weights. Span again at regular intervals to check and maintain weighing accuracy.

Instructions for spanning a scale system include

- To Interpret a Span Error Message, and Escape
- To Prepare for Spanning
- SPANNING: To Achieve Low-End and High-End Span Values

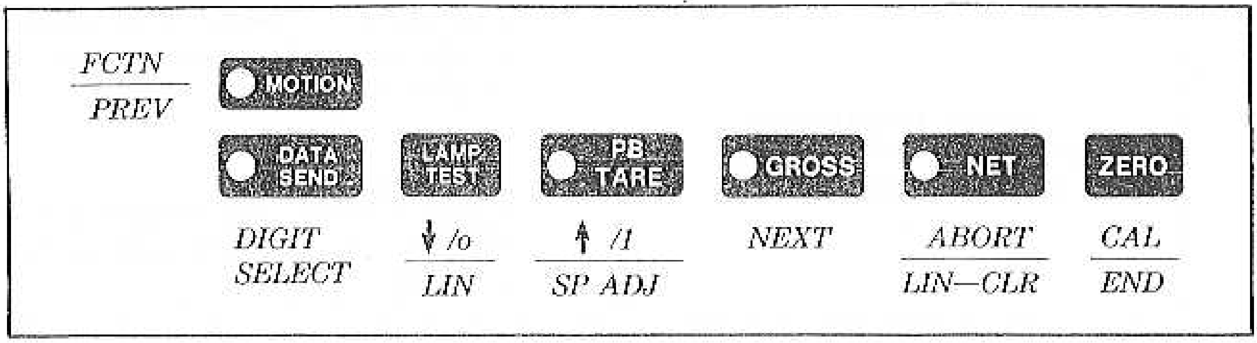


FIGURE 3: Pseudo Key Names for Configuration, Calibration, Span Adjust, and Linearity Modes

__To Interpret a Span Error Message, and Escape__:

In executing the procedure for spanning, if you miscalculate when placing test weights on the scale, or if you miskey a span value, one of the following error messages is displayed:

SPAN ERROR MESSAGES

If you have not placed enough weight on the scale; or if you have keyed in an incorrect span load value . . .	C-Lo Message indicates span weight value is less that 0.5% of scale capacity; difference between span-low and span-high is less than 100 count of internal resolution.
If you have placed too much weight on the scale; or if you have keyed in an incorrect span weight value . . .	C-Hi Message indicates internal span-high count calculatedfrom span weight value is more than 262,143 counts of internal resolution.

ESCAPING FROM SPAN ERROR MESSAGE	
Escape from error message by pressing either **GROSS (NEXT)** key or **NET (ABORT)** key.	
If you choose to press **GROSS (NEXT)** key to escape from span error message . . .	CAL Calibration Mode display allows you to start span procedure over and correct the amount of weight you place on the scale, or to key in a correct span weight value.
If you choose to press **NET (ABORT)** key to escape from span error message . . .	00000 Display returns to Weighing Mode. Previous span and linearity values are restored.

To Prepare for Spanning:

1. Place Configuration Switch **S7-2** in **ON-DOWN** position to enable reconfiguration of settings for function parameters.

2. Refer to configured setting for UNITS OF MEASURE Parameter. Then locate that setting in TABLE 1 and perform steps as indicated:

TABLE 1: Configuration of UNITS OF MEASURE Parameter for Spanning

If your normal configured setting for UNITS OF MEASURE Parameter is . . .	Do this to prepare for spanning:
Pounds/Kilograms . . .	A. Press front panel "lb." key. B. Proceed to Step 3.
Kilograms Only . . .	A. Access Configuration Mode and reconfigure UNITS OF MEASURE Parameter to ***Pounds Only***. B. Press **ZERO (END)** key. C. Proceed to Step 3.
Pounds Only . . .	A. Press no keys. B. Proceed to Step 3.
Full-Scale Kilograms . . .	A. Press no keys. B. Proceed to Step 3.

3. Control voltage sensitivity through analog-to-digital circuitry with Span Switches **S6-1** and **S6-2** (See FIGURE 1).

Refer to TABLE 2 and select a setting as close as possible to maximum voltage output from weight sensors. *Maximum voltage output* means total millivolt output: deadload and liveload,plus overrange.

TABLE 2: Sensitivity Settings for Span Switch Bank S6

FULL MILLIVOLT PER VOLT	SWITCH SETTINGS S6-1	SWITCH SETTINGS S6-2
4.00	OFF-UP	OFF-UP
2.66	ON-DOWN	OFF-UP: Typical
1.33	OFF-UP	ON-DOWN
	ON-DOWN	ON-DOWN: Not Allowed

THIS IS WHAT WE'LL USUALLY USE.

4. Obtain test weights equal to full-scale capacity. For a high-capacity scale system which will require a build-up *test*, use test weights equal to as great a

From this point on in span procedure, you may press **NET (ABORT)** key to start routine over, if necessary . . .	Display will return to Weighing Mode and span values that were valid prior to adjustments made during current span procedure will be restored.

5. Press **GROSS (NEXT)** key . . .	S X000 *S* = Span. *X* represents location of flashing selector digit.
6. Enter value of certified test weights, as follows:	
6a. Press **PB TARE (UP ARROW)** key or **LAMP TEST (DOWN ARROW)** key, as necessary, to increment up or down . . .	First digit of value is entered at location of flashing selector digit.
6b. Press **DATA SEND (DIGIT SELECT)** key, as necessary . . .	to change location of flashing selector digit and finish entering value of certified test weights

ESCAPING FROM SPANNING DISPLAY	
If unwanted weight on the scale should accidentally interrupt the calibration procedure during the outcome to Step 9, spanning, some or all displayed digits will vary rapidly as the WI-120 attempts to average the accidental weight impluse.	
If unwanted weight is applied during spanning, press **NET (ABORT)** key . . .	Display returns to Weighing Mode.
and start over with Step 1 of *SPANNING* procedure.	

10. When spanning display of Step 9 has stabilized for 5 seconds,

    press **GROSS (NEXT)** . . .

    SHXXXXXX
    SH = Span High. *X*'s represent high-end span value.

11. Place on scale platform certified test weights equaling weight value you entered in Steps 6a and 6b . . .

    SHXXXXXX
    X's represent internal raw count of A-to-D converter.

CONTINUING OR CONCLUDING CALIBRATION

After spanning, do the following, depending on your weighing application:

✓ **For a high-capacity scale system that requires a build-up test,** because certified test weight value is less than full-scale capacity,

proceed to section entitled ***SPANNING A HIGH-CAPACITY SCALE SYSTEM WITH A BUILD-UP TEST.***

✓ **If your scale system requires a linearity adjustment,** because check readings taken with certified test weights indicate scale system is not linear,

proceed to section entitled ***LINEARITY-ADJUSTING A SCALE SYSTEM.***

✓ **In cases where both a build-up test and a linearity adjustment are necessary,**

do the build-up test first.

✓ **If the scale system requires neither a build-up test nor a linearity adjustment,**

1. Reconfigure UNITS OF MEASURE Parameter to appropriate selection for normal weighing operations, if you changed it before executing span procedure; then press **ZERO (END)** key to lock in reconfigured setting.

2. Disable Configuration Mode by placing Configuration Switch **S7-2** in **OFF-UP** position.

1. If you desire a higher display resolution for this build-up test, access Configuration Mode and reconfigure DIVISION SIZE Parameter to one-half normal division, and press **ZERO (END)**.

2. If you have not already done so, do previous procedure entitled *SPANNING:To Achieve Low-End and High-End Span Values.* Use largest certified test weights available . . .

000000

Zeroed display is final step of spanning procedure.

3. Press **ZERO (CAL)** key for five seconds . . .

CAL

Display indicates you have accessed Calibration Mode.

4. Press **PB TARE (UP ARROW)** . . .

SPAn ADJ

Briefly displayed message announces Span Adjust Mode. Then you see this message.

9. Press **PB TARE (UP ARROW)** key or press **LAMP TEST (DOWN ARROW)** key to tweak displayed value so that it precisely equals summed total of scale weight:

   Uncertified Weight
   plus Certifed Test Weights . . .

Correct value is displayed.

> Each depression of an arrow key equals an adjustment of 1/4 division, so it may take up to four depressions of **PB TARE (UP ARROW)** and **LAMP TEST (DOWN ARROW)** to change displayed value.

> Previous linearity adjustments are voided by your first depression of an arrow key to tweak displayed value in Span-Adjust Mode.
>
> You can restore voided linearity adjustments by pressing **NET (ABORT)** key.

10. Remove certified test weights

15. Repeat Steps 10 through 14 until scale system has been loaded as closely as possible to capacity.

16. Press **ZERO (END)** key . . . — Display returns to Weighing Mode. **Adjustments tweaked during build-up test are locked in.**

17. Remove all weights from scale platform and verify that display returns to zero.

18-A. Replace certified test weights on scale platform, and verify that displayed weight value is accurate.

18-B. If displayed value of certified known test weights is not correct,
✓ **DO NOT re-adjust span settings,**
or system will lose its span values from previous steps.
✓ **DO adjust linearity;**
see *LINEARITY-ADJUSTING A SCALE SYSTEM*.

19. If a linearity adjustment is not necessary, conclude calibration by doing Steps A through E:

A. Reconfigure UNITS OF MEASURE Parameter to option appropriate for normal weighing operations.

B. Reconfigure DIVISION SIZE Parameter to option appropriate for normal weighing operations.

C. Disable Configuration Mode by placing Configuration Switch S7-2 in OFF-UP position . . . — **Calibration is complete.**

D. If you disabled Auto Zero Tracking at the end of your span routine, press **AZT** key now to re-enable Auto Zero Tracking.

E. Secure WI-120 enclosure.

LINEARITY-ADJUSTING A SCALE SYSTEM

> DEFINITION
> A ***linearity adjustment*** aligns a scale system with correct values obtained from certified test weights at graduated levels of full-scale capacity, from 1.5% to 98.5% of capacity.

Immediately after spanning, check the linearity of a scale system by taking a series of readings of displayed weight values at equal intervals of full scale. If these check readings show that your system is not linear, then you will need to do a linearity adjustment.

> DEFINITION
> ***Maximum deviation from linearity*** is the greatest difference between displayed weight value and actual value of certified test weights.

This section explains how to

- Determine Maximum Deviation from Linearity
- Adjust Linearity, Using Maximum Deviation Value

To Determine Maximum Deviation from Linearity:

1. Determine the weight value at which maximum deviation from linearity occurs: take readings of certified test weights at equal intervals of capacity between empty and full scale, as shown in the following example. For a 1000-pound capacity scale, you might choose to take readings at equal intervals of 250 pounds. Suppose you obtain weight values shown in TABLE 3.

TABLE 3

READINGS TAKEN TO FIND MAXIMUM DEVIATION FROM LINEARITY

Non-Linear Example: 1000-Pound Capacity Scale System

Certified Test Weights Equaling the Following:	Yield These Displayed Weight Values:
250 lbs	247.5 lbs
500 lbs	495.0 lbs
750 lbs	747.5 lbs
1000 lbs	1000.0 lbs

In the non-linear example in TABLE 3, maximum deviation from linearity is 5 pounds, and it occurs at midpoint of scale capacity, or 500 pounds. **For this 1000-pound non-linear system, you would use a value of *500 pounds* to do a linearity adjustment.**

Maximum deviation from linearity often occurs at midpoint of full-scale capacity, but not always. **Do not ASSUME this will be true for your scale system.** It is imperative that you take check readings, using the method illustrated in TABLE 3, to determine maximum deviation from linearity for your own scale system.

2. Record the certified test weight value at which maximum deviation occurs for your scale system. **The value at which maximum deviation from linearity occurs on your scale system is the value of certified test weights with which you will do your single linearity adjustment.**

To Adjust Linearity, Using Maximum Deviation Value:

1. Leave Configuration Switch **S7-2** in **ON-DOWN** position.

2. If you want higher display resolution, access Configuration Mode, reconfigure DIVISION SIZE Parameter to one-half normal division size, and press **ZERO (END)**

3. With scale empty and display in Gross or Net Weighing Mode, press **ZERO (CAL)** key for 5 seconds . . . CAL
Display indicates you have accessed Calibration Mode.

4. Press **LAMP TEST (LIN)** key . . . Lin
Display indicating you have accessed Linearity Mode appears for one second. Then you see:

L XXXXXX
X's equal deadload value. Deadload val should equal zero.

If deadload value displayed in Step 4 outcome **equals zero**, proceed to Step 6.

If deadload value displayed in Step 4 outcome **does not equal zero**, proceed to Step 5 and adjust for drifted zero as follows:

ADJUSTING FOR DRIFTED ZERO

5a. Exit Linearity Mode by pressing **ZERO (END)**.	Display returns to Weighing Mode.
5b. Press **ZERO (CAL)** for 5 seconds.	CAL
5c. Press **PB TARE (SP ADJ)**	SPAn ADJ Brief display indicates that you will nc be allowed to adjust the low-end span value, if value of scale weight is 5.0% or less of scale capacity. Then you see C XXXXXX *X*'s represent the same non-zero deadloa value you saw in Linearity Mode.
5d. To adjust deadload value, press **PB TARE (UP ARROW)** or press **LAMP TEST (DOWN ARROW)** to zero the scale	C 000000 Up to 5.0% of capacity can be zeroed in this way. To zero more than 5.0%, see ***ADJUSTING DEADLOAD.***
5e. Press **ZERO (END)**	Display returns to Gross or Net Weighin Mode.
5f. Again, execute Steps 3 and 4 of linearity-adjusting procedure.	L 000000 Deadload value of zero is displayed in Linearity Mode.

6. Apply certified test weights of the same value at which maximum deviation from linearity occurred . . .

Uncorrected weight value is displayed: *495 lbs* for TABLE 3 example.

7. Press **PB TARE (UP ARROW)** or press **LAMP TEST (DOWN ARROW)** to adjust displayed weight . . .

to equal value of certified test weights. When accurate weight value is displayed, linearity is adjusted. Up to +\-20 divisions of non-linearity may be corrected.

> Each depression of an arrow key equals 1 scale division.

> If necessary, you may clear most recent linearity adjustment, like this:
>
> 8a. Press **NET (LIN CLR)** . . .
>
> Uncorrected weight value is displayed again.
>
> 8b. Then repeat Step 7.

9. When you are satisfied that accurate weight value is displayed, press **ZERO (END)** . . .

Display returns to Weighing Mode. **Linearity adjustment is locked in;** scale system is now *linear.*

10. Conclude calibration, as follows:

   A. Reconfigure UNITS OF MEASURE Parameter to appropriate option for normal weighing operations, if you changed it before you spanned the system. (Refer to **TABLE 1.**)

   B. Reconfigure DIVISION SIZE Parameter back to appropriate level for normal weighing operations. Then press **ZERO (END)** key to lock in reconfigured setting.

   C. Place Configuration Switch **S7-2** in **OFF-UP** position . . .

   Calibration is completed.

   D. If you pressed **AZT** key to disable Auto Zero Tracking after spanning, press **AZT** key now to re-enable the function.

   E. Secure WI-120 enclosure. Your system is now ready for normal weighing operations.

ADJUSTING ZERO DRIFT AND THE HIGH-END SPAN VALUE

These adjustments provide alternate methods of correcting span values for situations in which doing full calibration would be inconvenient.

This section explains how to

- View Deadload Value and Adjust for Drifted Zero of 5.0% or Less
- Adjust the High-End Span Value

To View Deadload Value and Adjust for Drifted Zero of 5.0% or Less:

This procedure allows you to adjust for zero drift without recalibrating. If more than 5.0% needs to be zeroed, see ***ADJUSTING DEADLOAD.***

QUESTION: Exactly what will be accomplished by adjusting for zero drift?

ANSWER: The procedure will re-align the low-end span value at absolute zero without affecting the span itself, that is, the difference in count value between span-low and span-high.

1. Place Configuration Switch **S7-2** in **ON-DOWN** position.

2. From Gross or Net Weighing Mode, with scale platform empty, press **ZERO (CAL)** for 5 seconds . . .

   CAL
   Display indicates you have accessed Calibration Mode.

3. Press **PB TARE (SP ADJ)** key . . .

   SPAn ADJ
   Brief display indicates that you are now allowed to adjust the low-end span value if scale weight is 5.0% or less of scale capacity. Then you see:

   C XXXXXX
   X's represent deadload value. Deadload value should equal zero.

4. If display equals zero, meaning no zero drift has occurred, press **ZERO (END)** . . .

   To return to Gross or Net Weighing Mode

5. If display does not equal zero, press **PB TARE (UP ARROW)** or press **LAMP TEST (DOWN ARROW)** to zero the scale . . .

   C 000000
   Up to 5.0% of scale capacity can be zer in this way. To zero more than 5.0%, s ***ADJUSTING DEADLOAD.***

6. Press **ZERO (END)** . . .

Deadload value is locked in. Display returns to Gross or Net Weighing Mode.

7. Place Configuration Switch **S7-2** in **OFF-UP** position to prepare the system for normal weighing.

To Adjust the High-End Span Value:

This procedure allows you to tweak the high-end span value without doing a complete spanning procedure.

1. Place Configuration Switch **S7-2** in **ON-DOWN** position.

2. Execute Steps 1 through 14 of ***SPANNING A HIGH-CAPACITY SCALE SYSTEM WITH A BUILD-UP TEST.***

3. Press **ZERO (END)** . . .

Adjustment to high-end span value is locked in. Display returns to Gross or Net Weighing Mode.

4. Place Configuration Switch **S7-2** in **OFF-UP** position . . .

System is ready for normal weighing.

ADJUSTING DEADLOAD

A deadload-adjust capability on the WI-120 now allows you to shift the zero reference, or low-end span value, by more than 5% of capacity without affecting the span. Deadoad may require adjustment due to zero shift or due to addition or removal of dead weight on the scale. Deadload-adjust capability is allowed in the following versions of software:

WI-120 Indicator V1.14 and higher
WI-120 Accumulator V2.0 and higher
WI-120 Gross-Tare-Net Indicator V1.13 and higher

Deadload-adjust range depends upon the high-end span value. You may bump up the zero reference with this procedure until the high-end span value plus the overload value equals the maximum internal count value of 262,143 internal counts. You may shift the zero reference down as far as the minimum internal count value of zero.

Remember that the millivolt sensitivity setting of switch bank S6 determines the signal level at which a WI-120 reaches its maximum internal counts. If you change the S6 settings, you must recalibrate the WI-120.

1. Access Calibration Mode and press **GROSS (NEXT)** key four times to advance to spanning display . . .

SPXXXXXX
WI-120 is calculating low-end span value. Right-end digits vary, then stabilize; entire display flickers.

3. Press **ZERO (END)** . . .

Adjusted deadload is locked in, and WI-120 returns to Weigh Mode.

SERIAL PROGRAMMING

INTRODUCTION

When the WI-120 is fitted with a Serial Interface PC Card, the unit can transmit data to a peripheral device via either a current loop or a RS-232 communications link.

It can also receive a control character (05_{16}) from a peripheral device. This allows a data transmission to be initiated through the serial port.

Programming is a combination of entering configuration parameters through the front panel and selecting programming switch settings on the serial card.

SELECTING THE INTERFACE TYPE

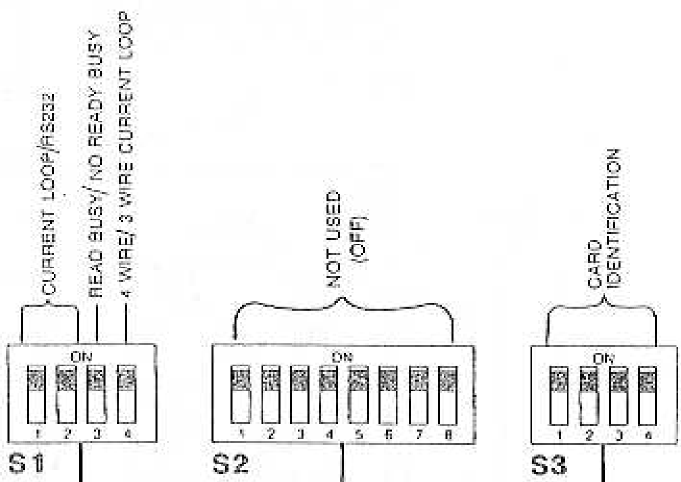
Refer to the following table and select the setting that is appropriate for a particular application. RS232, 3-wire current loop, or 4-wire current loop interfaces can be selected. In addition, S1-3 can be set to ON if the device to be interfaced does not provide a READY/BUSY signal.

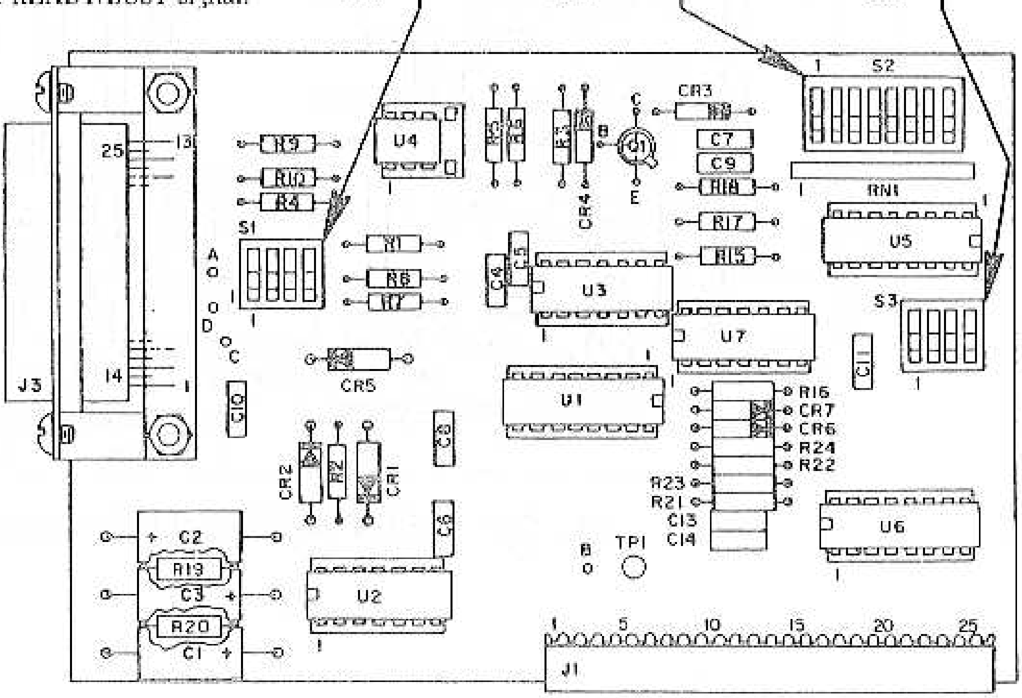
TYPE OF INTERFACE PROGRAMMING				
Interface Type	Programming Switch Settings S1-1	S1-2	S1-3	S1-4
RS-232	ON	OFF	*	
3-Wire Current Loop	OFF	ON	*	ON
4-Wire Current Loop	OFF	ON	*	OFF

NUMBER OF CARDS USED

As shown in the following table, each standard WI-120 can support two Serial Interface PC Cards.

SERIAL CARD ADDRESS PROGRAMMING				
PC Card Installed	Programming Switch Settings S3-1	S3-2	S3-3	S3-4
First or Only Serial Card (A)	ON	ON	OFF	OFF
Second Serial Card (B)	OFF	OFF	ON	ON

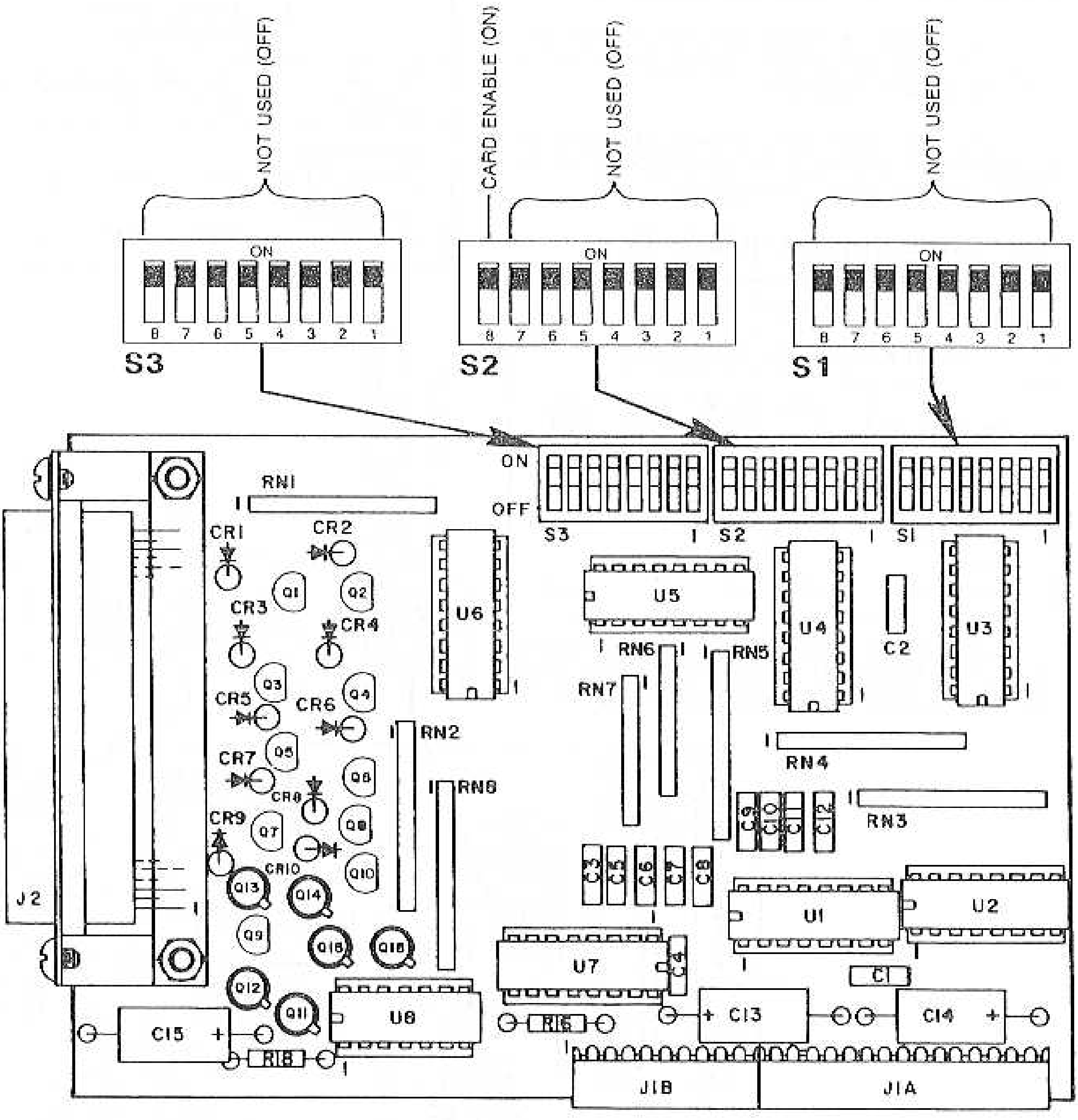




SERIAL CARD PROGRAMMING SWITCHES

CUTOFF PROGRAMMING

To enable the cutoff circuitry, set S2-8 to ON. Leave all other switches in the OFF position.



CUTOFF CARD PROGRAMMING SWITCHES

SINGLE-DUAL RS422/RS485 PROGRAMMING

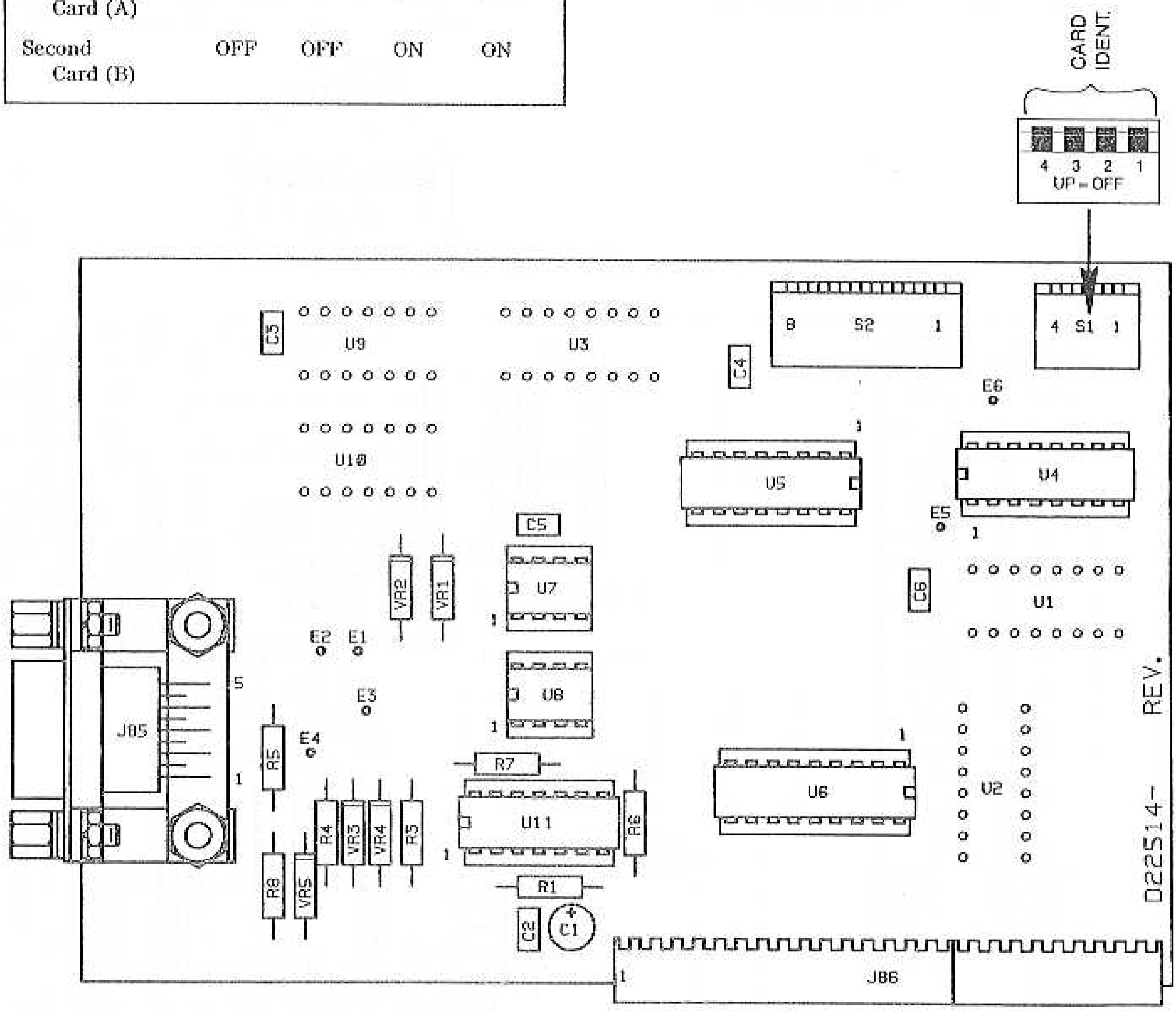
SINGLE RS422/485

The WI-120 can support up to two Single RS422/RS485 PC Cards. Refer to the following table and program the card appropriately.

SINGLE RS422/RS485 PROGRAMMING				
PC Card Installed	SWITCH 1			
	1	2	3	4
First or Only Card (A)	ON	ON	OFF	OFF
Second Card (B)	OFF	OFF	ON	ON

DUAL RS422/485

Programming requirements for this PC Card is dependent on the applications. Consult the factory for proper switch settings.



RS422/RS485 PROGRAMMING SWITCHES

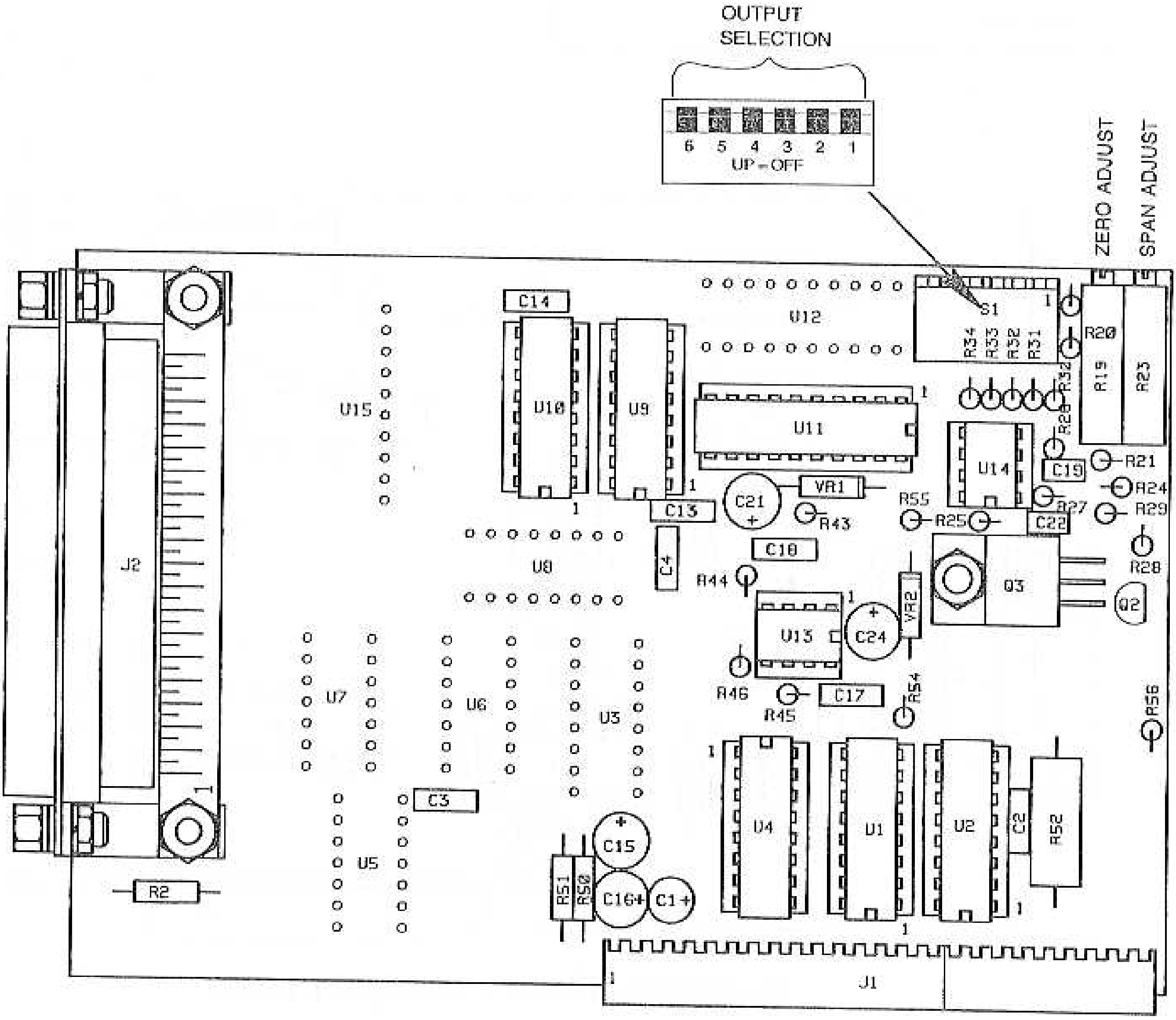
ANALOG PROGRAMMING
P/N 23438-0020

The Analog PC Card must be programmed so that it supplies the proper range of voltage or current to a peripheral device. Refer to the following table and select the setting that is appropriate for a particular application.

After this is done, use R19 to adjust the zero reference so that the card supplies the correct output when no weight is on the scale.

Finally, load the scale to capacity and use R23 to span the output from the card to the proper level.

ANALOG OUTPUT PROGRAMMING						
OUTPUT RANGE	SWITCH 1					
	1	2	3	4	5	6
0 - 10 VDC	OFF	OFF	OFF	OFF	ON	OFF
0 - 5 VDC	OFF	OFF	OFF	ON	OFF	OFF
1 - 5mA	OFF	OFF	ON	OFF	OFF	ON
4 - 20mA	OFF	ON	ON	OFF	OFF	ON
10 - 50mA	ON	ON	ON	OFF	OFF	ON



ANALOG CARD PROGRAMMING SWITCHES

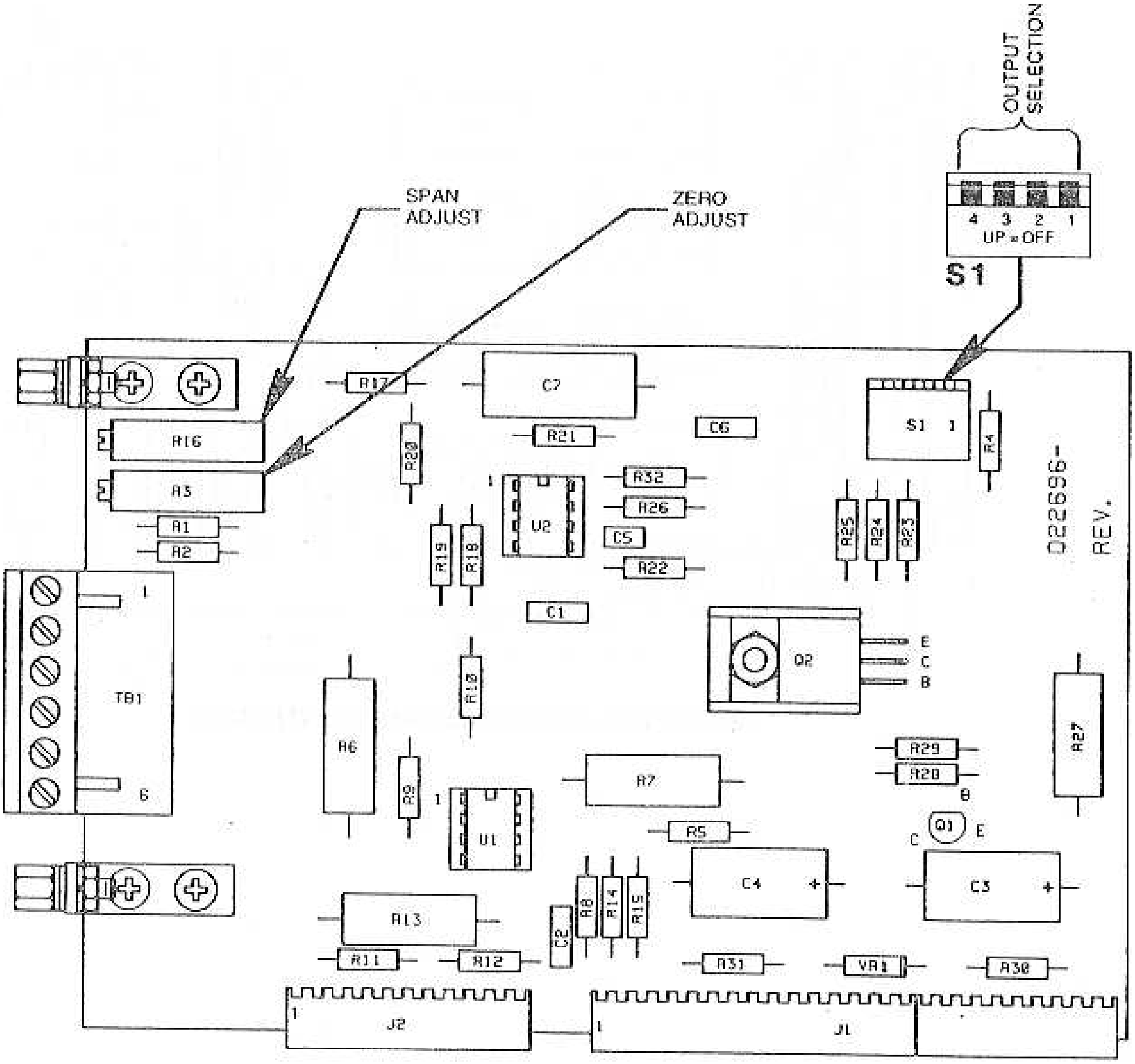
ANALOG PROGRAMMING
OLD STYLE P/N 22696-0011

The Analog PC Card must be programmed so that it supplies the the proper range of voltage or current to a peripheral device. Refer to the following table and select the setting that is appropriate for a particular application.

After this is done, use R3 to adjust the zero reference so that the card supplies the correct output when no weight is on the scale.

Finally, load the scale to capacity and use R16 to span the output from the card to the proper level.

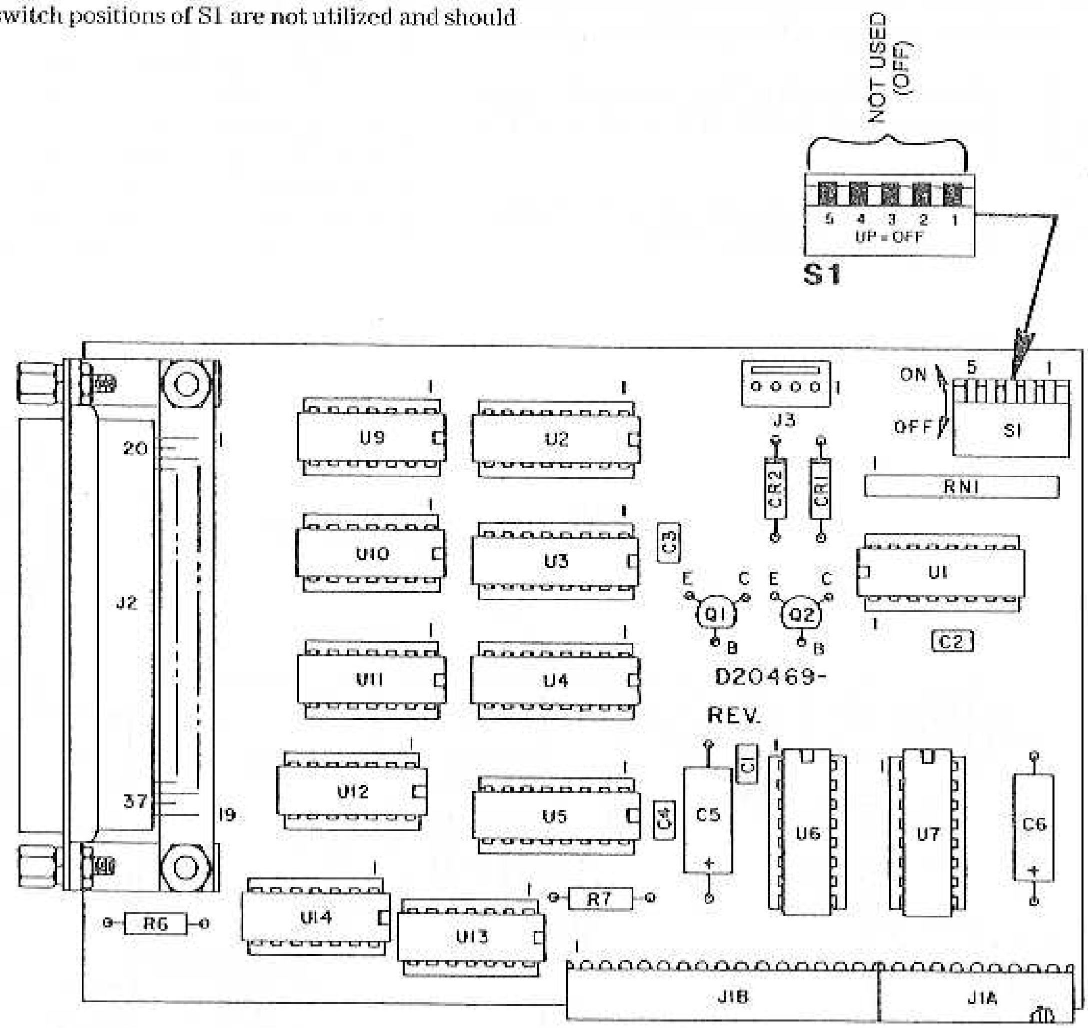
ANALOG OUTPUT PROGRAMMING				
OUTPUT RANGE	SWITCH 1			
	1	2	3	4
1-5 Milliamps	ON	ON	OFF	OFF
4-20 Milliamps	ON	ON	OFF	ON
10-50 Milliamps	ON	ON	ON	ON
0-5 VDC	OFF	OFF	OFF	OFF
0-10 VDC	OFF	ON	OFF	OFF



ANALOG CARD PROGRAMMING SWITCHES

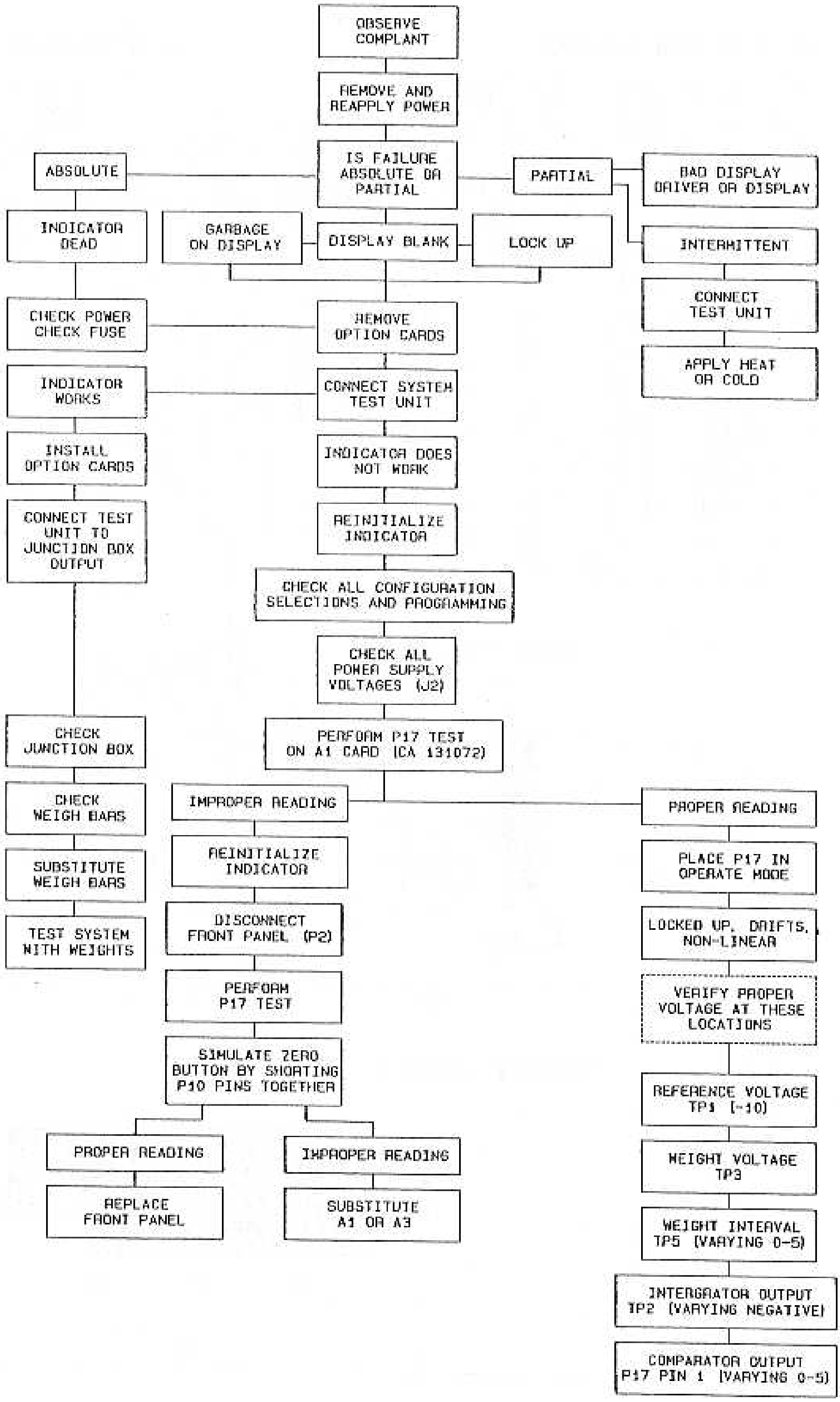
BCD PROGRAMMING

If the WI-120 is fitted with a Parallel BCD Interface PC Card, all programming is through the configuration selections. The switch positions of S1 are not utilized and should be OFF.

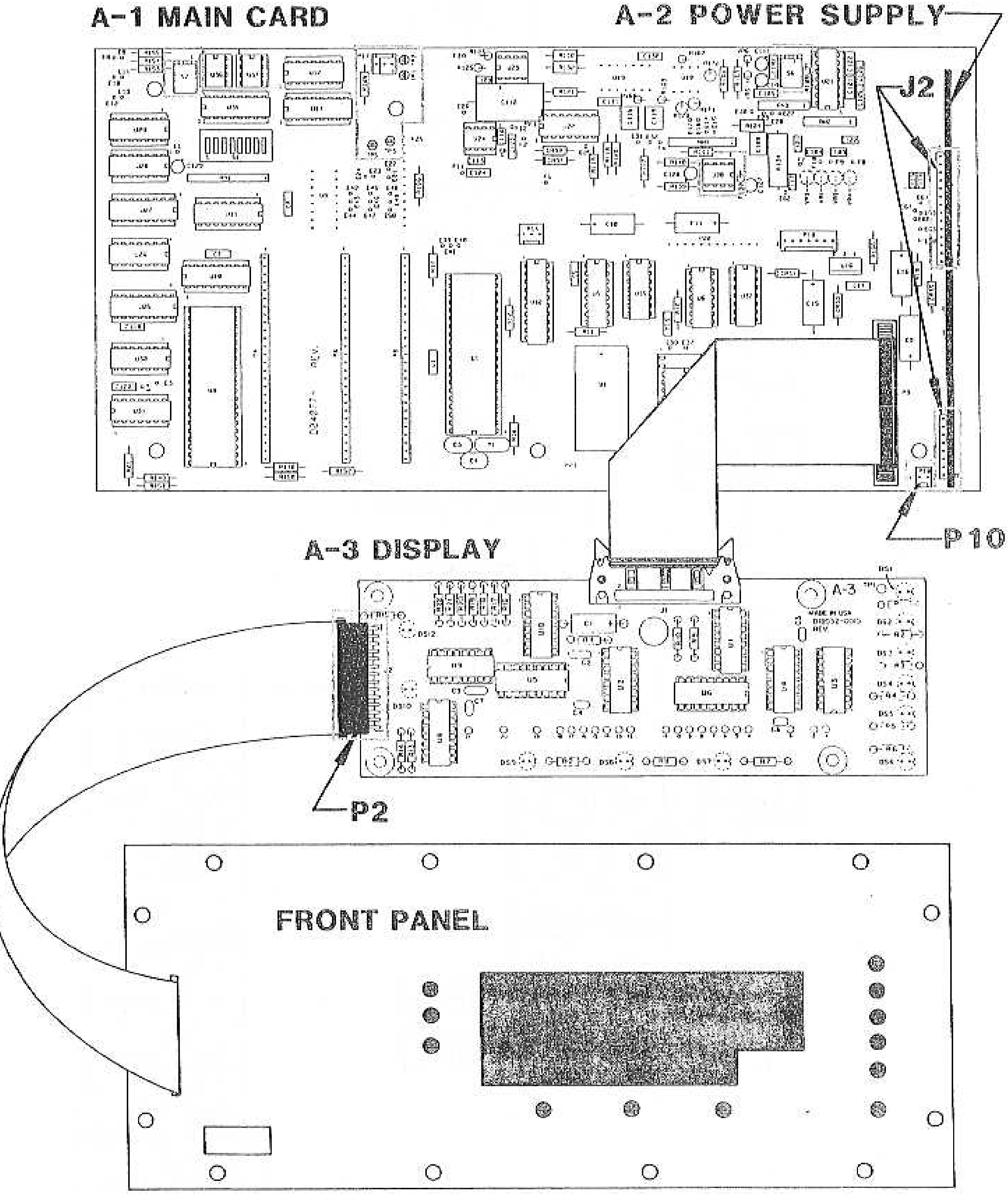


BCD CARD PROGRAMMING SWITCHES

WI-120 TROUBLE SHOOTING SEQUENCE



WI-120
TROUBLE SHOOTING LOCATIONS

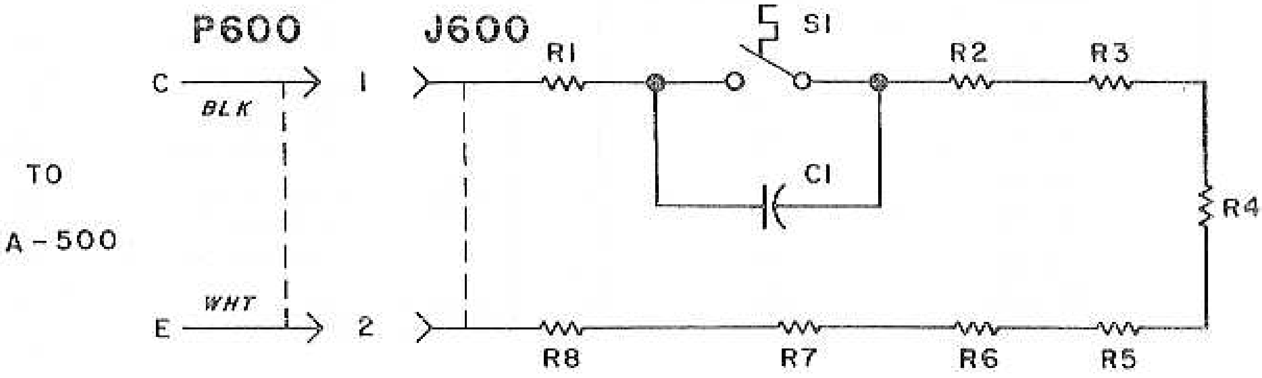


HEATER PLATE KIT 20006-0010

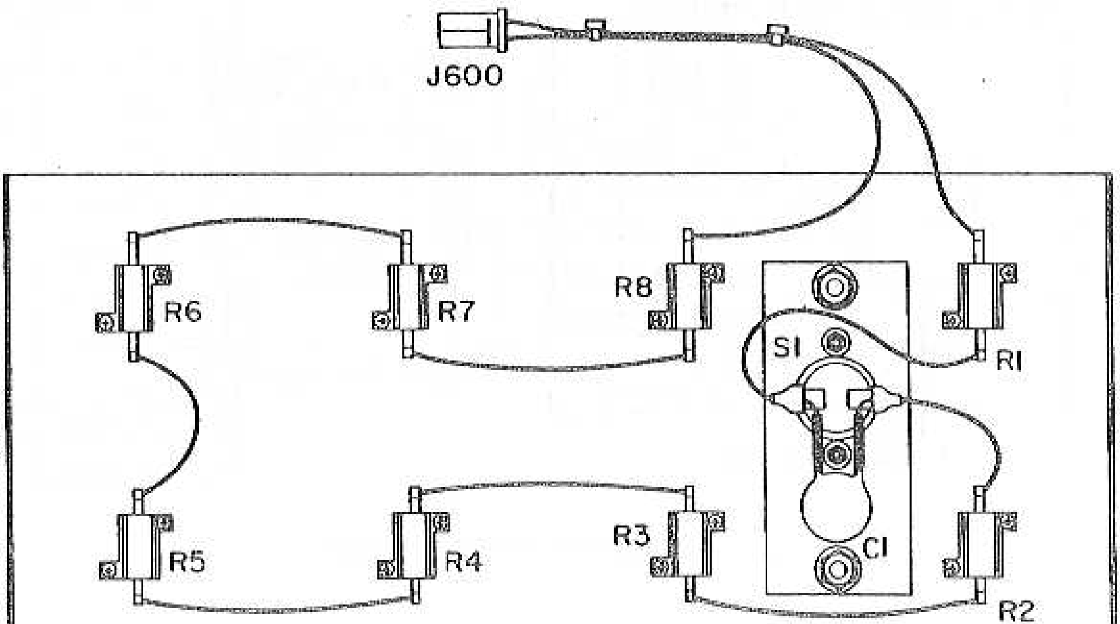
The heater plate assembly is installed in the bottom of some watertight weight indicator enclosures. It is used to extend the operating temperature range in cold environments or to combat condensation problems.

PARTS LIST

DESG.	DESCRIPTION	PART NO.
	Heater Plate Assembly	20005-0011
C1	0.1 uF ±10% 500V cer	15819-0082
J600	2 pin connector:	14533-0080
	Requires:	
	connector pin	14541-0023
P600	2 pin connector	14533-0072
	Requires:	
	connector pin	14541-0015
R1-R8	42.2 ohm 1% 5W WW	15835-0355
S1	Thermostat	14357-0018
	Thermostat insulator	20009-0017



HEATER PLATE SCHEMATIC



COMPONENT LAYOUT

TRANSFORMER ASSEMBLY 20042-0016

CIRCUIT DESCRIPTION

The transformer assembly consists of power transformer (T1) and two connectors (P13 and P502).

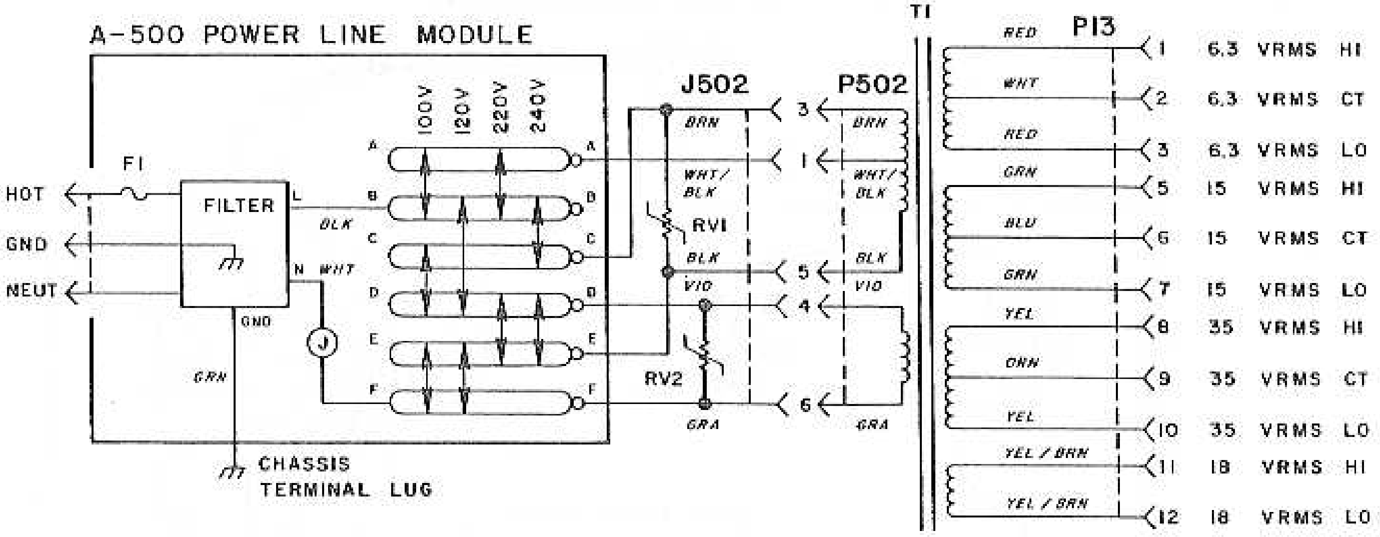
T1 receives its a.c. input voltage from power module A-500. It supplies a.c. power to the A-2 power supply PC card from its secondary windings. Refer to the table for output voltage readings.

T1 OUTPUT VOLTAGE TABLE

Measure between J13 Pins	Nominal Voltage readings (Volts RMS)
1 and 2	3.1
2 and 3	3.1
5 and 6	9.2
6 and 7	9.2
8 and 9	18
9 and 10	18
11 and 12	20

PARTS LIST

DESG.	DESCRIPTION	PART NO.
A500	Power Line Module Assembly	19571-0017
A500	Power Line Module Assembly with Heater Plate Connector	19571-0025
T1	Power Transformer	17843-0013
P13	12 Pin Connector	14531-0165
	Requires: Connector Pin	14543-0021
J502	6 Pin Socket	14533-0064
	Requires: Connector Pin	14541-0023
P502	6 Pin Connector	14533-0056
	Requires: Connector Pin	14541-0015
RV1, RV2	Varistor	16046-0010



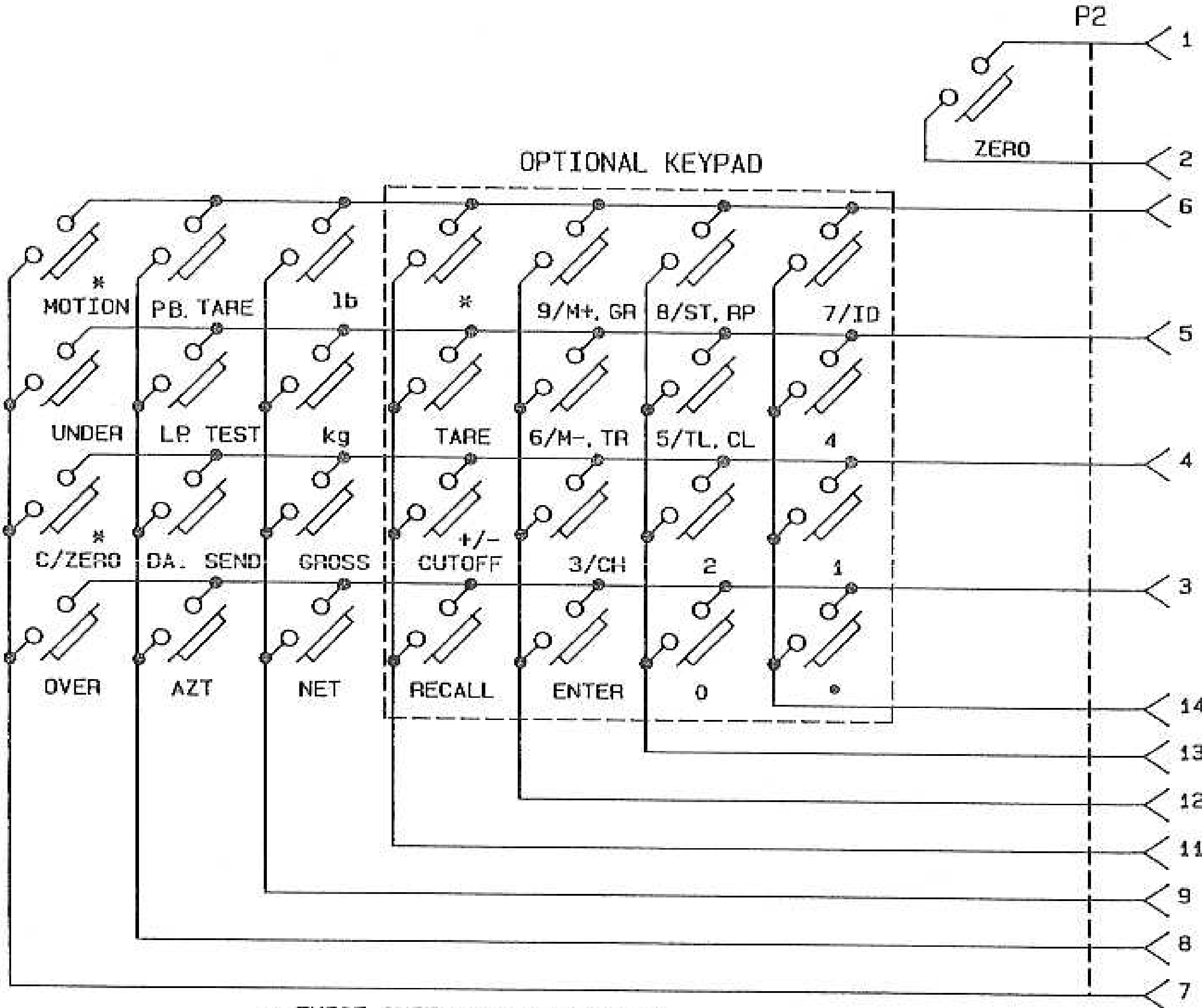
AC POWER SUPPLY SCHEMATIC

WI-120 FRONT PANELS

The front panel is available in four different configurations. Three have an optional keypad while one does not have an optional keypad.

If a front panel key is suspected of being faulty, use an ohmmeter and check it for continuity by pressing the key.

Front panels are not repairable and should be replaced if faulty.



* THESE SWITCHES ARE NOT USED

THE A-1 MICROPROCESSOR/A-to-D PC CARD
WT P/N 24463-0018

A-1.1 CIRCUIT DESCRIPTION

The A-1 PC Board contains the Microprocessor System, the Analog-To-Digital Weight Conversion Circuitry, and the circuitry which carries power supply voltages and signals to and from the various PC cards. At times, it is also fitted with an optional clock circuit U34 or a radio frequency interference (RFI) shielding kit.

A-1.2 THE MICROPROCESSOR SYSTEM

The Microprocessor System consists of a Texas Instruments TMS 9995 microprocessor IC (U1), read only memory or ROM (U2), random access memory or RAM (U4), a TMS 9901 programmable systems interface (U8), two nonvolatile static random access memory devices EEPROM (U36 and U37) and various circuit selector IC's.

A 2.45 MHz internal clock is contained in the 9995 IC and is controlled by an external crystal (Y1). Output (CLKOUT) from this clock provides the timing reference for the programmable systems interface (U8) and the asynchronous communications controller (A-5 PC Card, U1).

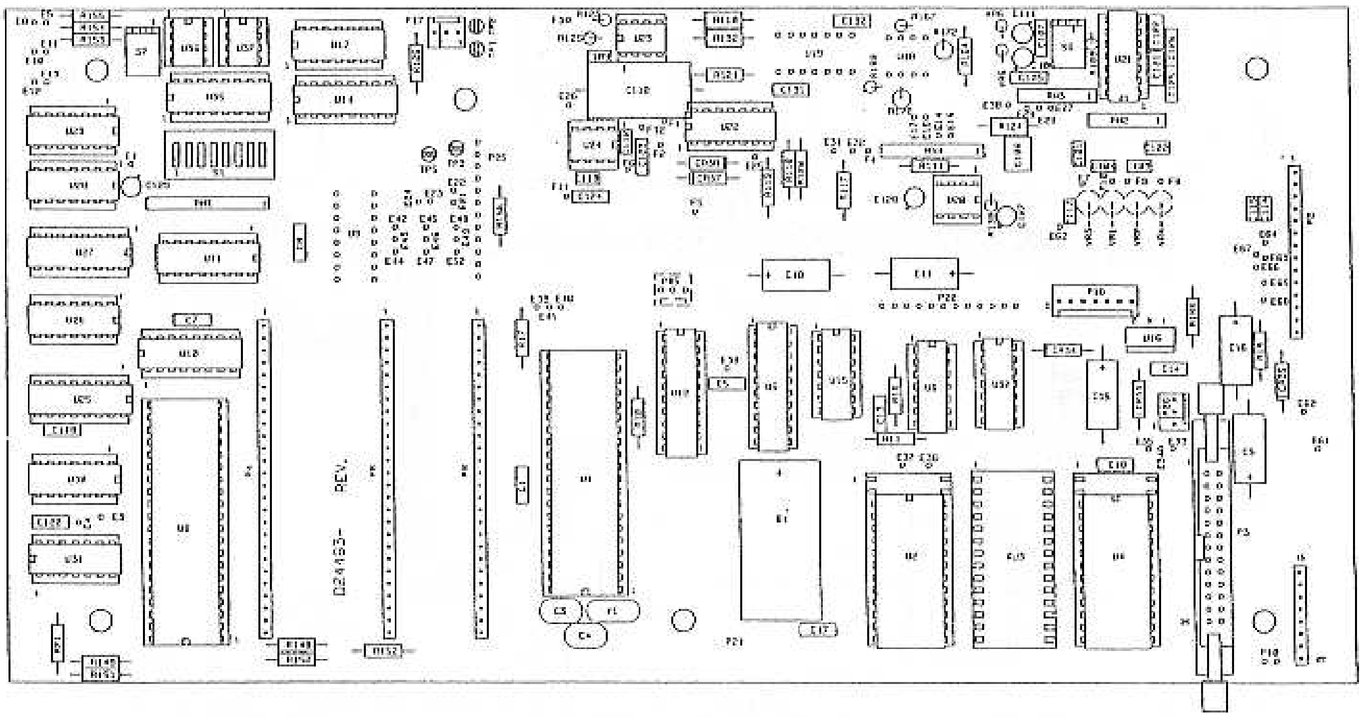
The microprocessor uses the address bus lines A0 through A15 to address each particular memory data location when the memory enable line (MEMEN) is active (low) and the I/O's when the MEMEN line is inactive (high).

Data is transferred between the microprocessor and memories via lines D0 through D7 of the data bus. If the data bus in line (DBIN) is active (low), the microprocessor will read data from memory. If the write enable line (WE) is active (low), the microprocessor can write data into the RAM. A Programmable Logic Array device (U5) is used to enable the RAM, ROM or other circuits.

The microprocessor transfers data serially to and from a particular I/O via a CRU (communications register unit). The 9995 receives incoming data one bit at a time from the CRUIN line and sends out one bit of data at a time over the CRUOUT line (also used as a memory address line) while the CRUCLK (CRU CLOCK) enables data on the CRUOUT line to be written into the I/O.

To initiate serial data transmissions and to transfer weight count totals from the Analog-to-Digital Circuitry's counters, interrupts shift the microprocessor from the routine currently being executed to a special routine required by an asynchronous external request and shift the microprocessor back to the original routine when the interrupt signal is removed.

A TMS 9901 programmable systems interface IC (U8) is used to transfer raw weight count data and interrupt signals to the microprocessor.



A-1 MICROPROCESSOR / A-to-D COMPONENT LAYOUT

Two EEPROM devices U36 and U37 are utilized to store the configuration programming selections. They will continue to hold data even if there is a power disruption. Data transmitted on the address lines to U36 and U37 is latched by U35. Data from U36 and U37 is communicated out through U11 back to the microprocessor on the CRUIN line. *Replacement of either U36 or U37 will cause the configuration programming to default to preset factory parameters.*

The PAL (Programmable Array Logic) device U5, enables the programmable systems interface (U8), A-3 Display/Keypad PC Card Circuitry, ROM (U2), RAM (U4) or U10. U10, when enabled, provides an analog "CLOCK, CLEAR,CONTINUE" signal or selects the security code switch S1. U11, when addressed and enabled, sends programming data to the microprocessor on the CRUIN line.

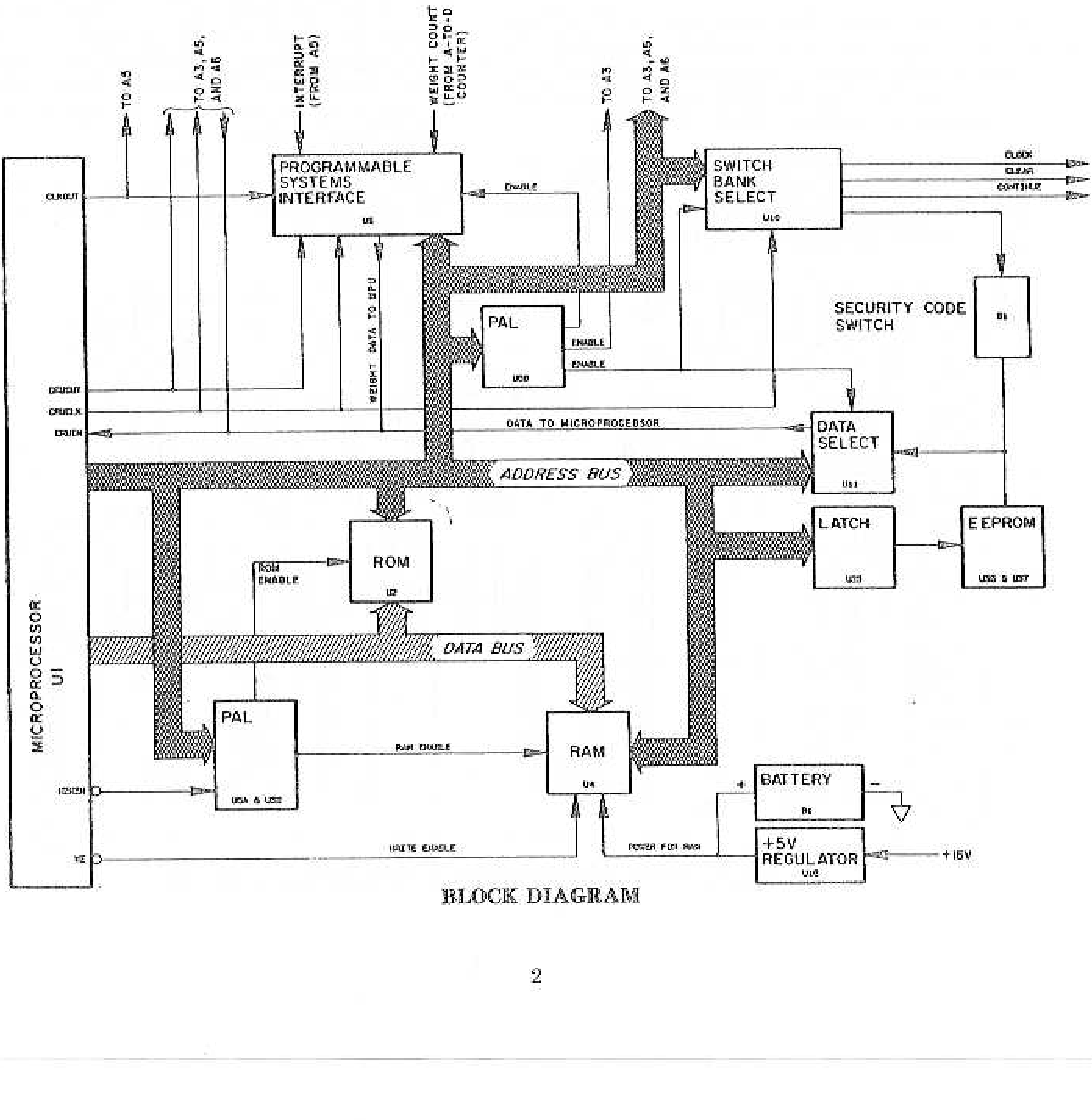
A-1.3 THE ANALOG-TO-DIGITAL CIRCUITRY

The Analog-to-Digital Conversion Circuitry consists of weight Voltage amplifiers (U20B and U21), a reference voltage amplifier (U20A), Switching Circuitry (U22), a dual slope ratiometric integrator (U23), a comparator (U24), a clock (contained in U1, the 9995 microprocessor IC), a clock pulse divider (U28), counters (U30 and U31), and Analog-to-Digital Control Logic Circuitry (U25, U26, U27, and U29).

Input voltage enters the Analog-to-Digital Circuitry when an excitation voltage is sent to the weight transducer from the A-2 Power Supply PC Card and the weight transducer provides the Analog-to-Digital Circuitry with two voltage inputs: a raw weight voltage and a reference voltage.

Once in the Analog-to-Digital Circuitry, the weight voltage is sent to an amplifier (U21) and the reference voltage is sent through an amplifier (U20A).

In addition, the amplified weight voltage is applied to an analog filter (U20B) through a switch selectable sensitivity resistor that has been set to match the sensitivity of the amplifier to that of the weight transducer.



BLOCK DIAGRAM

When the proper number of clock pulses have flowed through the counters, the Timing Control Logic Circuitry will start the Analog-to-Digital Cycle by allowing the amplified weight voltage to be sent to the integrator (U24).

In addition, the amplified weight voltage is applied to an analog filter (U20B) through a switch selectable sensitivity resistor that has been set to match the sensitivity of the amplifier to that of the weight transducer.

When the proper number of clock pulses have flowed through the counters, the Timing Control Logic Circuitry will start the Analog-to-Digital Cycle by allowing the amplified weight voltage to be sent to the integrator (U24).

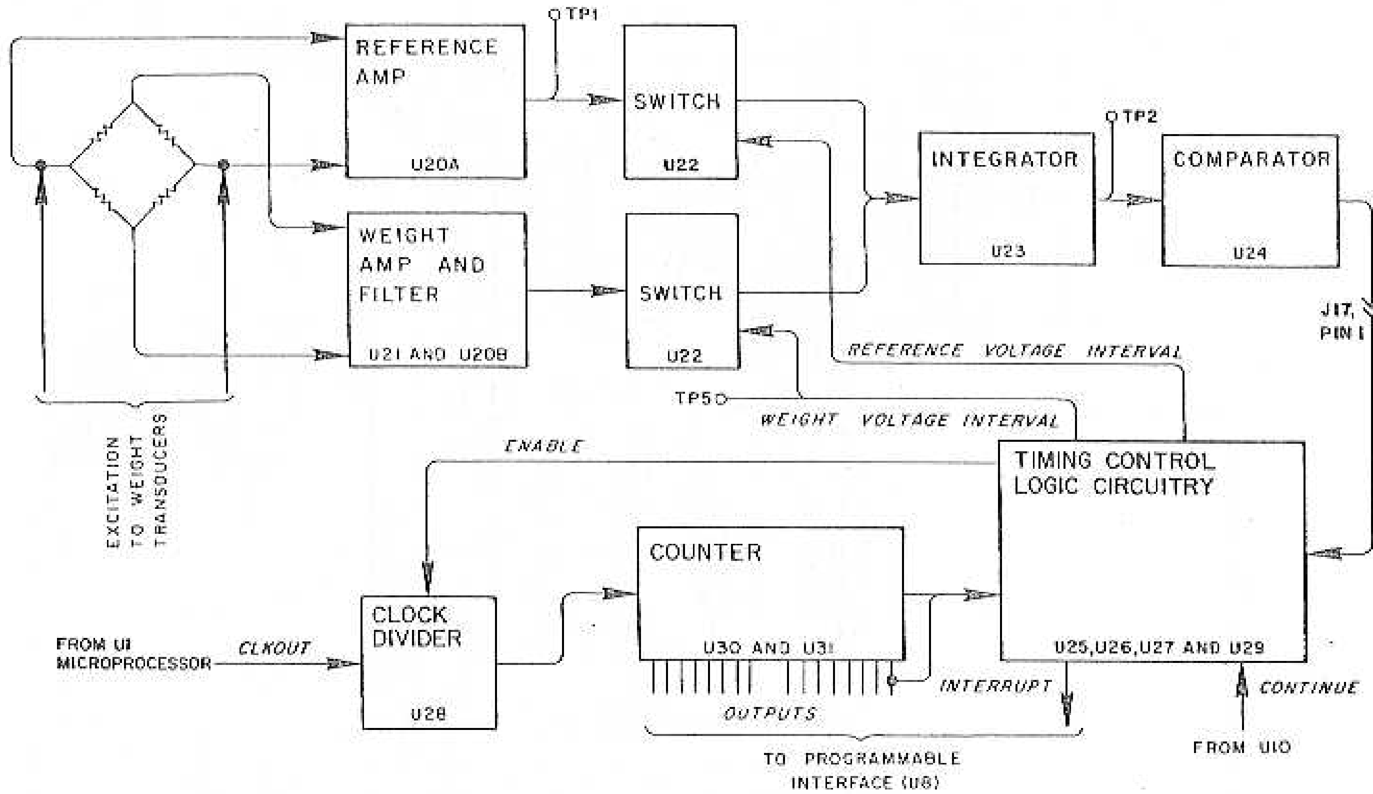
During this period of time, known as the **Weight Voltage Interval**, the integrator's output will be a sloping negative voltage, or ramp, whose angle is directly proportional to the weight voltage, but of the opposite polarity. (In other words, a positive weight voltage will cause the integrator to issue negative output.)

After 245,760 clock pulses have flowed through the counters, the Timing Control Logic Circuitry will direct U22 to apply the reference voltage to the integrator. During this period of time, known as the **Reference Voltage Interval**, the constant voltage supplied will allow the integrator's output to Interval ramp back up towards zero.

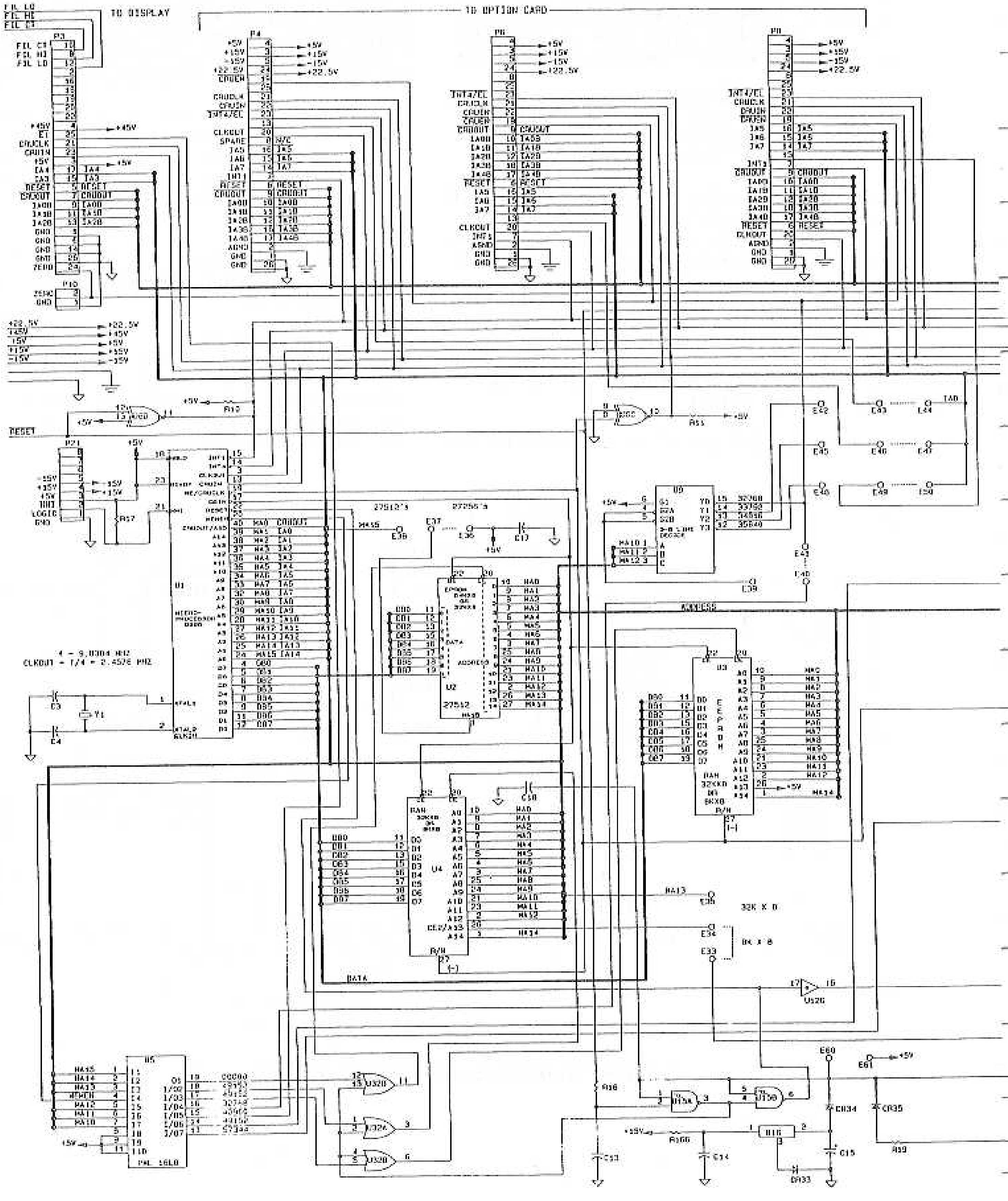
When the integrator's output reaches zero, an interrupt signal is sent to the microprocessor and the number of clock pulses that it took for the integrator's output to ramp back to zero is recorded. This total will then be used by the microprocessor to calculate the amount of weight on the scale.

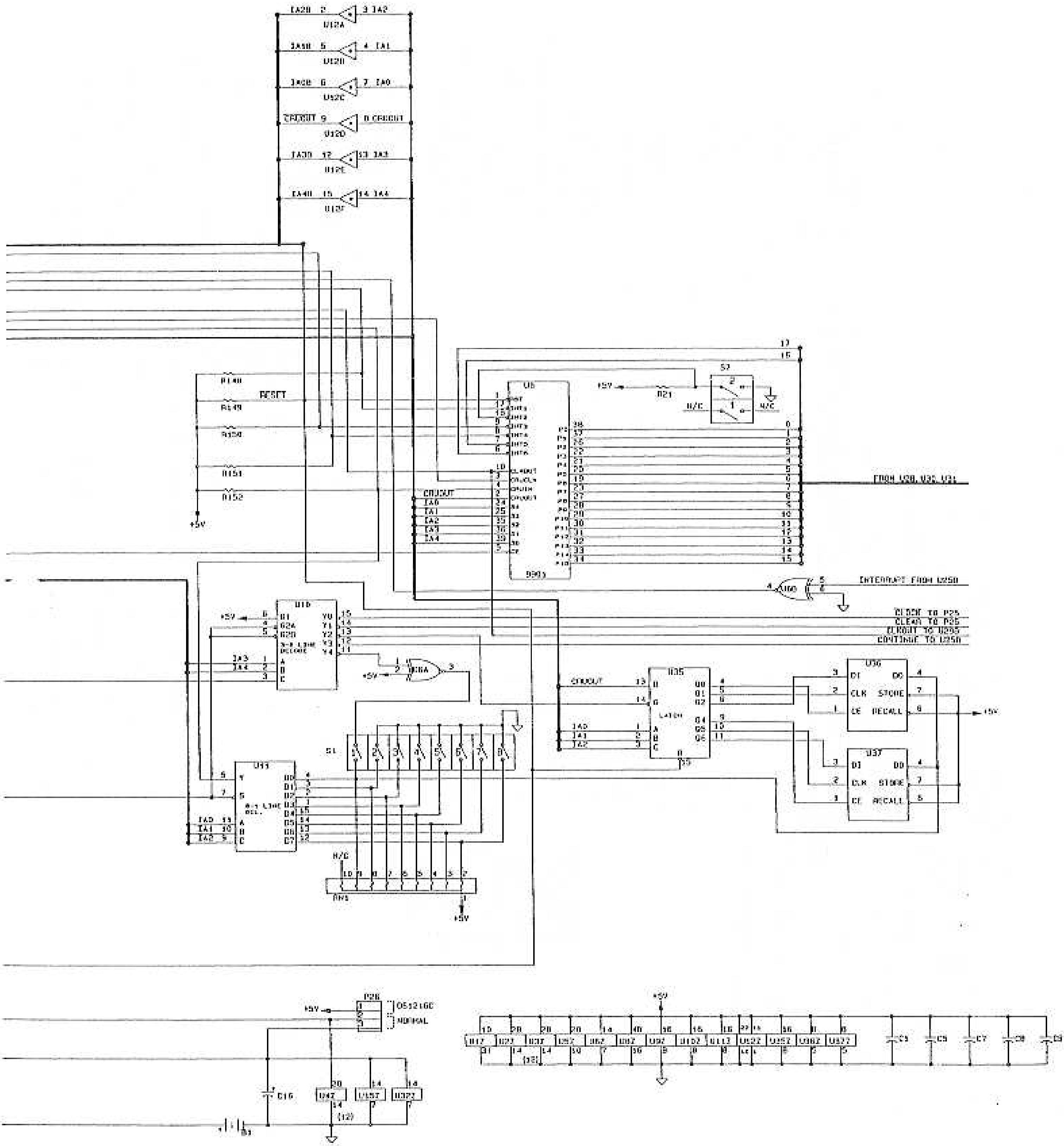
After the microprocessor has recorded the counter total, it issues a continue signal that allows the counters to finish their counting cycle.

When 262,144 clock pulses have passed from the time that the reference voltage was first applied to the integrator, the Timing Control Logic Circuitry will cause the weight voltage to again be sent to the integrator and the Analog-to- Digital Cycle will begin again as the counters are reset and start counting from zero again.

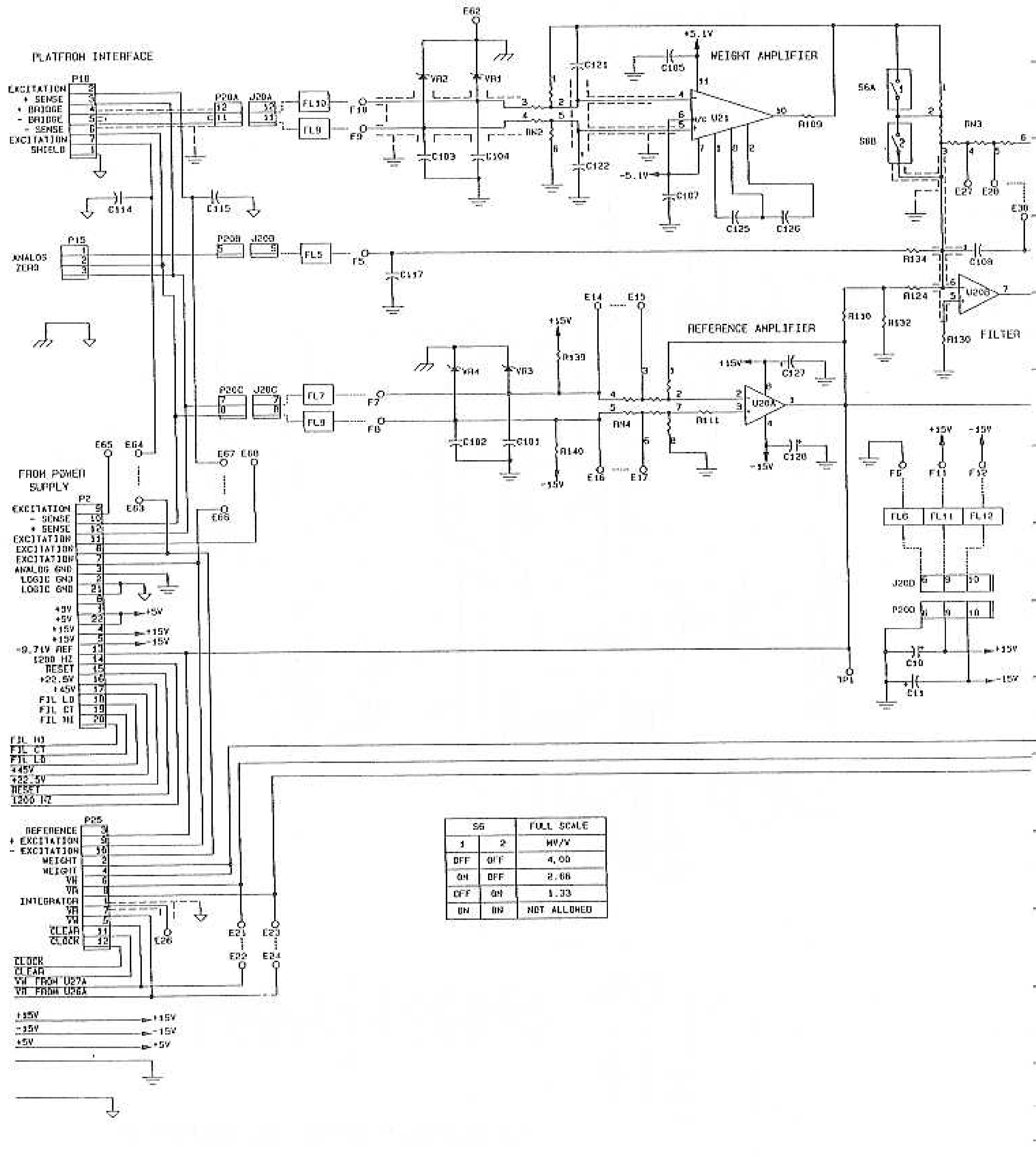


ANALOG TO DIGITAL CIRCUITRY BLOCK DIAGRAM

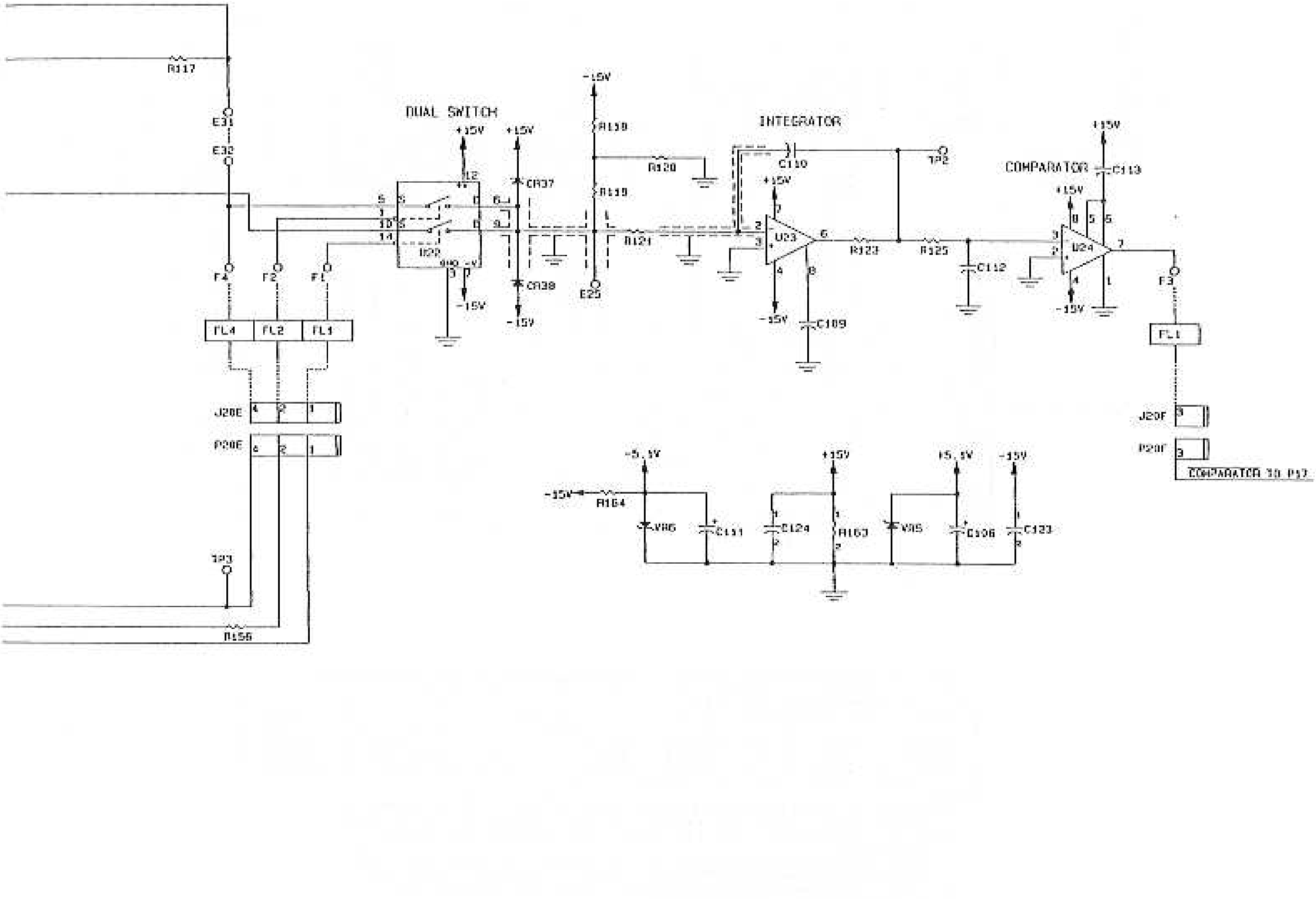

TO DISPLAY
TO OPTION CARD
27512's
27256's
4 = 9.8304 MHZ
CLKOUT = f/4 = 2.4576 MHZ
ADDRESS
DATA
32K X 8
8K X 8
PAL 16L8



MICROPROCESSOR SECTION SCHEMATIC

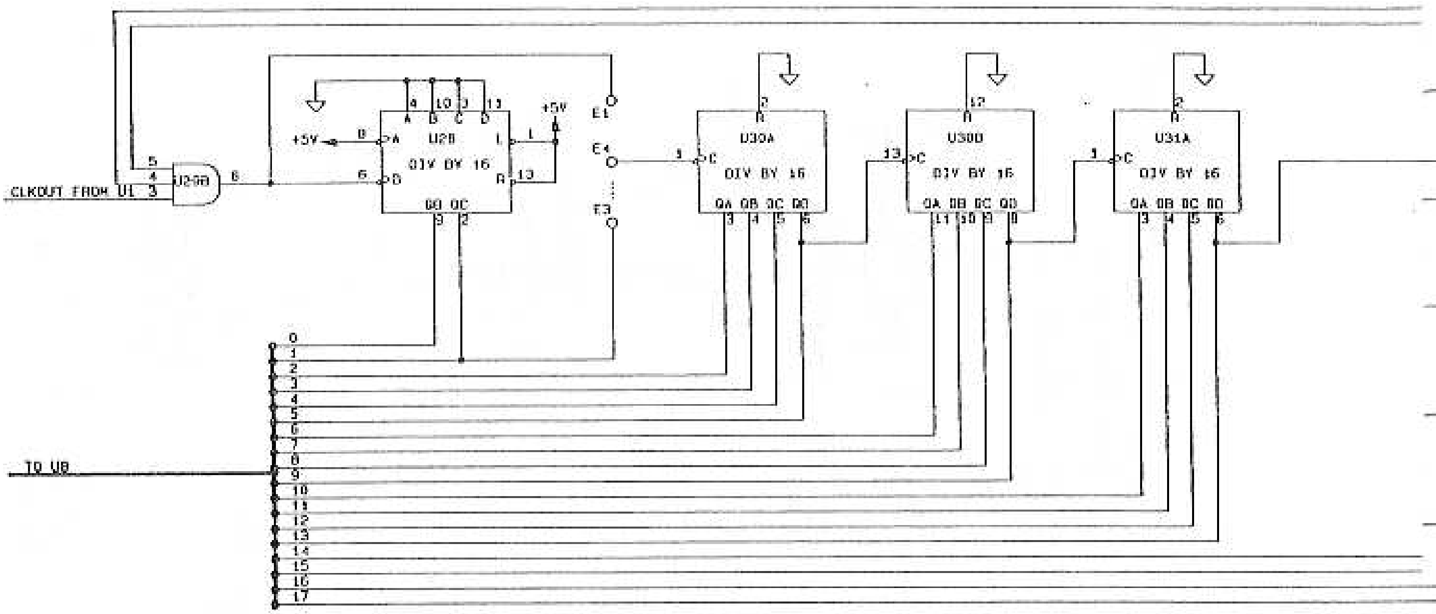


S6		FULL SCALE
1	2	MV/V
OFF	OFF	4.00
ON	OFF	2.66
OFF	ON	1.33
ON	ON	NOT ALLOWED



ANALOG TO DIGITAL SCHEMATIC

COUNTERS

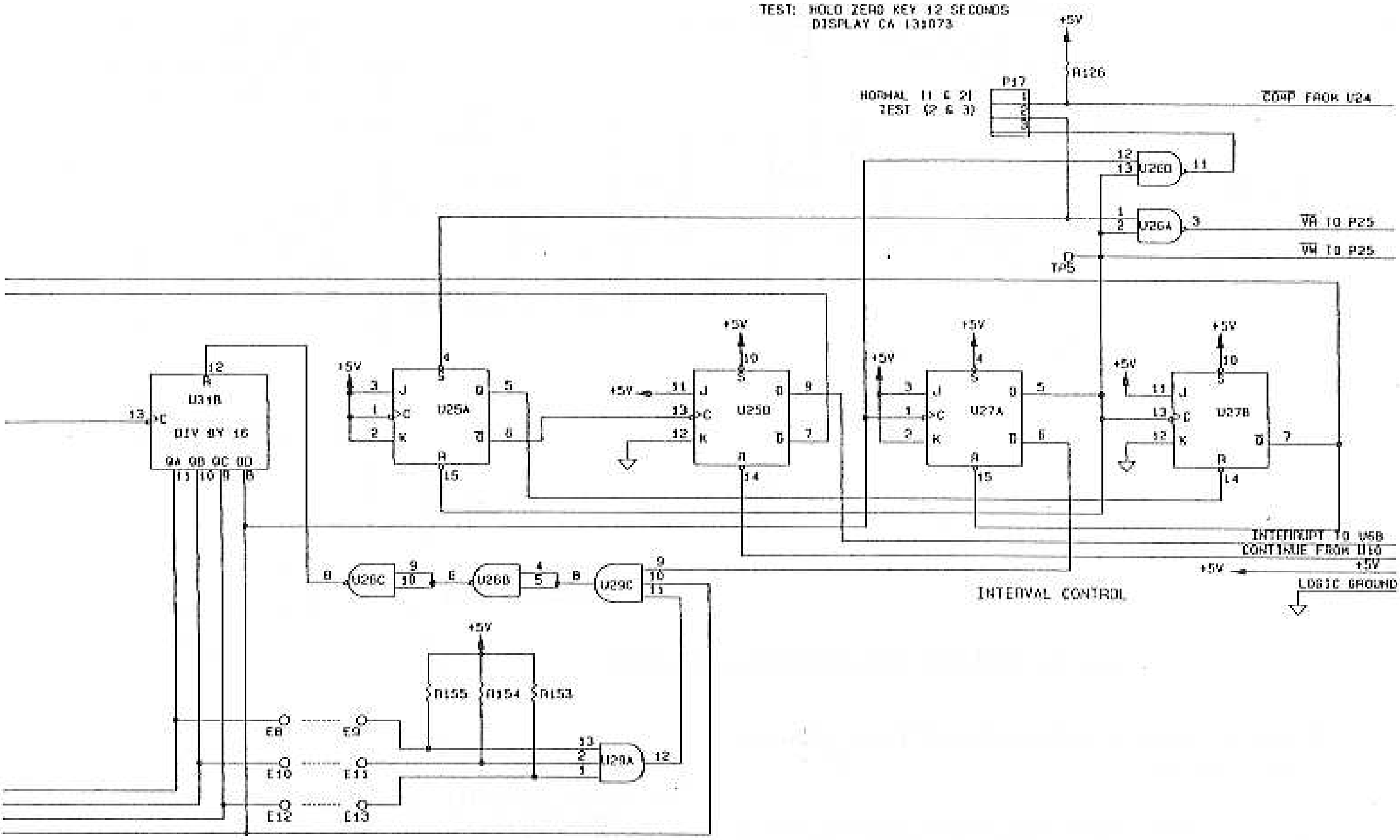


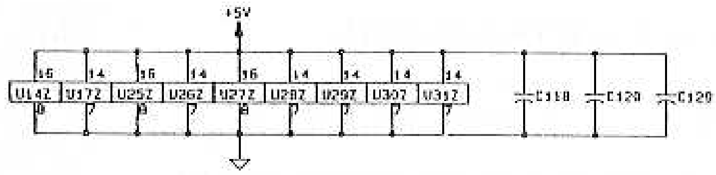
JUMPER POSITIONS FOR DIFFERENT CONVERSION RATES AND POWER LINE REJECTION FREQUENCIES

CONVERSION RATE	POWER LINE REJECTION	DIVIDER	JUMPER	JUMPER	C	RESOLUTION
21.43Hz	50Hz	1	E1-4	E12-13	.10uf	50,000
23.08Hz	60Hz	1	E1-4	E10-11	.10uf	50,000
4.84Hz	50/60Hz	4	E3-4	E10-11 , E12-13 , E8-9	1.0uf	200,000

NOTES:

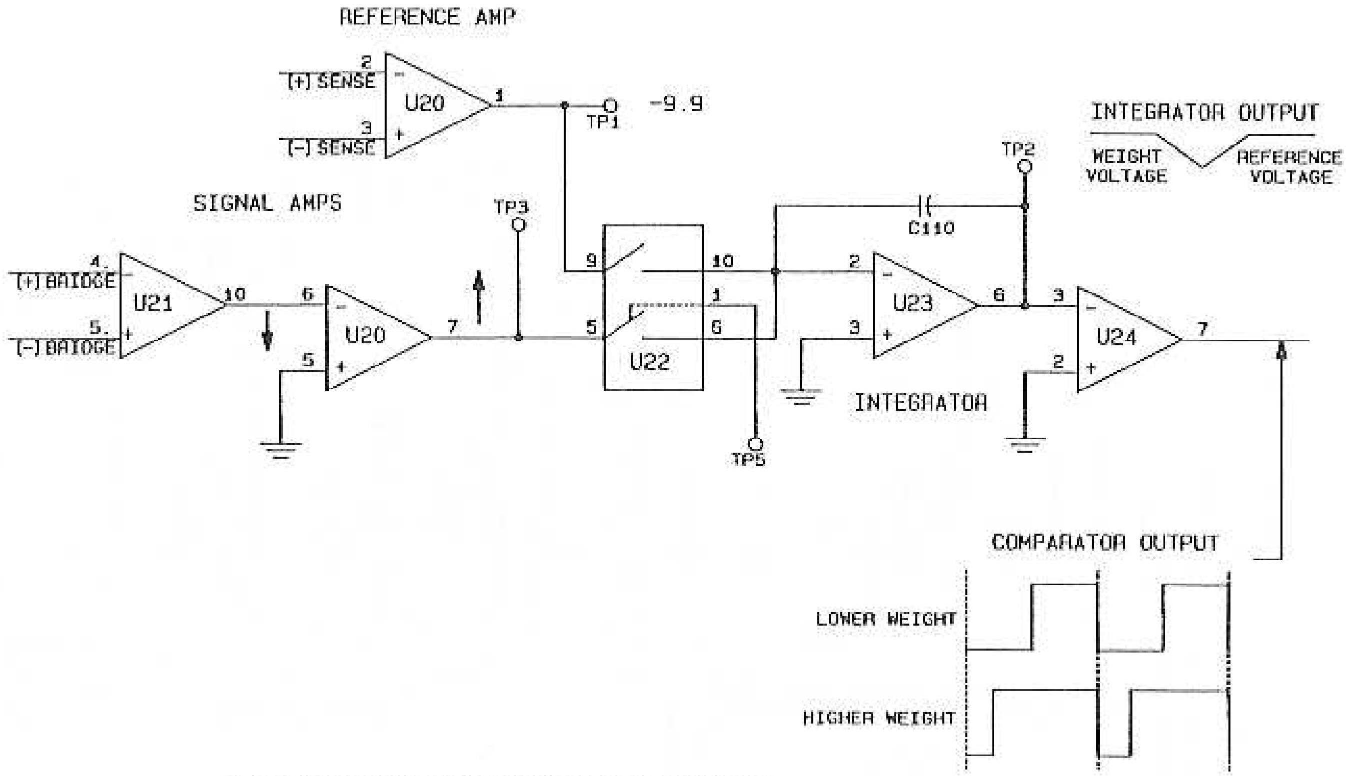
1. E21 TO E22 AND E23 TO E24 ARE CUT FOR 3 SCALE USE. E25 TO E26 IS JUMPERED.
2. CUT FOIL FROM E37 TO E38 AND JUMPER E36 TO E37 TO FUNCTION WITH 27128 EPROMS.
3. CUT FOIL E33 TO E35 AND JUMPER E33 TO E34 TO USE WITH 2KX8 RAMS INSTEAD OF 8KX8 RAMS.
4. TO USE WITH OPTION CARDS WITH MORE THAN 32 BITS OF I/O, INSTALL U9, CUT FOIL FROM E40 TO E41, JUMPER E39 TO E40 AND JUMPER E42 TO E43, E45 TO E46, OR E48 TO E49 DEPENDING ON WHICH SLOT IS USED TO INSTALL THE OPTION CARD.
5. WJ-110 STANDARD CONVERSION RATE IS 4.84Hz.
6. JUMPER E60 TO E61 IF PARTS FOR BATTERY BACKUP ARE DELETED, i.e., C14, C15, C16, U16, R19, CR33, CR34, CR35 AND B1.
7. REMOVE PIN 8 OF CONNECTOR J2.
8. REMOVE PIN 25 OF P4, P6 AND P8.





COUNTERS AND CONTROL LOGIC SCHEMATIC

A-1.4 A CLOSER LOOK AT THE A-TO-D CYCLE'S TIMING AND FREQUENCY



WI-120 ANALOG TO DIGITAL DIAGRAM

A-1.4A An Overview of the A-to-D Timing Control Logic Circuitry

The Timing Control Logic Circuitry consists of a clock, a switching gate (U29B), a clock pulse divider (U28), counters (U30 and U31), and the Interval Control Circuitry (U25 and U27).

A-1.4B Structure of the A-to-D Cycle

The Analog-to-Digital Cycle can be divided into two portions: the weight portion and the reference portion.

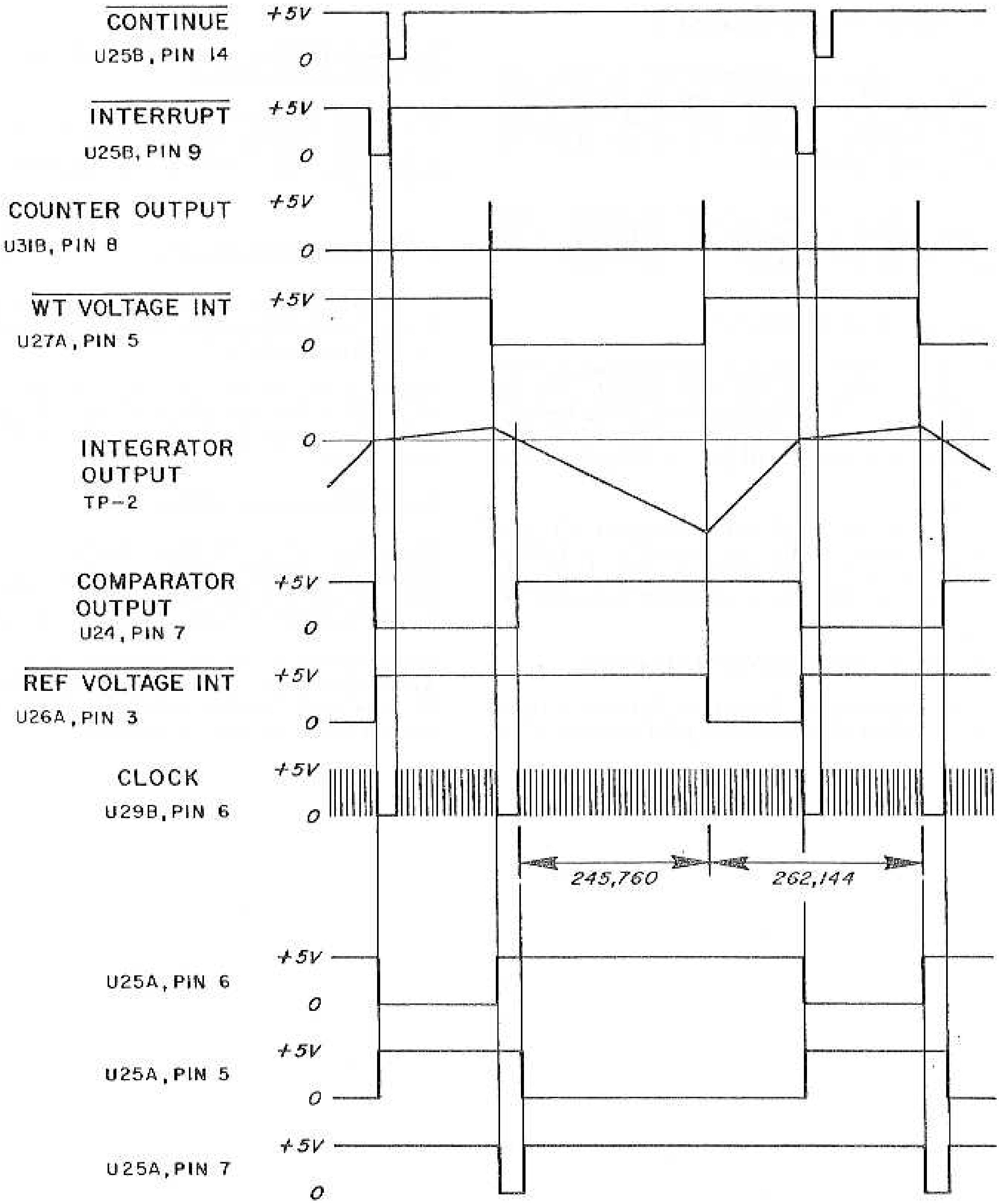
The weight portion of the Analog-to-Digital Cycle can further be divided into two smaller segments. During the first segment, **The Weight Interval Delay**, clock pulses are temporarily stopped from flowing through the counters as a weight voltage is applied to the integrator. This keeps the counters set at zero until output from the integrator reaches zero. As output from the integrator falls below zero, the second segment of the Weight Portion of the A-to-D Cycle, **The Weight Interval**, begins. In this segment, clock pulses are again allowed to flow through the counters as weight voltage is applied to the integrator for one complete counting cycle (245,760 counts).

When the counter total reaches 245,760, the counter overflows and starts counting from zero again. As this occurs, the second half of the Analog-to-Digital Cycle, the reference portion, begins.

The second half of the Analog-to-Digital Cycle can be divided into three segments. During the first, known as **The Reference Voltage Segment**, a negative reference voltage is fed into the integrator. The second, **The 9995 Read Delay**, begins when the output from the integrator crosses zero and the Timing Control Logic Circuitry temporarily stops clock pulses so that the microprocessor has time to read the total on the counters. The third segment, **The Counter Cycle Completion Segment**, gives the counters a chance to count up to 262,144 so that they can be reset and start counting from zero for the next Analog-to-Digital Cycle.

A-1.4C The Counting Cycle Completion Segment

When the microprocessor has read and stored a counter total, it issues a continue signal that resets U25B, pin 14. U25B, pin 7, in turn, causes the switching gate (U29B) to allow clock pulses to flow through the clock pulse divider (U28, pin 6) to the counters (U30 and U31) so that the counter can finish its counting cycle.



NOTE: SOME PULSE WIDTHS HAVE BEEN EXAGGERATED TO SHOW TIMING RELATIONSHIPS.

A-1.4D The Weight Interval Delay

When the counter total reaches 262,144, the counters are reset. Output from U31, pin 8 causes pin 7 of U27B to go low and U27B, in turn, causes the switching gate (U26B, pin 6) to stop the flow of clock pulses through pin 6 of U29B, U28, and the counters.

When the clock pulses are stopped, a weight voltage is applied to the integrator causing its output to ramp down in proportion to the strength of the weight voltage.

A-1.4E The Weight Interval

When output from the integrator (TP2) reaches zero, output from the comparator (U24, pin 7) goes high (+5 v). Pin 6 of U25A resets U25B. Pin 5 of U25A resets U27B and pin 7 of U25B, in turn, causes pin 6 of U26B to again allow clock pulses to flow through pin 6 of U29B, U28, and the counters.

The weight interval ends when the counter total again reaches 245,760 and the counter supplies an output on U31, pin 8. As this occurs, U27A, pin 5 goes high (+5 V) and causes a negative reference voltage to be applied to the integrator.

A-1.4F The Reference Voltage Segment

As the clock continues, the counters (U30 and U31) begins counting from zero again. U26A, pin 3 goes high (+5 v). The negative reference voltage causes output from the integrator to ramp back to zero.

When output from the integrator reaches zero, the comparator output goes low and ends the reference voltage segment of the reference interval by causing pin 5 of U25A to go high.

A-1.4G The 9995 Read Delay

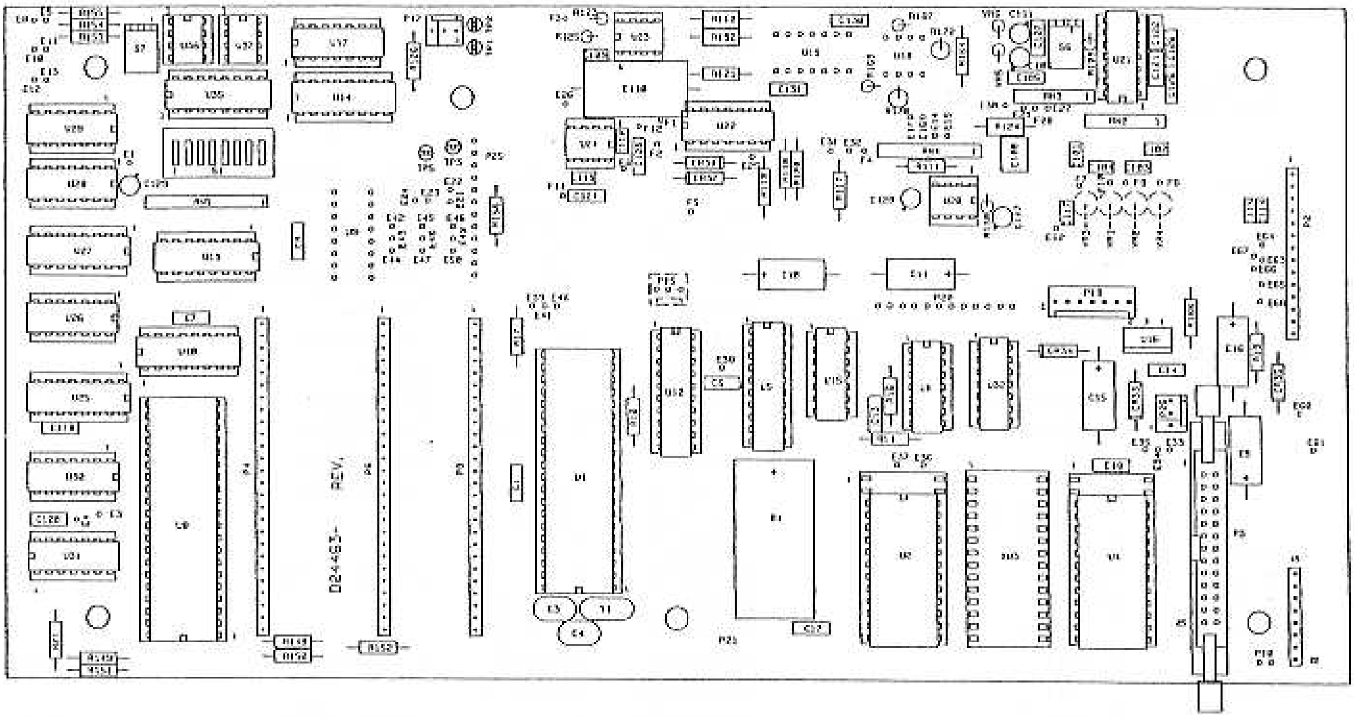
When U25A, pin 5 goes high, it causes U25B, pin 7 to issue an interrupt signal to the microprocessor and turn off the clock pulses at U29B, pin 6.

Upon receiving this interrupt signal, the microprocessor temporarily abandons its task, reads the counter total, stores it in memory, and sends a continue signal to the U25B, pin 14.

A-1.4H Starting a New A-to-D Cycle

This continue signal starts the new Analog-to-Digital Cycle by resetting U25B. U25B, pin 7, in turn, removes the interrupt from the microprocessor and causes U29B, pin 6 to again let clock pulses flow through U28 to the counter.

At this point, the microprocessor returns to the task it was performing when it received the interrupt signal and a new **Counting Cycle Completion Segment** begins as the counters are allowed to count to 262,144.

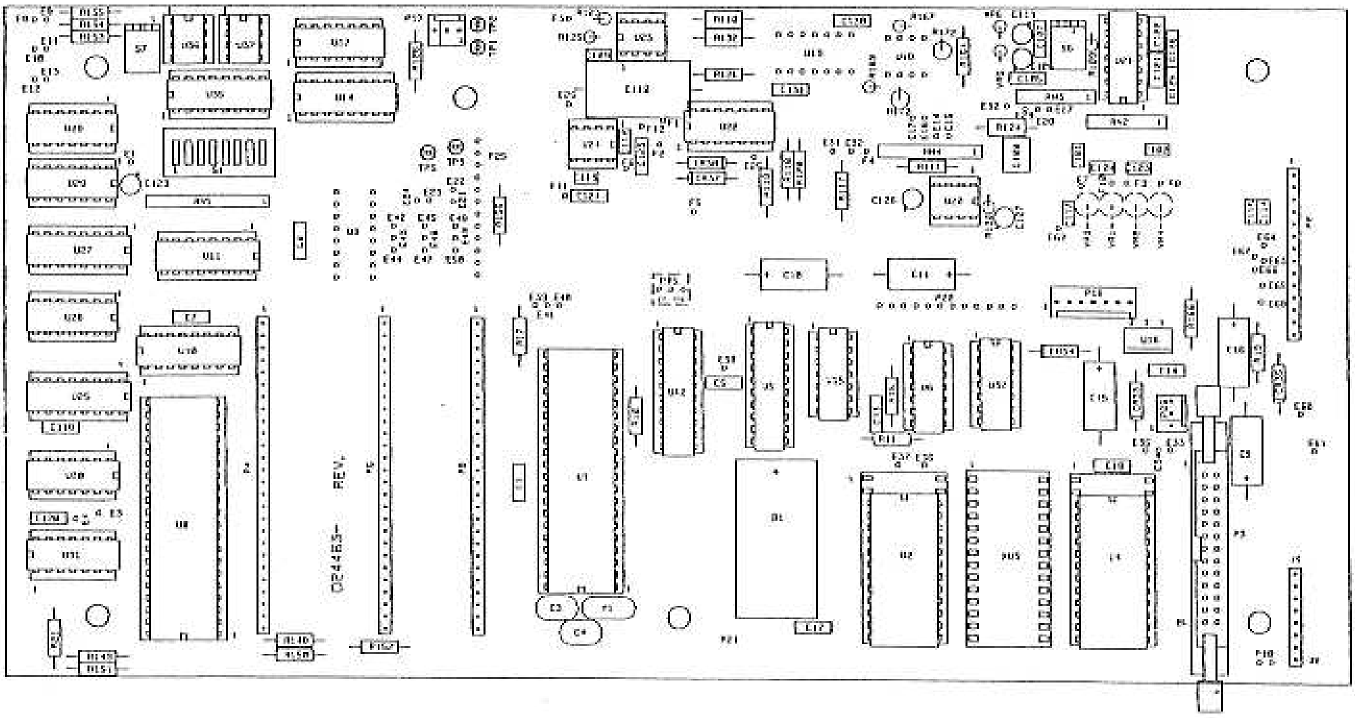


PARTS LIST
A-1 MAIN CARD WT/PN 24463-0018

SYMBOL	DESCRIPTION	W-T PART NUMBER
B1	Battery, Lithium 3V	17961-0019
C1, 5, 7, 8, 17, 18, 105, 107, 118, 120, 123-126, 130, 131	.1UF	15623-0120
C3, 4	12PF, 500V	15625-0078
C9, 15, 16	47UF, 10V	17660-0137
C10, 11	22UF, 25V	17762-0119
C13, 14	.22UF, 50V	15624-0046
C101-104, 112-115, 117	.01UF, 100V	15620-0123
C106, 111, 127, 128, 129	1.0UF, 35V	22327-2519
C108	1UF, 50V	23267-0158
C109	100PF, 200V	15619-0134
C110	1UF, 100V	18083-0226
C121, 122	.22UF, 50V	23267-0117
CR33-35, 37, 38	1N4148	15668-0035
FL1-12	EMI FILTER	17874-0015
J17,26	Two Circuit Shunt	18015-0013
J20	Connector, 12 Socket	23229-0122
	Requires 12 Pins	23229-5014
P2	Connector, 8 pin	17734-0072
P3	Connector, 26 pin ribbon	17818-0295
P4,6,8	Connector, 16 pin	17734-0155
P4A,6A,8A	Connector, 10 pin	17734-0098
P10	Connector, 2 pin-lock	17794-0012
P15,17,26	Connector, 3 pin-lock	17794-0020
P18	Connector, 7 pin-lock	17794-0061
P20	Connector, 12 pin-lock	17794-0111
R10, 11, 148-155	2.2K ±5% ¼W CC	14477-0815
R16	51K ±5% ¼W CC	14477-1144
R17, 21	10K ±5% ¼W CC	14477-0971
R19, 125	470 ohm ±5% ¼W CC	14477-0658
R109, 117 123, 166	100 ohm ±5% ¼W CC	14477-0492
R110	47.5K ±1% 1/10W film	17873-2582
R111	23.7K ±1% 1/8W film	15677-4218
R118	300K ±5% ¼W CC	14477-1326
R119	16M ±5% ¼W CC	14477-1748
R120	22K ±5% ¼W CC	14477-1052
R121	102K ±1% 1/8W film	15677-4820
R124, 165 170, 172	301K ±1% 1/10W film	17873-3358
R126, 156	1K ±5% ¼W CC	14477-0732
R130	11.5K ±1% 1/8W film	15677-3913
R132	12.1K ±1% 1/10W film	17873-2012
R163, 164	2.0K ±1% 1/8W film	15677-3186
R167	150K ±1% 1/8W film	15677-4986
RN1	Resitor network	17852-0045
RN2	Resistor network	23256-0011
RN3	Resistor network	23256-0037
RN4	Resistor network	23256-0029
S1	Switch, 8 position	14329-0088
S6, 7	Switch, 2 position	14329-1029
U1	9995	15657-0277
U2	27256	24192-0016

PARTS LIST
A-1 MAIN CARD WT/PN 24463-0018

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
U4	5564	15657-0293	U30, 31	74LS393	14315-0381
U5	16L8	24465-0016	U32	74HC32	18080-0138
U6	74LS266	14315-0811	U34	DS1216C (clock ciruitry)	22397-0021
U8	TMS9901	15657-0178	U35	74LS259	14315-0837
U10	74LS138	14315-0589	U36, 37	X2444/10p-45	15657-0400
U11	74LS251	14315-0829	VR5, 6	1N751A	15669-0034
U12	74LS373	14315-1108	XU1, 8	Socket 40 pin	14361-0087
U15	74HC132	18080-0252	XU2, 3, 4	Socket 28 pin	14361-0079
U16	7805	15658-0011	XU5, 12	Socket 20 pin	14361-0137
U20	OP-14EP	14323-0506	XU10, 11	Socket 16 pin	14361-0038
U21	ICL7652CPD	14323-0464	14, 25,		
U22	DG200	14323-0241	27, 35		
U23	LM308	14323-0266	XU6, 15,	Socket 14 pin	14361-0020
U24	LM311N	14323-0258	17, 21, 22,		
U25, 27	74LS112A	14315-1082	26, 28-32		
U26	74LS00	14315-0423	XU20, 23,	Socket 8 pin	14361-0012
U28	74LS197	14315-0621	24, 36, 37		
U29	74LS11	14315-0498	Y1	Crystal, 9.8304 MHZ	16125-0089



HARDWARE MODIFICATIONS FOR SPECIFIC OPTIONS

1. RFI SHIELD OPTION-WT P/N 24463-0026 when installed the Analog-to-Digital Circuitry is separated from the rest of the card, filtered, and enclosed in an RFI-shielded box.

2. TIME AND DATE CIRCUITRY-WT P/N 22397-0021 (U34) plug-in module is installed in XU4 socket and mount the RAM circuit (U4) on top of U34, then relocate the jumper on P26 so that it is connecting P26-1 to P26-2.

3. VOLTAGE SUPPRESSION OPTION-WT P/N 22585-0015(VR1-VR4).Solder these components into their appropriate locations.

THE A-1 MICROPROCESSOR/A-to-D PC CARD
WT P/N 24077-0016

A-1.1 CIRCUIT DESCRIPTION

The A-1 PC Board contains the Microprocessor System, the Analog-To-Digital Weight Conversion Circuitry, and the circuitry which carries power supply voltages and signals to and from the various PC cards. At times, it is also fitted with an optional clock circuit in XU3 or a radio frequency interference (RFI) shielding kit.

A-1.2 THE MICROPROCESSOR SYSTEM

The Microprocessor System consists of a Texas Instruments TMS 9995 microprocessor IC (U1), read only memory or ROM (U2), random access memory or RAM (U5), a TMS 9901 programmable systems interface (U8), two nonvolatile static random access memory devices EEPROM (U36 and U37) and various circuit selector IC's.

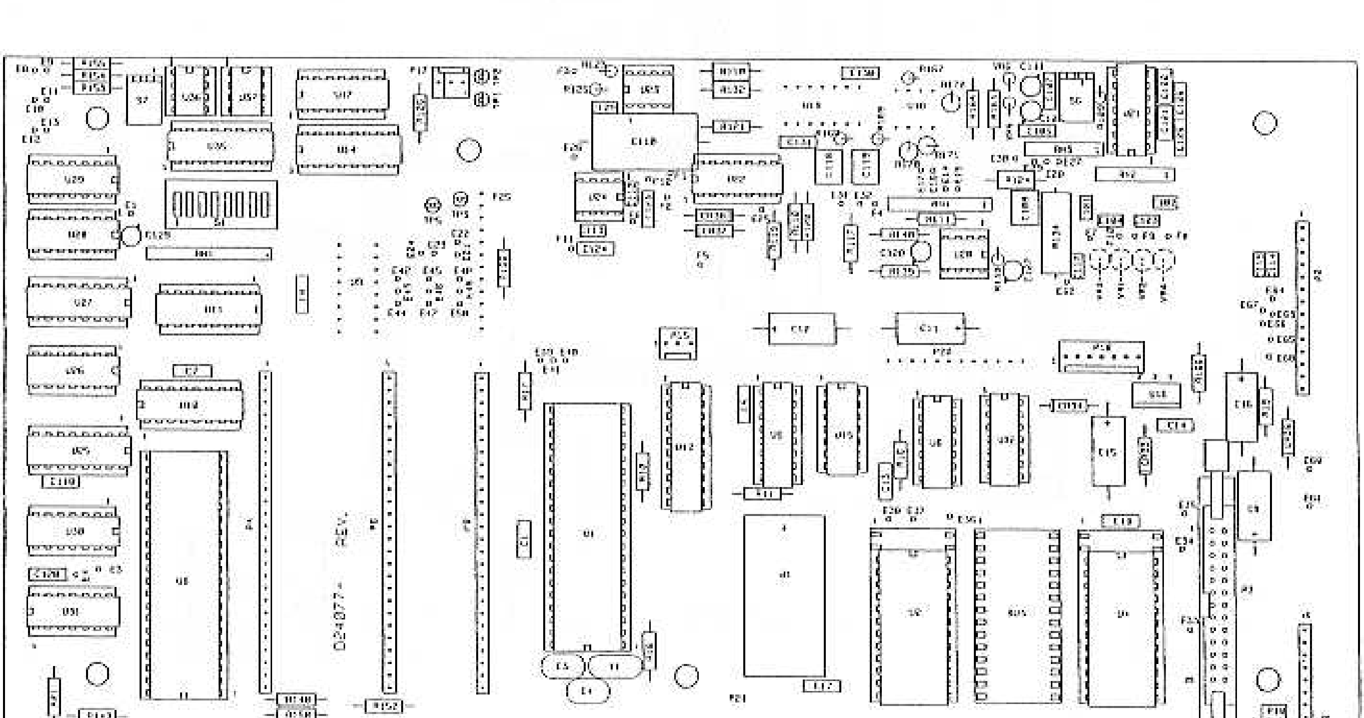
A 2.45 MHz internal clock is contained in the 9995 IC and is controlled by an external crystal (Y1). Output (CLKOUT) from this clock provides the timing reference for the programmable systems interface (U8) and the asynchronous communications controller (A-5 PC Card, U1).

The microprocessor uses the address bus lines A0 through A15 to address each particular memory data location when the memory enable line (MEMEN) is active (low) and the I/O's when the MEMEN line is inactive (high).

Data is transferred between the microprocessor and memories via lines D0 through D7 of the data bus. If the data bus in line (DBIN) is active (low), the microprocessor will read data from memory. If the write enable line (WE) is active (low), the microprocessor can write data into the RAM. A 3 to 8 line decoder (U5) is used to enable either the RAM or the appropriate Data Select Circuit.

The microprocessor transfers data serially to and from a particular I/O via a CRU (communications register unit). The 9995 receives incoming data one bit at a time from the CRUIN line and sends out one bit of data at a time over the CRUOUT line (also used as a memory address line) while the CRUCLK (CRU CLOCK) enables data on the CRUOUT line to be written into the I/O.

To initiate serial data transmissions and to transfer weight count totals from the Analog-to-Digital Circuitry's

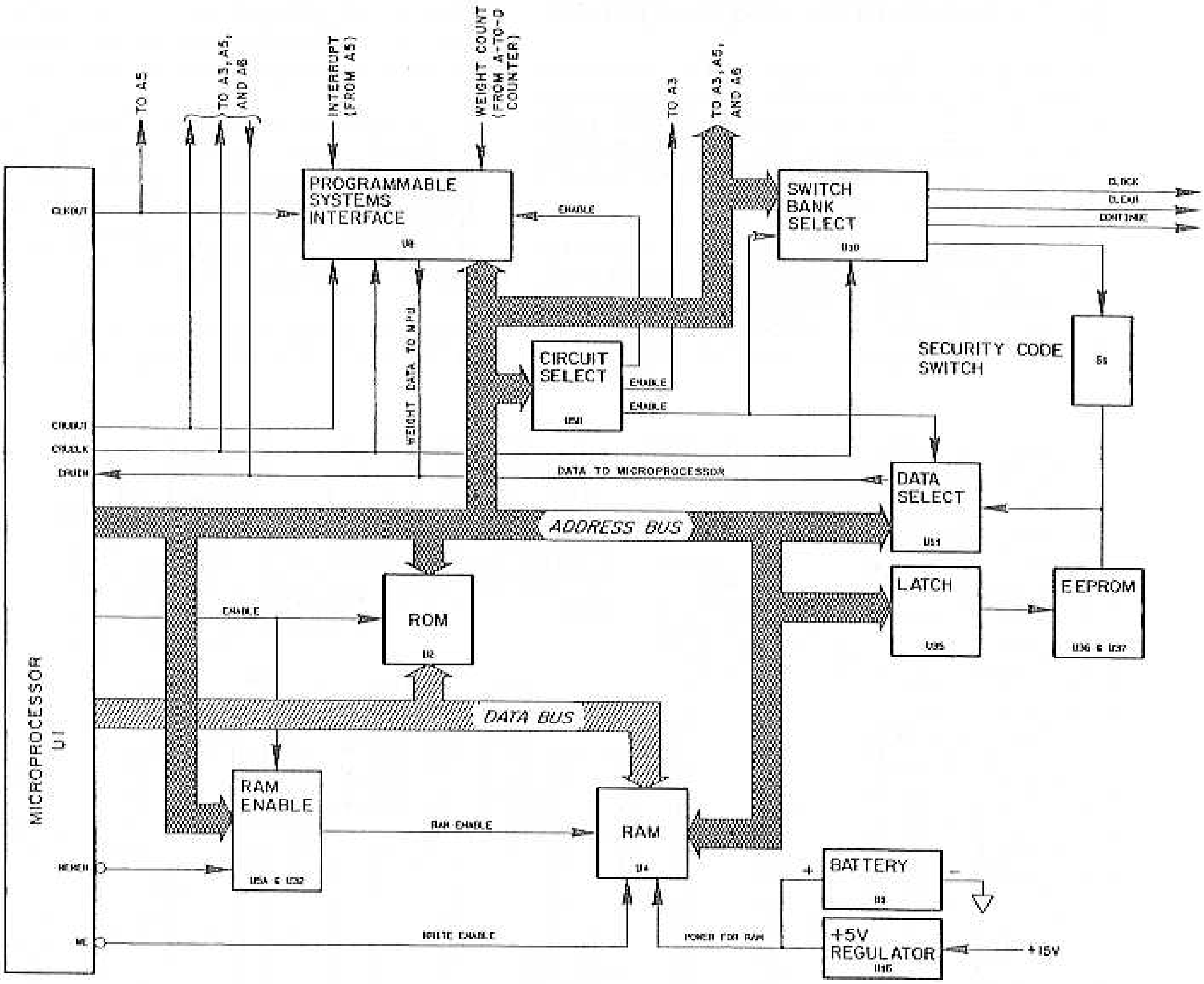


A-1 MICROPROCESSOR / A-to-D COMPONENT LAYOUT counters, interrupts shift the microprocessor from the routine currently being executed to a special routine required by an asynchronous external request and shift the microprocessor back to the original routine when the interrupt signal is removed.

A TMS 9901 programmable systems interface IC (U8) is used to transfer raw weight count data and interrupt signals to the microprocessor.

Two EEPROM devices U36 and U37 are utilized to store the configuration programming selections. They will continue to hold data even if there is a power disruption. Data transmitted on the address lines to U36 and U37 is latched by U35. Data from U36 and U37 is communicated out through U11 back to the microprocessor on the CRUIN line. *Replacement of either U36 or U37 will cause the configuration programming to default to preset factory parameters.*

3-to-8 line decoders decode address codes and enable appropriate circuitry. For example, U5 enables the programmable systems interface (U8), A-3 Display/Keypad Circuitry, or U10. U10, when enabled, provides an analog "CLOCK, CLEAR, CONTINUE" signal or selects the security code switch S1. U11, when addressed and enabled, sends programming data to the microprocessor on the CRUIN line.



BLOCK DIAGRAM

A-1.3 THE ANALOG-TO-DIGITAL CIRCUITRY

The Analog-to-Digital Conversion Circuitry consists of weight Voltage amplifiers (U20B and U21), a reference voltage amplifier (U20A), Switching Circuitry (U22), a dual slope ratiometric integrator (U23), a comparator (U24), a clock (contained in U1, the 9995 microprocessor IC), a clock pulse divider (U28), counters (U30 and U31), and Analog-to-Digital Control Logic Circuitry (U25, U26, U27, and U29).

Input voltage enters the Analog-to-Digital Circuitry when an excitation voltage is sent to the weight transducer from the A-2 Power Supply PC Card and the weight transducer provides the Analog-to-Digital Circuitry with two voltage inputs: a raw weight voltage and a reference voltage.

Once in the Analog-to-Digital Circuitry, the weight voltage is sent through dead load-compensating resistors and a potentiometer to an amplifier (U21) and the reference voltage is sent through an amplifier (U20A).

In addition, the amplified weight voltage is applied to an analog filter (U20B) through a switch selectable sensitivity resistor that has been set to match the sensitivity of the amplifier to that of the weight transducer. Adjustments are also included in the filter for calibrating the span of the weight indicator.

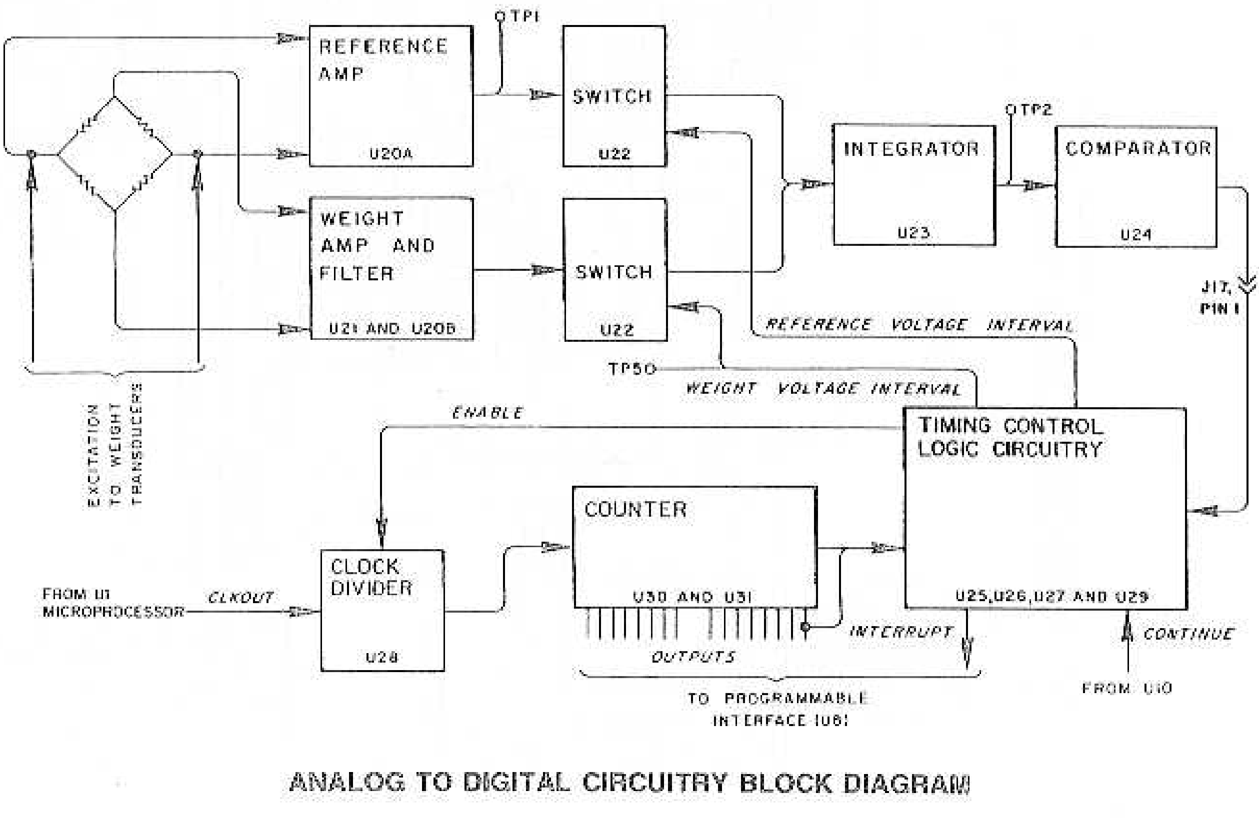
When the proper number of clock pulses have flowed through the counters, the Timing Control Logic Circuitry will start the Analog-to-Digital Cycle by allowing the amplified weight voltage to be sent to the integrator (U24). During this period of time, known as the **Weight Voltage Interval,** the integrator's output will be a sloping negative voltage, or ramp, whose angle is directly proportional to the weight voltage, but of the opposite polarity. (In other words, a positive weight voltage will cause the integrator to issue negative output.)

After 245,760 clock pulses have flowed through the counters, the Timing Control Logic Circuitry will direct U22 to apply the reference voltage to the integrator. During this period of time, known as the **Reference Voltage Interval,** the constant voltage supplied will allow the integrator's output to Interval ramp back up towards zero.

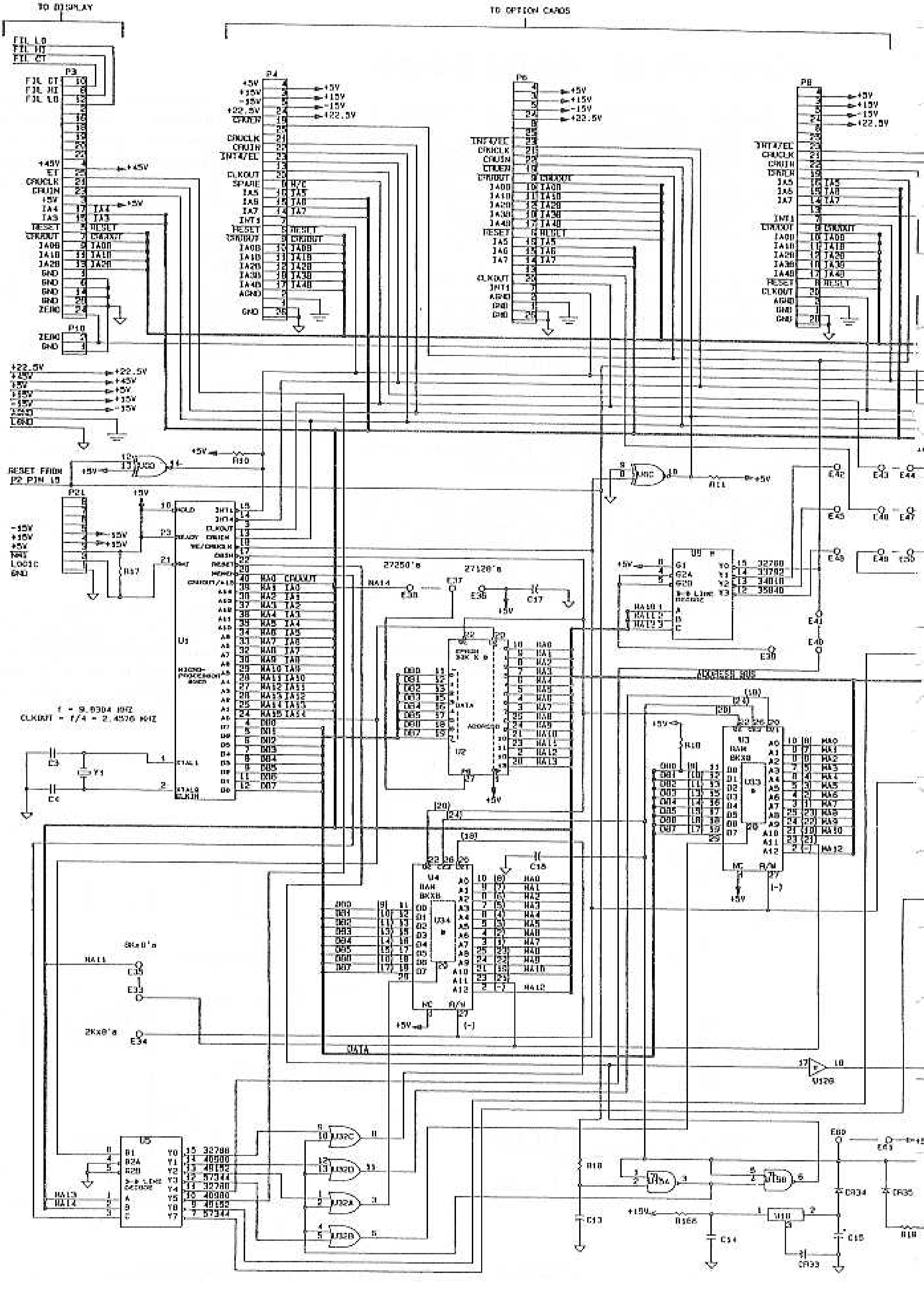
When the integrator's output reaches zero, an interrupt signal is sent to the microprocessor and the number of clock pulses that it took for the integrator's output to ramp back to zero is recorded. This total will then be used by the microprocessor to calculate the amount of weight on the scale.

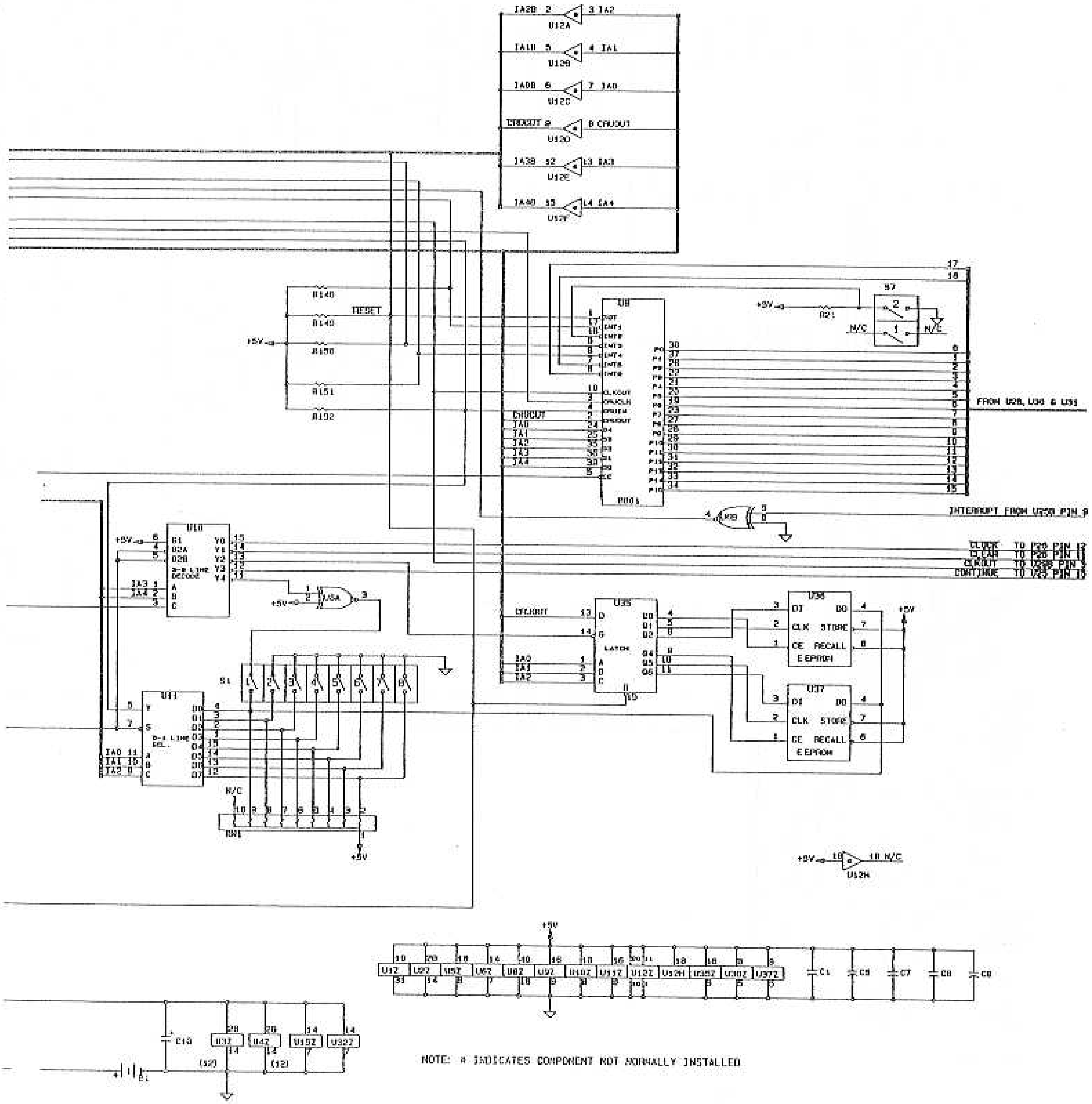
After the microprocessor has recorded the counter total, it issues a continue signal that allows the counters to finish their counting cycle.

When 262,144 clock pulses have passed from the time that the reference voltage was first applied to the integrator, the Timing Control Logic Circuitry will cause the weight voltage to again be sent to the integrator and the Analog-to- Digital Cycle will begin again as the counters are reset and start counting from zero again.



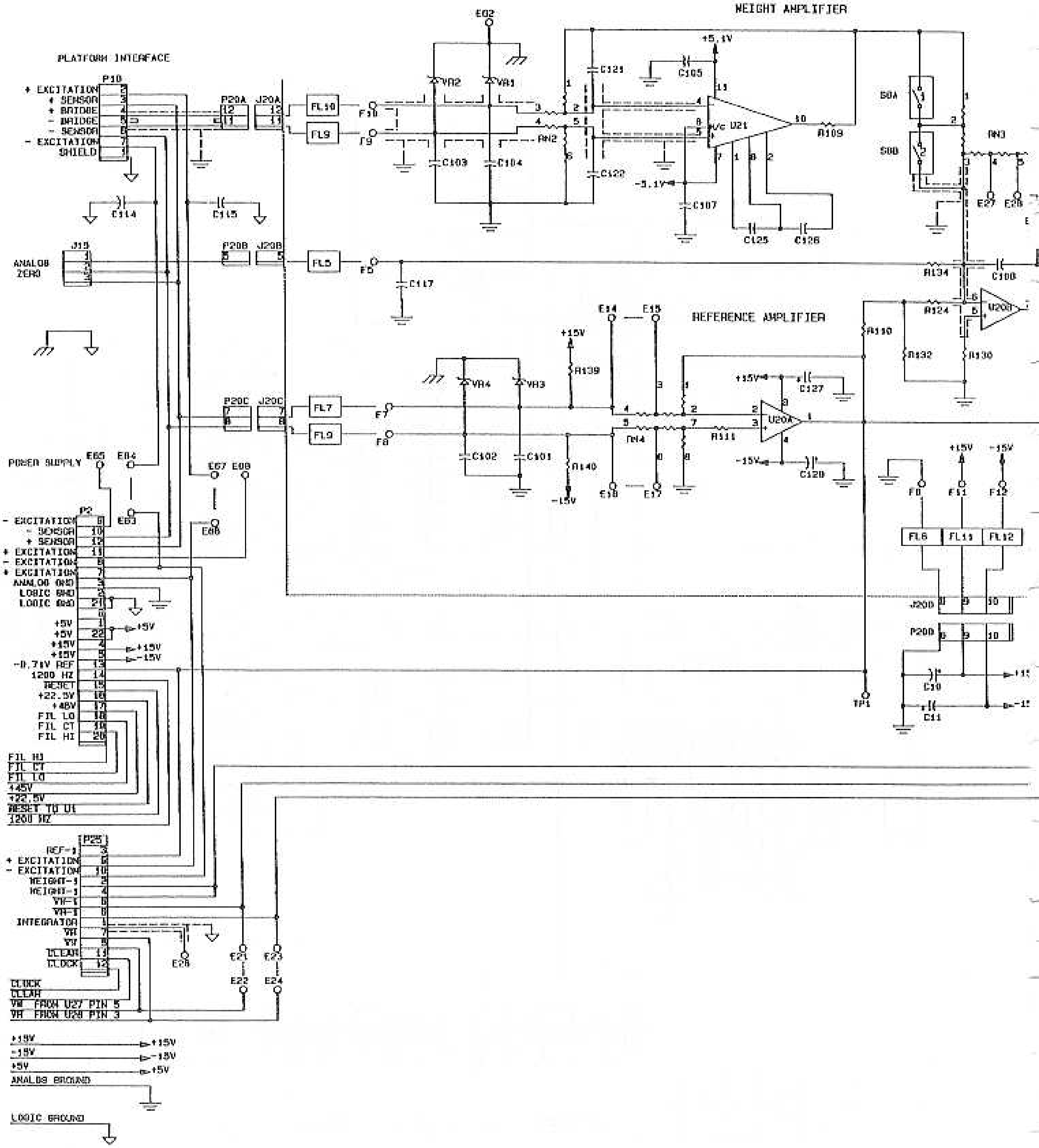
ANALOG TO DIGITAL CIRCUITRY BLOCK DIAGRAM

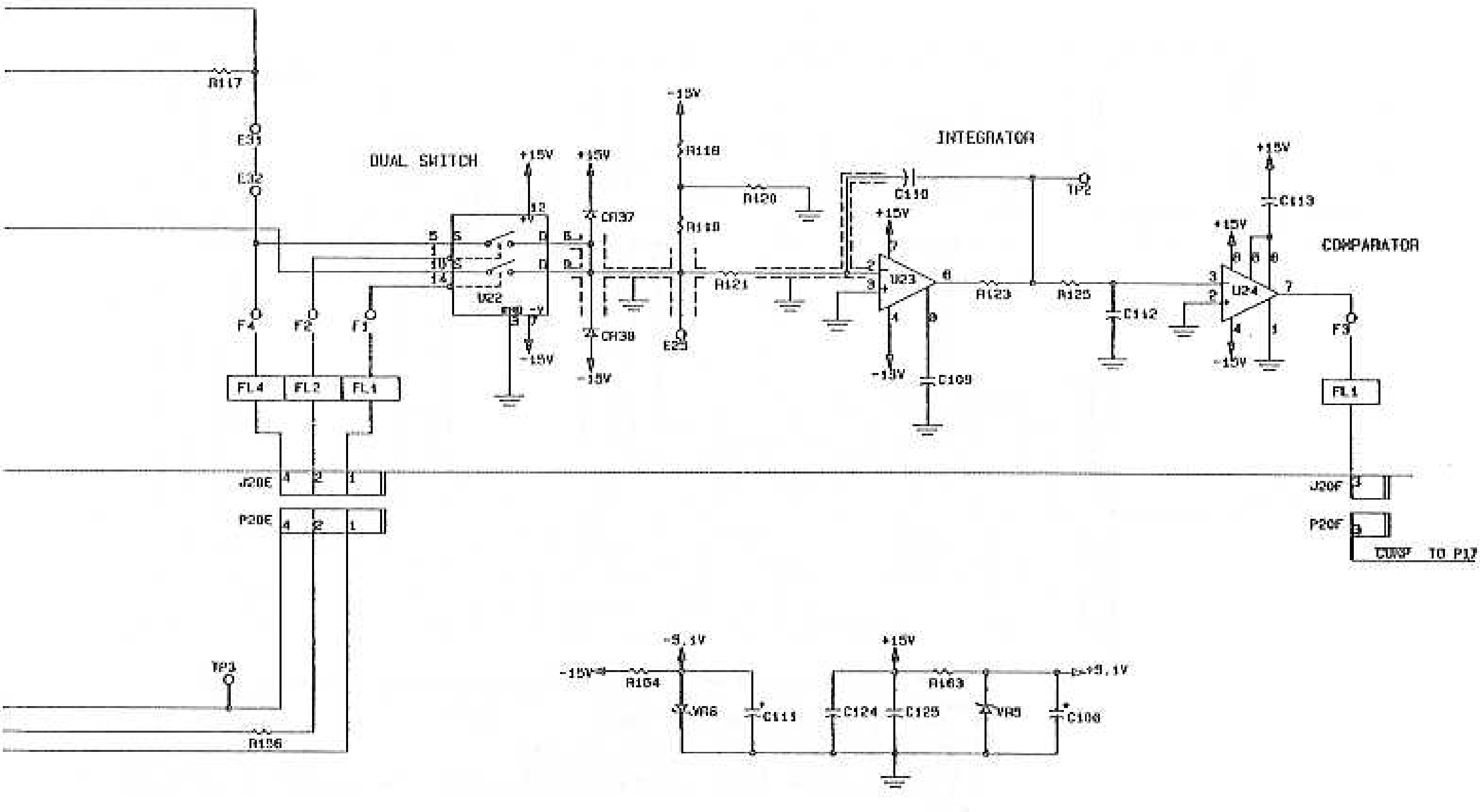




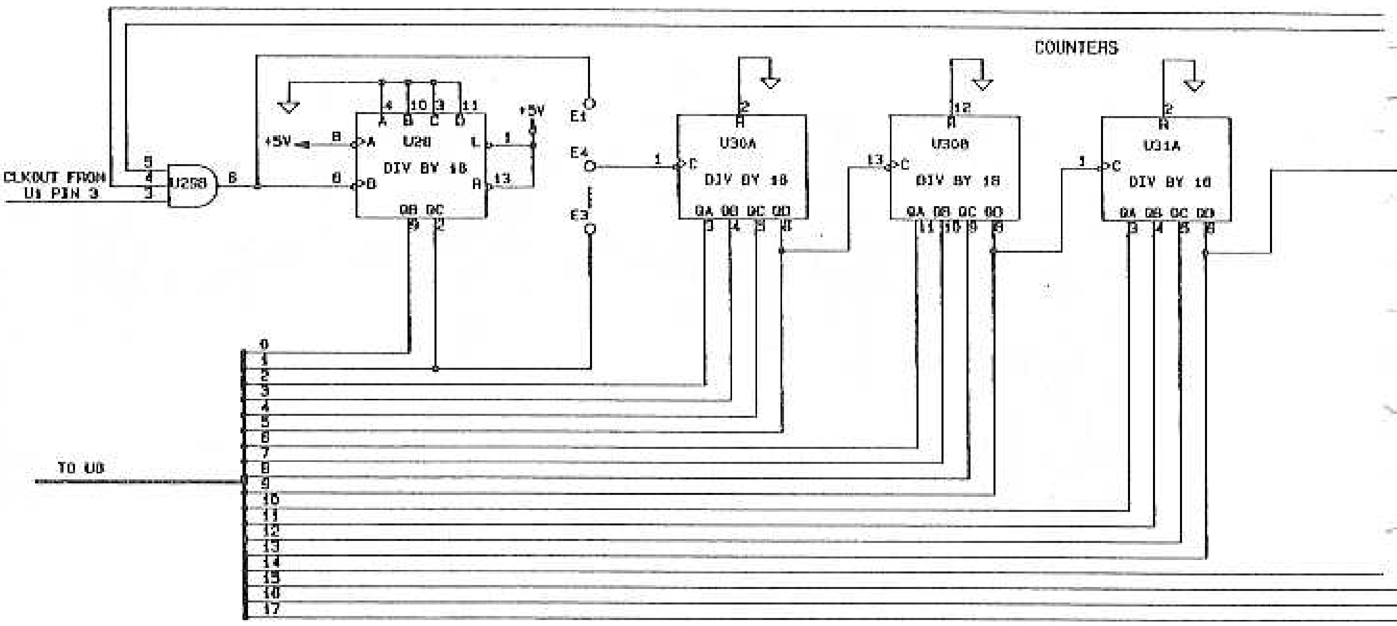
NOTE: # INDICATES COMPONENT NOT NORMALLY INSTALLED

MICROPROCESSOR SECTION SCHEMATIC


WEIGHT AMPLIFIER
PLATFORM INTERFACE
REFERENCE AMPLIFIER
POWER SUPPLY
+ EXCITATION
+ SENSOR
+ BRIDGE
- BRIDGE
- SENSOR
- EXCITATION
SHIELD
ANALOG ZERO
ANALOG GND
LOGIC GND
-0.71V REF
1200 HZ
RESET
+22.5V
+48V
FIL LO
FIL CT
FIL HI
RESET TO U1
REF-1
WEIGHT-1
INTEGRATOR
CLEAR
CLOCK
VM FROM U27 PIN 5
VR FROM U28 PIN 3
ANALOG GROUND
LOGIC GROUND



ANALOG TO DIGITAL SCHEMATIC

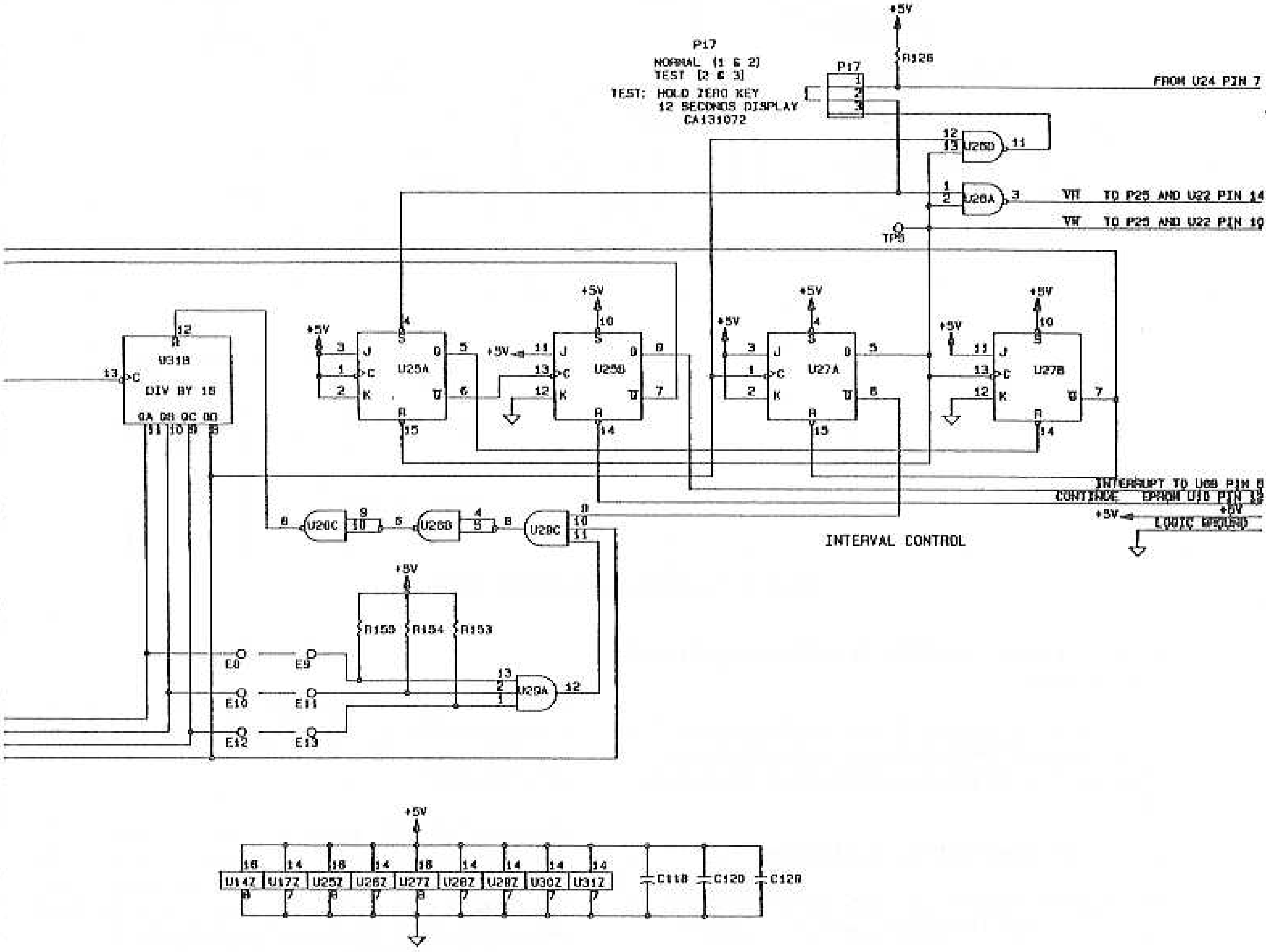


JUMPER POSITIONS FOR DIFFERENT CONVERSION RATES AND POWER LINE REJECTION FREQUENCIES

CONVERSION RATE	POWER LINE REJECTION	DIVIDER	JUMPER	JUMPER	C	RESOLUTION
21.43Hz	50Hz	1	E1-4	E12-13	.10uf	50,000
23.08Hz	60Hz	1	E1-4	E10-11	.10uf	50,000
4.84Hz	50/60Hz	4	E3-4	E10-11 , E12-13 , E8-9	1.0uf	200,000

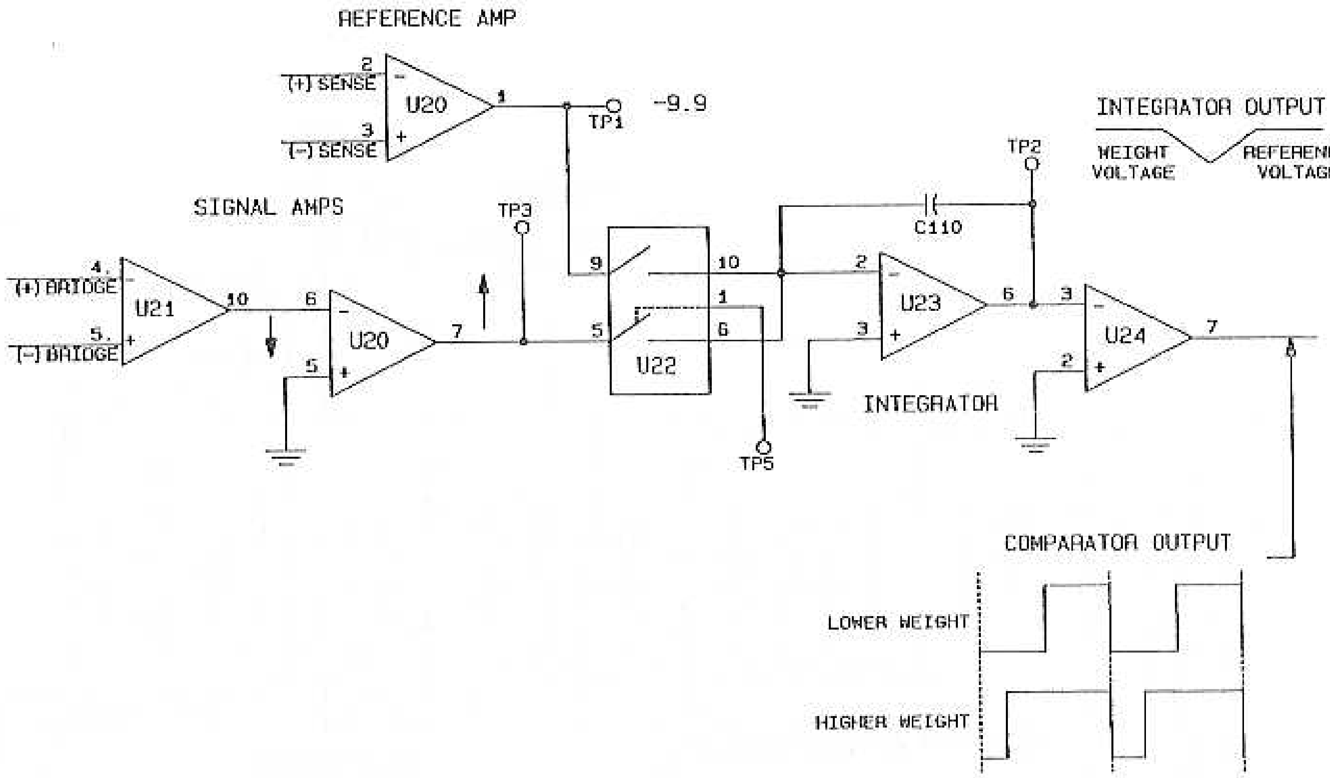
NOTES:

1. E21 TO E22 AND E23 TO E24 ARE CUT FOR 3 SCALE USE. E25 TO E26 IS JUMPERED.
2. CUT FOIL FROM E37 TO E38 AND JUMPER E36 TO E37 TO FUNCTION WITH 27128 EPROMS.
3. CUT FOIL E33 TO E35 AND JUMPER E33 TO E34 TO USE WITH 2Kx8 RAMS INSTEAD OF 8KX8 RAMS.
4. TO USE WITH OPTION CARDS WITH MORE THAN 32 BITS OF I/O, INSTALL U9, CUT FOIL FROM E40 TO E41, JUMPER E39 TO E40 AND JUMPER E42 TO E43, E45 TO E46, OR E48 TO E49 DEPENDING ON WHICH SLOT IS USED TO INSTALL THE OPTION CARD.
5. STANDARD CONVERSION RATE IS 4.84Hz.
6. JUMPER E80 TO E81 IF PARTS FOR BATTERY BACKUP ARE DELETED, i.e., C14, C15, C16, U18, R19, CR33, CR34, CR35 AND B1.
7. REMOVE PIN 8 OF CONNECTOR J2.
8. REMOVE PIN 25 OF P4, P6 AND P8.



COUNTERS AND CONTROL LOGIC SCHEMATIC

A-1.4 A CLOSER LOOK AT THE A-TO-D CYCLE'S TIMING AND FREQUENCY



WI-120 ANALOG TO DIGITAL DIAGRAM

A-1.4A An Overview of the A-to-D Timing Control Logic Circuitry

The Timing Control Logic Circuitry consists of a clock, a switching gate (U29B), a clock pulse divider (U28), counters (U30 and U31), and the Interval Control Circuitry (U25 and U27).

A-1.4B Structure of the A-to-D Cycle

The Analog-to-Digital Cycle can be divided into two portions: the weight portion and the reference portion.

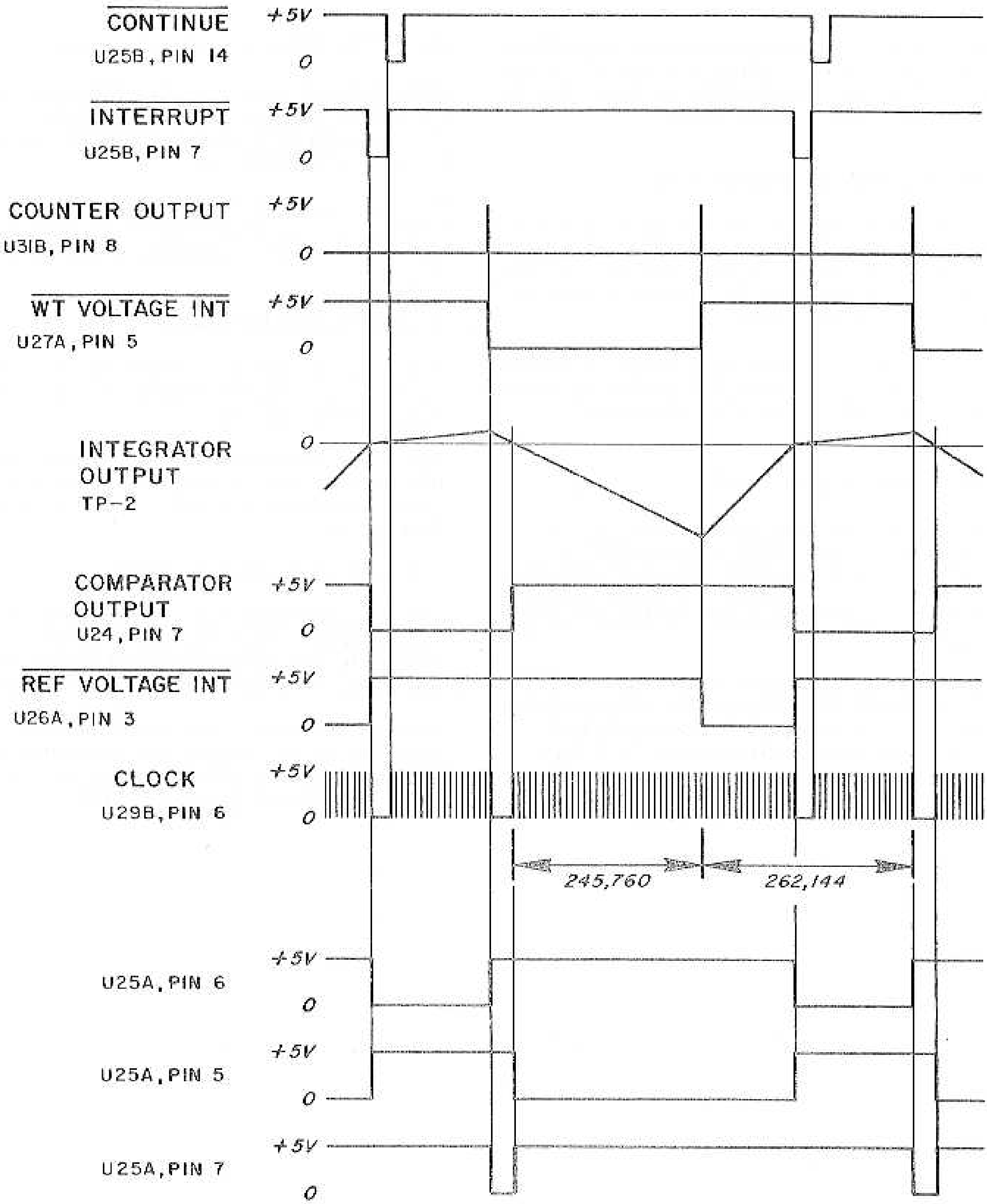
The weight portion of the Analog-to-Digital Cycle can further be divided into two smaller segments. During the first segment, The **Weight Interval Delay,** clock pulses are temporarily stopped from flowing through the counters as a weight voltage is applied to the integrator. This keeps the counters set at zero until output from the integrator reaches zero. As output from the integrator falls below zero, the second segment of the Weight Portion of the A-to-D Cycle, The **Weight Interval**, begins. In this segment, clock pulses are again allowed to flow through the counters as weight voltage is applied to the integrator for one complete counting cycle (245,760 counts).

When the counter total reaches 245,760, the counter overflows and starts counting from zero again. As this occurs, the second half of the Analog-to-Digital Cycle, the reference portion, begins.

The second half of the Analog-to-Digital Cycle can be divided into three segments. During the first, known as **The Reference Voltage Segment**, a negative reference voltage is fed into the integrator. The second, **The 9995 Read Delay**, begins when the output from the integrator crosses zero and the Timing Control Logic Circuitry temporarily stops clock pulses so that the microprocessor has time to read the total on the counters. The third segment, **The Counter Cycle Completion Segment**, gives the counters a chance to count up to 262,144 so that they can be reset and start counting from zero for the next Analog-to-Digital Cycle.

A-1.4C The Counting Cycle Completion Segment

When the microprocessor has read and stored a counter total, it issues a continue signal that resets U25B, pin 14.



NOTE: SOME PULSE WIDTHS HAVE BEEN EXAGGERATED TO SHOW TIMING RELATIONSHIPS.

U25B, pin 7, in turn, causes the switching gate (U29B) to allow clock pulses to flow through the clock pulse divider (U28, pin 6) to the counters (U30 and U31) so that the counter can finish its counting cycle.

A-1.4D The Weight Interval Delay

When the counter total reaches 262,144, the counters are reset. Output from U31, pin 8 causes pin 7 of U27B to go low and U27B, in turn, causes the switching gate (U26B, pin 6) to stop the flow of clock pulses through pin 6 of U29B, U28, and the counters.

When the clock pulses are stopped, a weight voltage is applied to the integrator causing its output to ramp down in proportion to the strength of the weight voltage.

A-1.4E The Weight Interval

When output from the integrator (TP2) reaches zero, output from the comparator (U24, pin 7) goes high (+5 v). Pin 6 of U25A resets U25B. Pin 5 of U25A resets U27B and pin 7 of U25B, in turn, causes pin 6 of U26B to again allow clock pulses to flow through pin 6 of U29B, U28, and the counters.

The weight interval ends when the counter total again reaches 245,760 and the counter supplies an output on U31, pin 8. As this occurs, U27A, pin 5 goes high (+5 V) and causes a negative reference voltage to be applied to the integrator.

A-1.4F The Reference Voltage Segment

As the clock continues, the counters (U30 and U31) begins counting from zero again. U26A, pin 3 goes high (+5 v). The negative reference voltage causes output from the integrator to ramp back to zero.

When output from the integrator reaches zero, the comparator output goes low and ends the reference voltage segment of the reference interval by causing pin 5 of U25A to go high.

A-1.4G The 9995 Read Delay

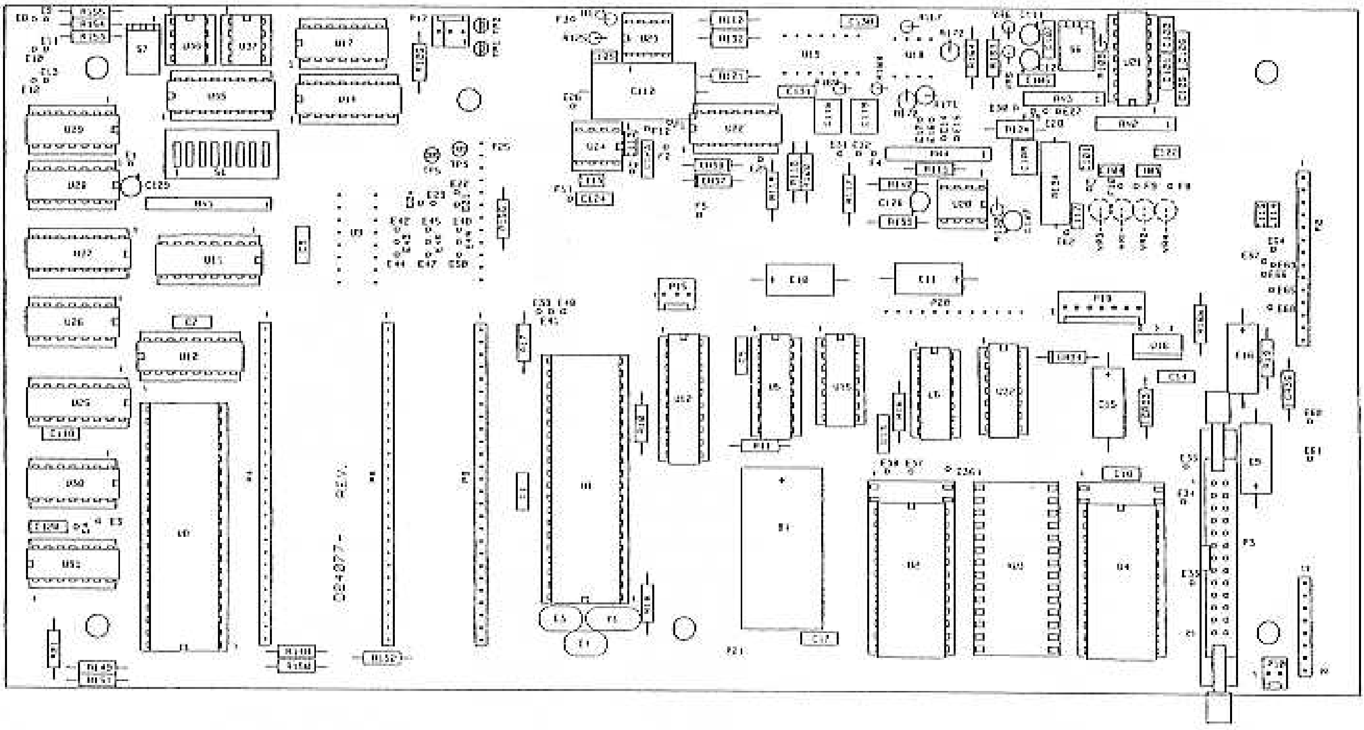
When U25A, pin 5 goes high, it causes U25B, pin 7 to issue an interrupt signal to the microprocessor and turn off the clock pulses at U29B, pin 6.

Upon receiving this interrupt signal, the microprocessor temporarily abandons its task, reads the counter total, stores it in memory, and sends a continue signal to the U25B, pin 14.

A-1.4H Starting a New A-to-D Cycle

This continue signal starts the new Analog-to-Digital Cycle by resetting U25B. U25B, pin 7, in turn, removes the interrupt from the microprocessor and causes U29B, pin 6 to again let clock pulses flow through U28 to the counter.

At this point, the microprocessor returns to the task it was performing when it received the interrupt signal and a new **Counting Cycle Completion Segment** begins as the counters are allowed to count to 262,144.



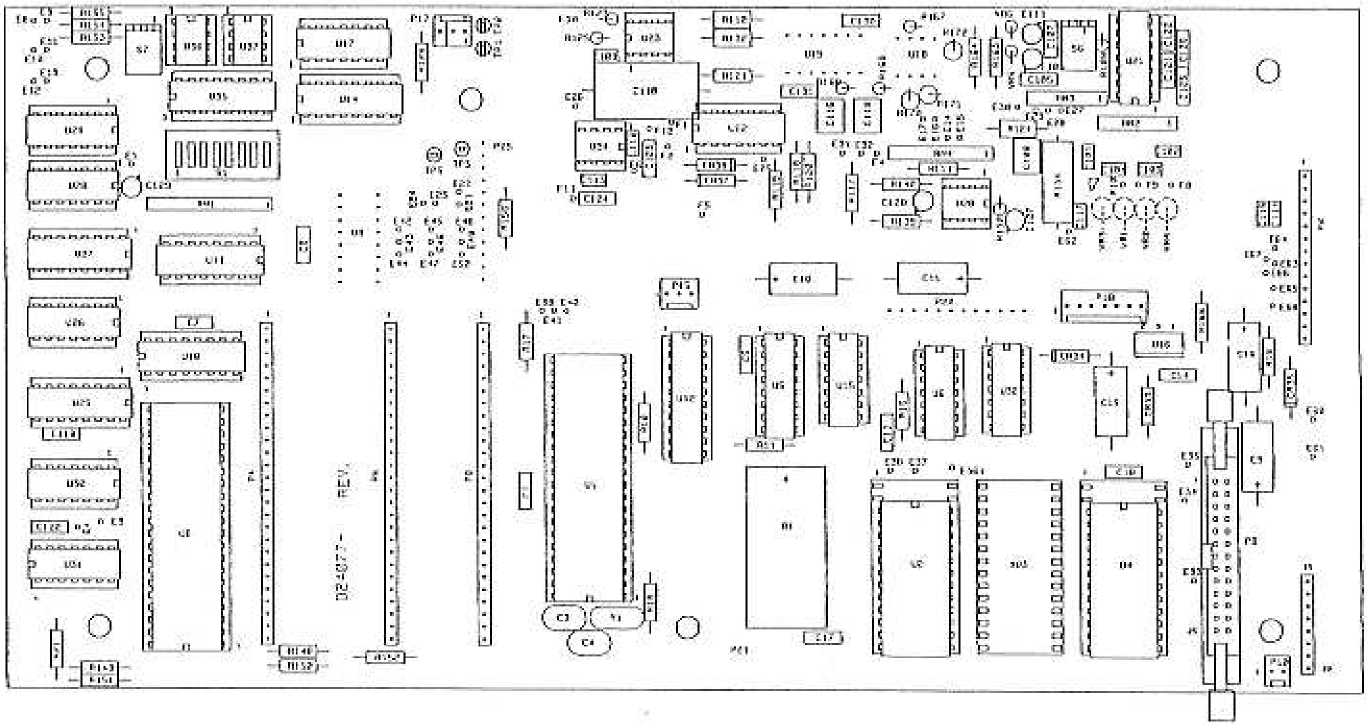
PARTS LIST
A-1 MAIN CARD WT/PN 24077-0016

SYMBOL	DESCRIPTION	W-T PART NUMBER
B1	Battery, Lithium 3V	17961-0019
C1, 5, 7, 8, 18, 105, 107, 118, 120, 123-126,	.1UF	15623-0120
C3, 4	12PF, 10V	15625-0078
C9, 15, 16	47UF, 10V	17660-0137
C10, 11	22UF, 25V	17762-0119
C13, 14	.22UF, 50V	15624-0046
C101-104, 112-115, 117	.01UF, 100V	15620-0123
C106, 111, 127, 128, 129	1.0UF, 50V	22327-2519
C108	1UF, 50V	23267-0158
C109	100PF, 200V	15619-0134
C110	1UF, 100V	18083-0226
C121, 122	.22UF, 50V	23267-0117
CR33-35, 37, 38	1N4148	15668-0035
FL1-12	EMI FILTER	17874-0015
J17	Two Circuit Shunt	17818-0295
J20	Connector, 12 Socket	23229-0122
	Requires 12 Pins	23229-5014
J3	Connector, 26 pin ribbon	17818-0295
P2	Connector, 8 pin	17734-0072
P3	Connector, 26 pin ribbon	17818-0295
P4,6,8	Connector, 16 pin	17734-0155
P4A,6A,8A	Connector, 10 pin	17734-0098
P10	Connector, 2 pin-lock	17794-0012

SYMBOL	DESCRIPTION	W-T PART NUMBER
P15,17	Connector, 3 pin-lock	17794-0020
P18	Connector, 7 pin-lock	17794-0061
P20	Connector, 12 pin-lock	17794-0111
R10, 11, 148-155	2.2K ±5% ¼W CC	14477-0815
R16	51K ±5% ¼W CC	14477-1144
R17, 18, 21	10K ±5% ¼W CC	14477-0971
R19, 125	470 ohm ±5% ¼W CC	14477-0658
R109, 117 123, 166	100 ohm ±5% ¼W CC	14477-0492
R110	47.5K ±1% 1/10W film	17873-2582
R111	23.7K ±1% 1/8W film	15677-3582
R116	300K ±5% ¼W CC	14477-1326
R119	16M ±5% ¼W CC	14477-1748
R120	22K ±5% ¼W CC	14477-1052
R121	102K ±1% 1/8W film	15677-4820
R124,	301K ±1% 1/10W film	17873-3358
R126, 156	1K ±5% ¼W CC	14477-0732
R130	11.5K ±1% 1/8W film	15677-3913
R132	12.1K ±1% 1/10W film	17873-2012
R139	105K ±1% 1/8W film	15677-4838
R140	45.3K ±1% 1/8W film	15677-4481
R163, 164	2.0K ±1% 1/8W film	15677-3186
R167	150K ±1% 1/8W film	15677-4986
RN1	Resitor network	17852-0045
RN2	Resistor network	23256-0011
RN3	Resistor network	23256-0037
RN4	Resistor network	23256-0029
S1	Switch, 8 position	14329-0088

PARTS LIST
A-1 MAIN CARD WT/PN 24077-0016

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
S6, 7	Switch, 2 position	14329-1029	U29	74LS11	14315-0498
U1	9995	15657-0277	U30, 31	74LS393	14315-0381
U2	27256	24192-0016	U32	74HC32	18080-0138
U4	5564	15657-0293	U33	DS1216 (clock ciruitry)	22397-0013
U5, 10	74LS138	14315-0589	U35	74LS259	14315-0837
U6	74LS266	14315-0811	U36, 37	X2444/10p-45	15657-0400
U8	TMS9901	15657-0178	VR5, 6	1N751A	15669-0034
U11	74LS251	14315-0829	XU1, 8	Socket 40 pin	14361-0087
U12	74LS373	14315-1108	XU2, 3, 4	Socket 28 pin	14361-0079
U15	74HC132	18080-0252	XU5, 10, 11, 14, 25, 27, 35	Socket 16 pin	14361-0038
U16	7805	15658-0011			
U20	OP-14EP	14323-0506			
U21	ICL7652CPD	14323-0464	XU6, 15, 17, 21, 22, 26, 28-32	Socket 14 pin	14361-0020
U22	DG200	14323-0241			
U23	LM308	14323-0266			
U24	LM311N	14323-0258	XU12	Socket 20 pin	14361-0137
U25, 27	74LS112A	14315-1082	XU20, 23, 24, 36, 37	Socket 8 pin	14361-0012
U26	74LS00	14315-0423			
U28	74LS197	14315-0621	Y1	Crystal, 9.8304 MHZ	16125-0089



HARDWARE MODIFICATIONS FOR SPECIFIC OPTIONS

1. RFI SHIELD OPTION-WT P/N 24077-0024 when installed the Analog-to-Digital Circuitry is separated from the rest of the card, filtered, and enclosed in an RFI-shielded box.

2. TIME AND DATE CIRCUITRY-WT P/N 22397-0013 (U33) plug-in module which is installed in XU3 socket.

3. DYNAMIC MONORAIL OR CONVEYOR SCALES require the software in U2 to be version V5.5 S8.0 or higher along with replacing C110 with a capacitor rating of .18uF. Foils need to be cut between E3 and E4, E8 and E9, E12 and E13. A jumper then needs to be installed between E1 and E4.

4. VOLTAGE SUPPRESSION OPTION-WT P/N 22585-0015(VR1-VR4).Solder these components into their appropriate locations.

A-2 POWER SUPPLY PC CARD
WT P/N 22921-0018

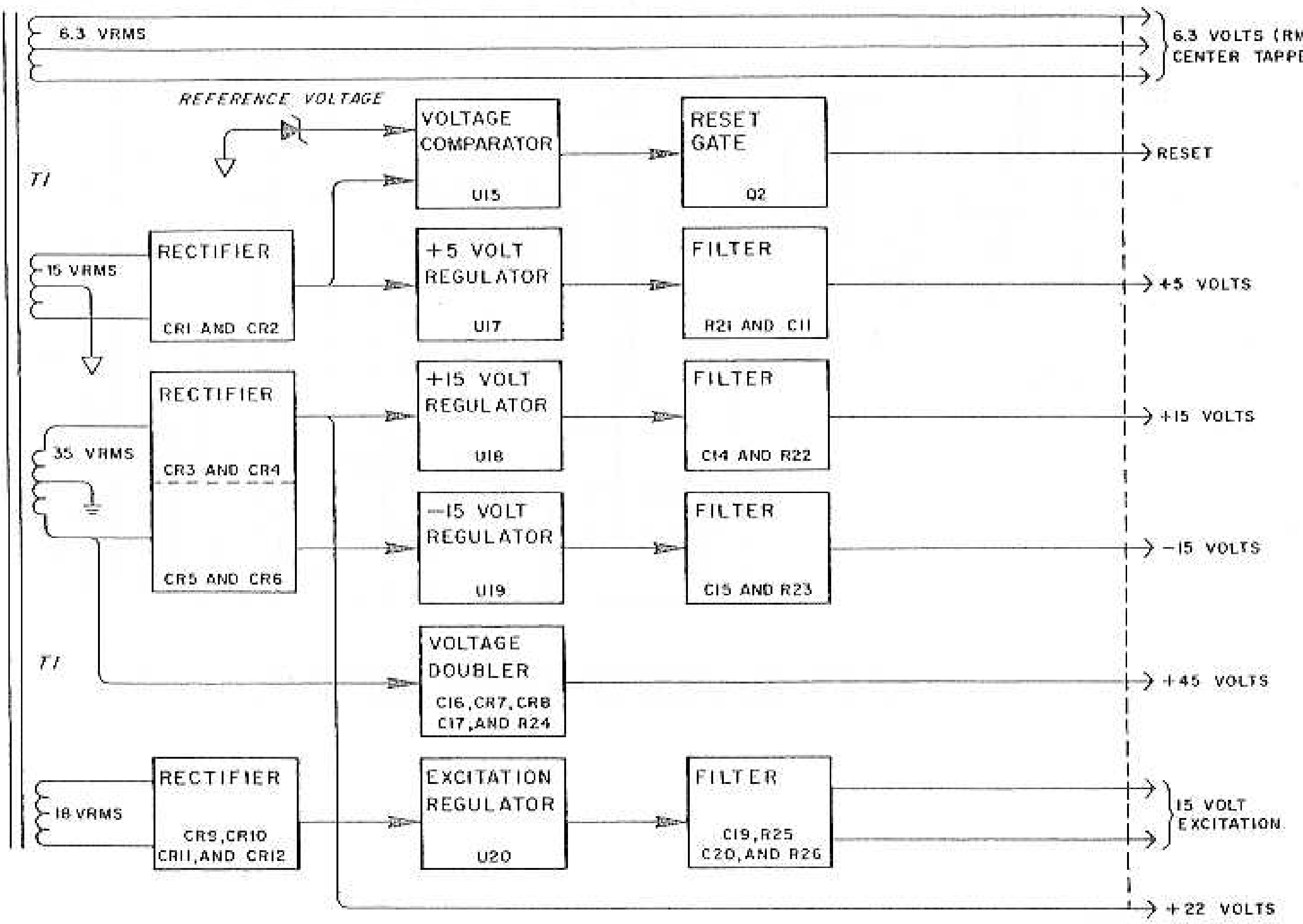
CIRCUIT DESCRIPTION

The A-2 Power Supply PC Card receives a.c. power from the four secondary windings of the chassis mounted transformer (T1).

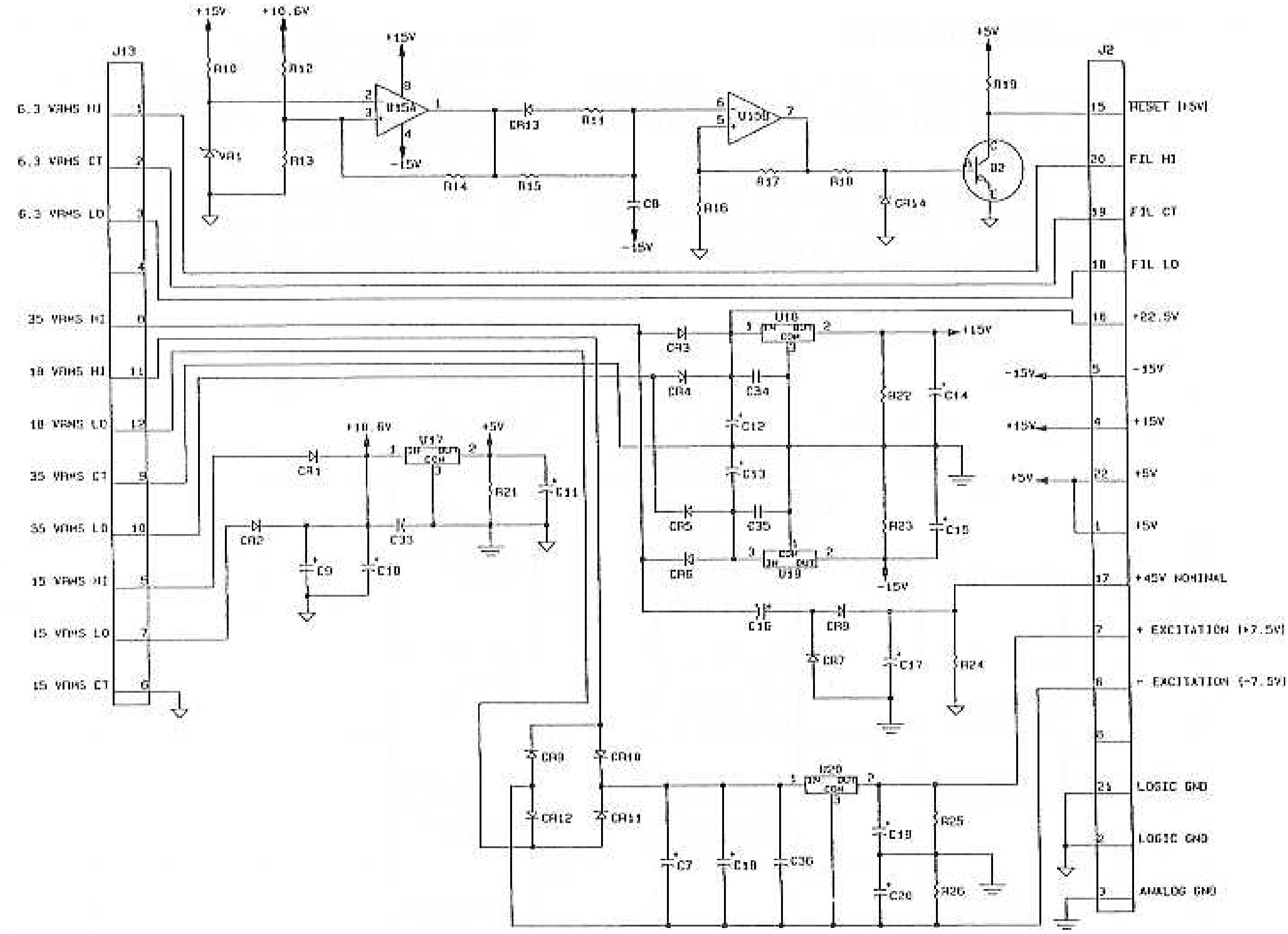
These windings provide the following amounts of power to the A-2 Card: 6.3 volt RMS center tapped, 15 volt RMS center tapped, 35 volt RMS center tapped, and 18 volt RMS.

The power supply, in turn, provides the following voltage outputs: 6.3 volts RMS center tapped, +5 volts regulated, +15 volts regulated, −15 volts regulated, +45 volts unregulated, +22.5 volts unregulated, and regulated 15 volts excitation voltage.

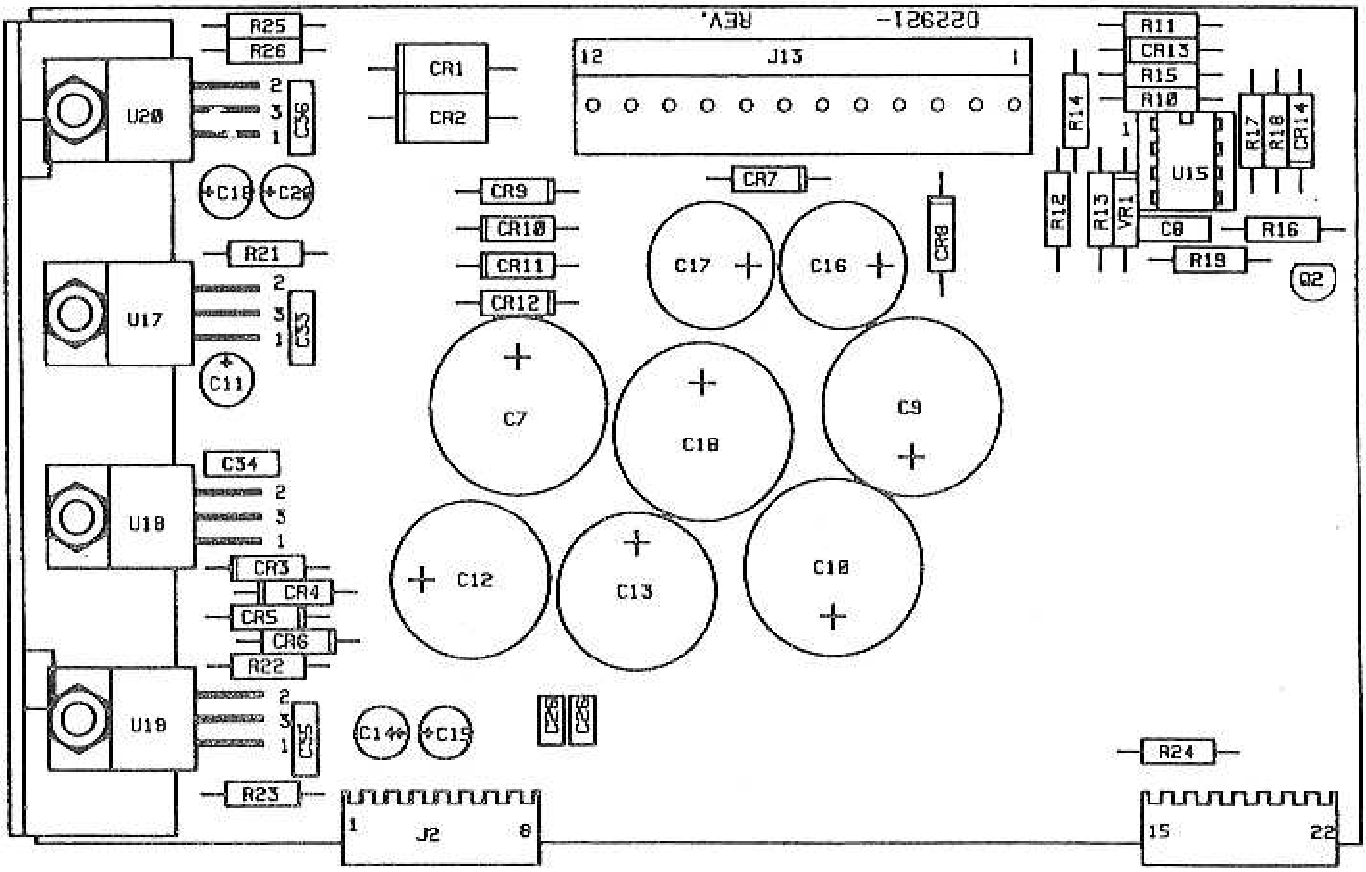
In addition, a reset pulse which clears the addressable latches on all of the system's PC cards is sent out each time power drops and is reapplied to the system.



A-2 BLOCK DIAGRAM



A-2 POWER SUPPLY PC CARD SCHEMATIC



COMPONENT LAYOUT AND PARTS LIST

SYMBOL	DESCRIPTION	W-T PART NUMBER
C7,18	2200UF, 35V ±20% Alum.	17995-0159
C8	0.1UF, 100 ±10% Cer.	15623-0120
C9,10	3300UF, 16V ±20% Alum.	17993-0169
C11	47UF, 10V ±20% Alum.	17992-0095
C12,13	1000UF, 35V ±20% Alum.	17995-0142
C14,15,19,20	22UF, 25V ±20% Alum.	17994-0077
C16,17	220UF, 63V ±20% Alum.	17997-0116
C33,34,35,36	0.22UF, 50V ±10% Cer.	15624-0046
CR1,2	1N4142	15668-0076
CR3-12	1N4004	15668-0043
CR13,14	1N4148	15668-0035
J2	2-8 pin connectors	17733-0073
J13	12 pin connector	14528-0194
Q2	2N3904	15665-0012
R10	510 OHM 5% 1/4W CC	14477-0666
R11,25,26	1K OHM 1% 1/8 W film	15673-2893

SYMBOL	DESCRIPTION	W-T PART NUMBER
R12	3.83K OHM 1% 1/8W film	15673-3453
R13	9.76K OHM 1% 1/8W film	15673-3842
R14	1M OHM 5% 1/4W CC	14477-1456
R15	2.2M OHM 5% 1/4W CC	14477-1532
R16,17,22,23	10K OHM 5% 1/4W CC	14477-0971
R18	47K OHM 5% 1/4W CC	14477-1136
R19	22K OHM 5% 1/4W CC	14477-1052
R21	4.7K OHM 5% 1/4W CC	14477-0896
R24	33K OHM 5% 1/4W CC	14477-1094
U15	1458	14323-0118
U17	7805	15658-0011
U18,20	7815	15658-0060
U19	7915	15658-0102
VR1	1N751A	15669-0034
XU15	8 pin socket	14361-0012
XU19,20	Insulator	17745-0053
	Polarizing key	17853-0044

THE A-2 DC POWER SUPPLY PC CARD

(WT P/N 21770-0012)

A-2.1 CIRCUIT DESCRIPTION

The A-2 DC Power Supply Card requires a positive d.c. input voltage between 12 and 48 volts and is compatible only with a d.c. indicator chassis.

Switching on the unit activates Q3 and enables the voltage regulatory circuitry and current limiter.

The voltage regulatory circuit is comprised of a voltage comparator (U3), U1, U2, and U13. The applied power is received by the transformer (T1), which is connected through Q1 and Q6 to the common side of the power supply.

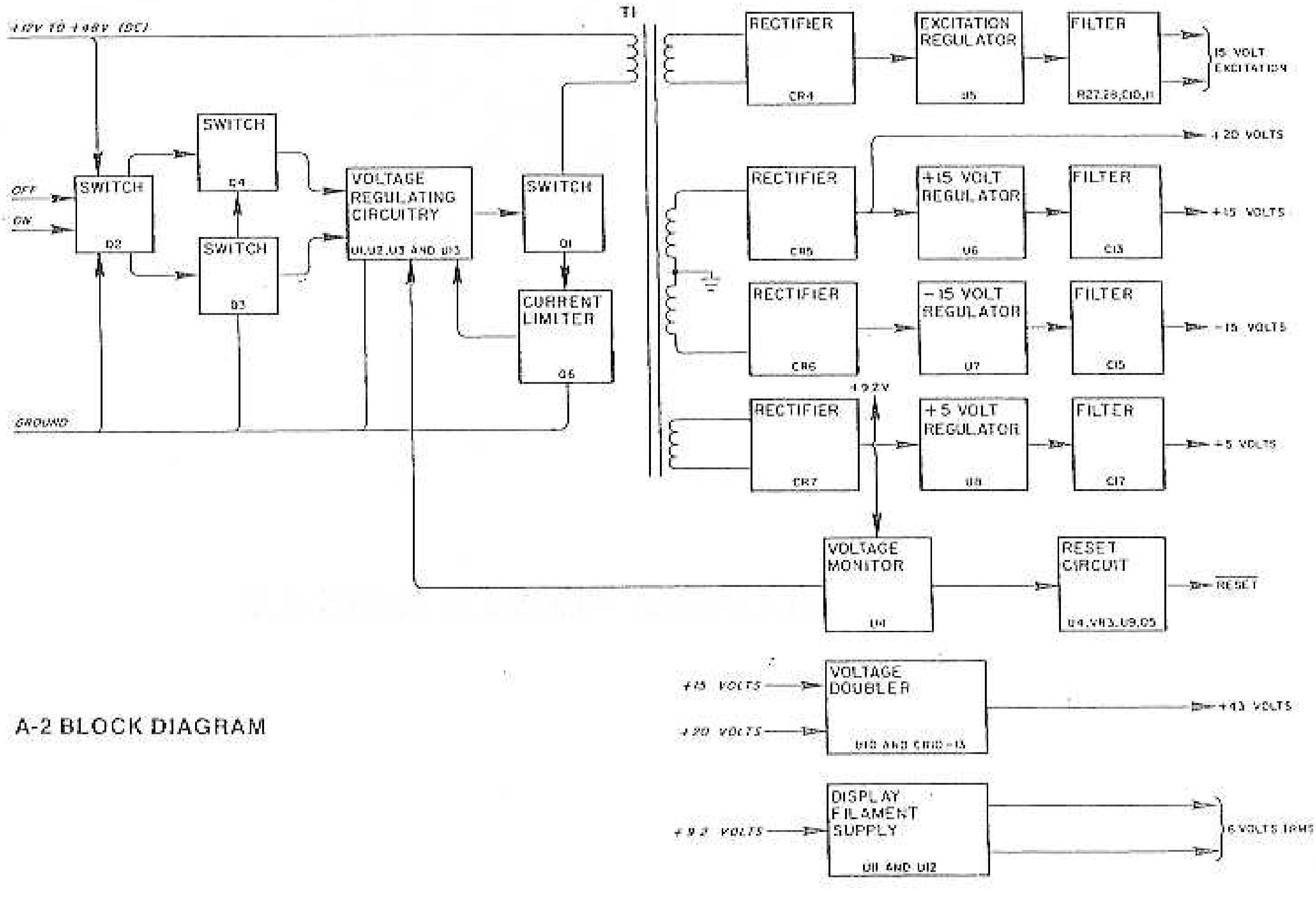
The current limiter (Q6) protects Q1 from excessive current draw by resetting U2 and discontinues the path of the applied power by turning off Q1's drive signal.

When input voltage is provided to the secondary windings of T1, it is monitored by U4 which keeps output voltages at the correct levels by alerting the regulatory circuitry.

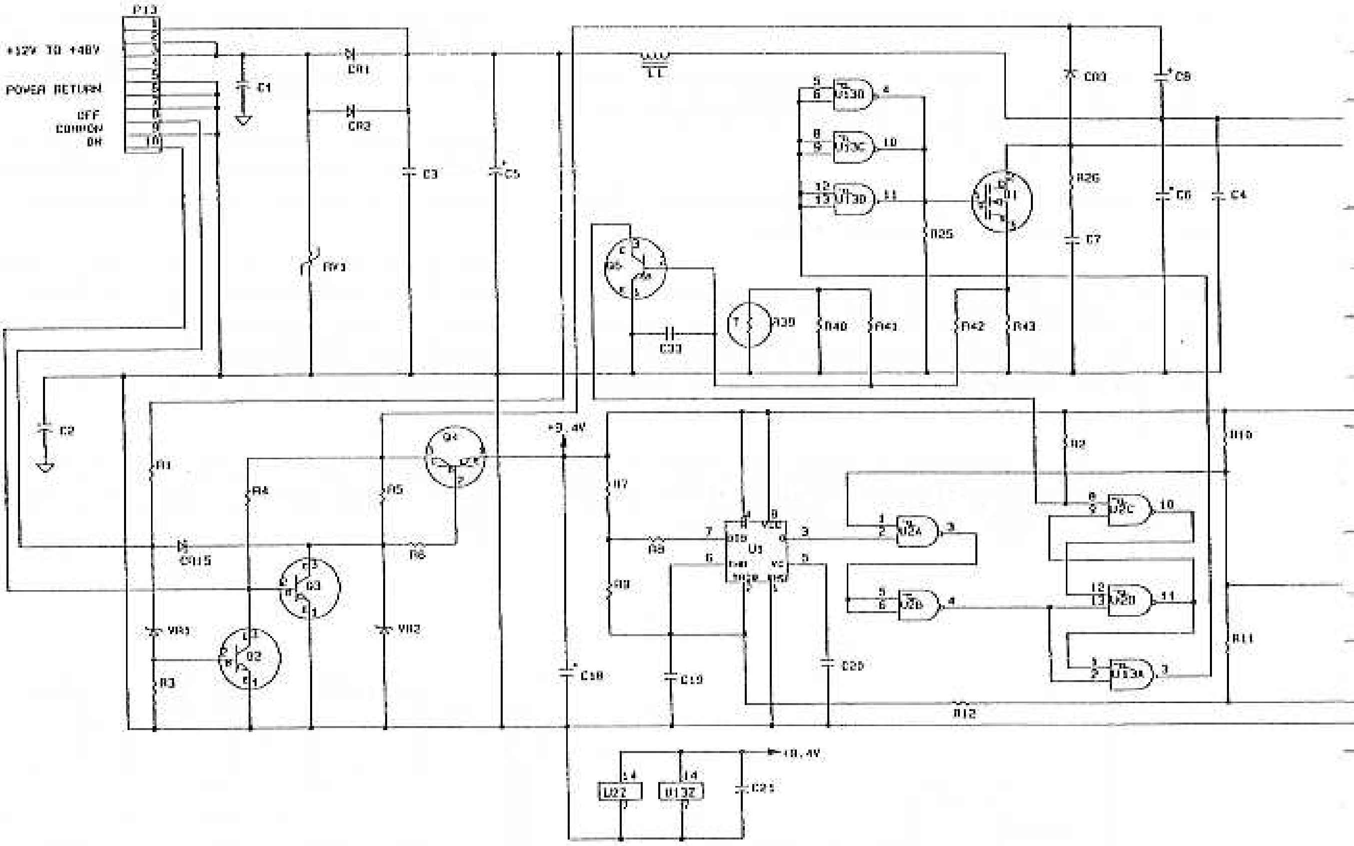
If the system is switched off or the supply voltage becomes inadequate, Q2 turns off Q4 and turns on Q3 disabling the regulating circuitry, Q1, and the output voltages.

While the card is activated, U11 and U12 provide 6 volts RMS to the filaments of the display. Other voltage outputs are: +5 volts regulated, +15 volts regulated, -15 volts regulated, +43 volts unregulated, +20 volts unregulated and regulated 15 volt excitation voltage.

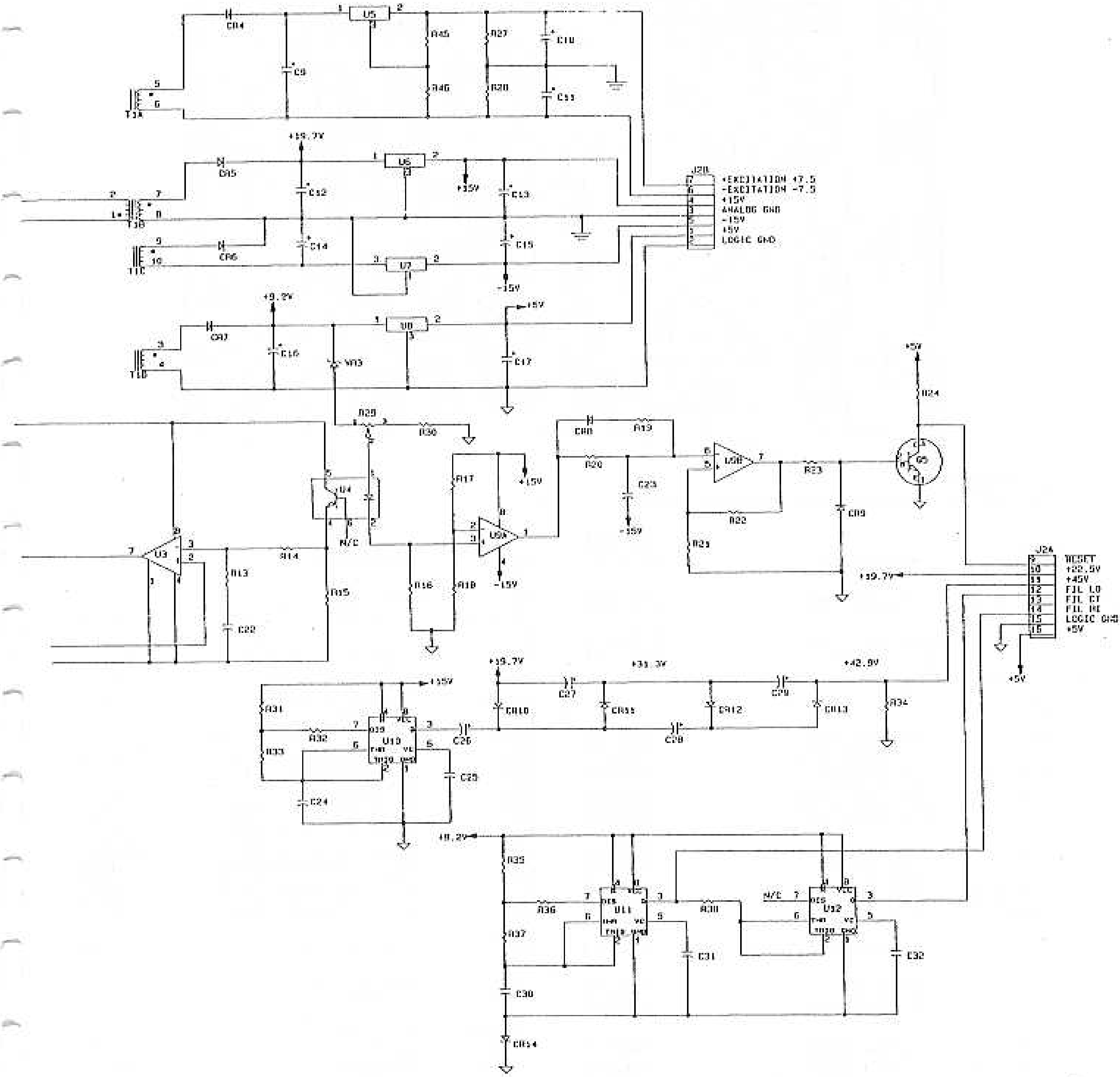
In addition, a reset pulse is sent to the addressable latches on each card if power drops and is reapplied to the A-2 Card.

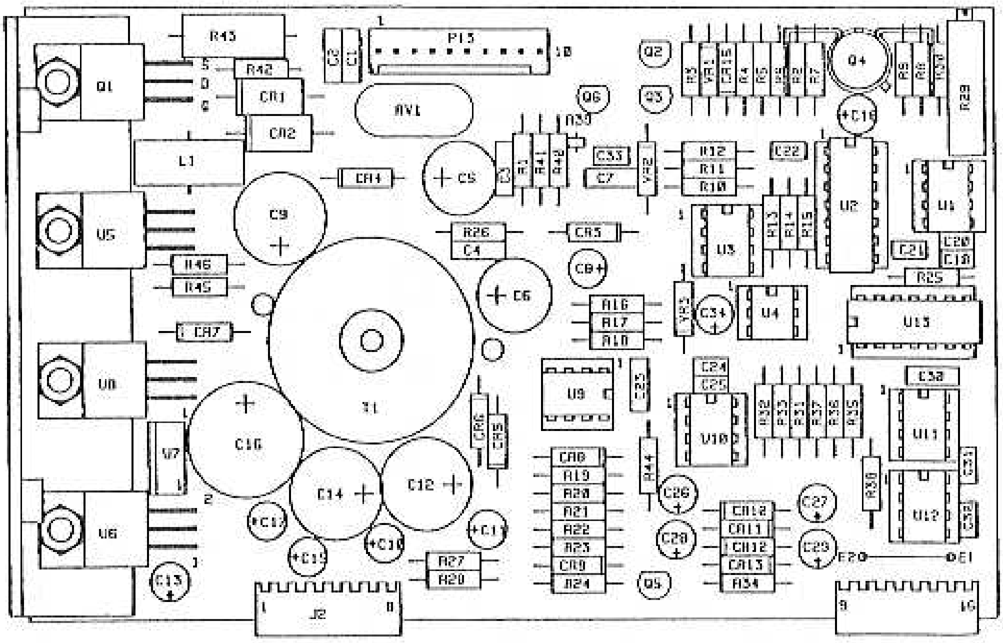


A-2 BLOCK DIAGRAM



A-2 DC POWER SUPPLY


J2B
+EXCITATION +7.5
-EXCITATION -7.5
+15V
ANALOG GND
-15V
+5V
LOGIC GND
J2A
RESET
+22.5V
+45V
FIL LO
FIL CT
FIL HI
LOGIC GND
+5V
U5
U6
U7
U8
U3
U4
U9A
U9B
U10
U11
U12
Q5
T1A
T1B
T1C
T1D
+19.7V
+9.2V
+15V
-15V
+5V
+31.3V
+42.9V
+8.2V
N/C



PARTS LIST
D.C. POWER SUPPLY PC CARD (W-T P/N 21770-0012)

SYMBOL	DESCRIPTION	W-T PART NUMBER
C1-4, 20-23 30-32	Cap., 0.1UF, 100 V	15623-0120
C5, 6	Cap., 100UF, 63 V	17997-0100
C7	Cap., .01UF, 200 V	15622-0121
C8, 10, 11, 13, 15, 18, 26-29, 34	Cap., 33UF, 35 V	17994-0077
C9, 12, 14	Cap., 470UF, 35 V	17995-0134
C16	Cap., 2200UF, 16 V	17993-0151
C17	Cap., 47UF, 10 V	17992-0095
C19	Cap., 1200 PF, 100 V	15620-0016
C33	Cap., 100PF, 200 V	15619-0134
CR1, 2	Diode, 1N4142	15668-0076
CR3-7	Diode, 1N4937	15668-0142
CR8-13, 15	Diode, 1N4148	15668-0035
CR14	Diode, 1N4004	15668-0043
J2	Connector, 8 socket	17733-0073
L1	Inductor, 43UHY	18698-0017
P13	Connector, 10 pin	17794-0095
Q1	Transistor, IRF530	16271-0057
Q2, 3, 5, 6	Transistor, 2N3904	15665-0012
Q4	Transistor, 2N2405	15660-0082
R1-3, 5	Resistor, 15K ±5% ¼W CC	14477-1011
R4	Resistor, 150K ±5% ¼W CC	14477-1250
R6, 26, 44	Resistor, 10 ohm ±5% ¼W CC	14477-0252
R7, 31, 36	Resistor, 10.7K ± 1% 1/8W film	15677-3889
R8,32	Resistor, 2.15K ± 1% 1/8W film	15677-3210
R9, 33	Resistor, 13.3K ± 1% 1/8W film	15677-3970
R10	Resistor, 8.2K ±5% ¼W CC	14477-0955
R11, 20	Resistor, 2.2M ±5% ¼W CC	14477-1532
R12, 14	Resistor, 56K ±5% ¼W CC	14477-1151
R13	Resistor, 2.2K ±5% ¼W CC	14477-0815
R15	Resistor, 5.1K ±5% ¼W CC	14477-0906
R16, 18	Resistor, 51 ohm ±5% ¼W CC	14477-0427
R17	Resistor, 51K ±5% ¼W CC	14477-1144

SYMBOL	DESCRIPTION	W-T PART NUMBER
R19	Resistor, 1K ±5% ¼W CC	14477-0732
R21, 22, 25, 34	Resistor, 33K ±5% ¼W CC	14477-1219
R23, 38	Resistor, 33K ±5% ¼W CC	14477-1094
R24	Resistor, 22K ±5% ¼W CC	14477-1052
R27, 28	Resistor, 2K ± 1% 1/8W film	15677-3210
R29	Pot., 50 ohm	14336-0114
R30	Resistor, 42.2 ohm ± 1% 1/8W film	15677-1576
R35	Resistor, 53.6K ± 1% 1/8W film	15677-4556
R37	Resistor, 66.5K ± 1% 1/8W film	15677-4648
R39	Thermistor, 5K	15793-0017
R40	Resistor, 9.09K ± 1% 1/8W film	15677-3814
R41	Resistor, 8.87K ± 1% 1/8W film	15677-3805
R42	Resistor, 13.7K ± 1% 1/8W film	15677-3988
R43	Resistor, .1 ohm ± 10% 3W film	15694-0017
R45	Resistor, 249 ohm ± 1% 1/8W film	15677-2311
R46	Resistor, 2.44K ± 1% 1/8W film	15677-2311
RV1	Varistor, V82ZA12	16046-0028
T1	Transformer	18084-0019
U1, 10-12	IC, NE555N	14323-0142
U2, 13	IC, 4093	15656-0252
U3	IC, LM311N	14323-0258
U4	IC, 4N35	14323-0324
U5	Regulator, LM317	15658-0151
U6	Regulator, 7815	15658-0060
U7	Regulator, 7915	15658-0102
U8	Regulator, 7805	15658-0011
U9	IC, 1458	14323-0118
VR1, 3	Diode, 1N755A	15669-0463
VR2	Diode, 1N4740A	15669-0125
XU1, 3, 9-12	Socket IC 8 pin	14361-0012
XU2, 13	Socket IC 14 pin	14361-0020
XU4	SocketIC 6 pin	14361-0145
XQ4	Heat Sink	15557-0070

A-3 DISPLAY/KEYBOARD INTERFACE PC CARD 19532-0015

CIRCUIT DESCRIPTION

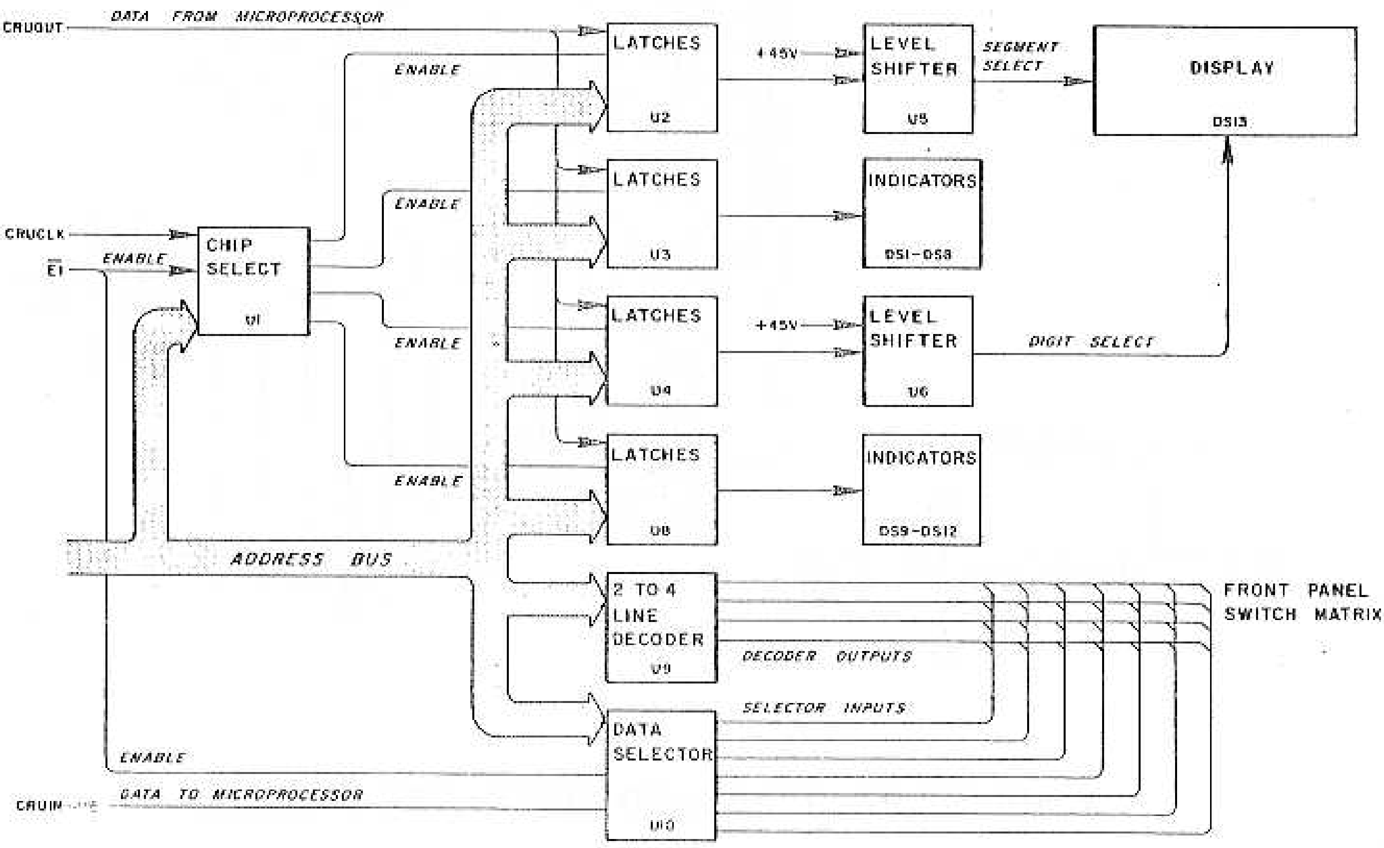
The A-3 Display/Keyboard Interface PC card consists of an 8-digit fluorescent display tube, indicator LED's, display and indicator interface circuitry, and keyboard interface circuitry. The front panel keys are connected to the microprocessor through the keyboard interface circuitry and will be included in this section. Refer to the block diagram.

On the Display/Keyboard interface PC card, appropriate address lines are connected to each device so that address codes select a particular IC and a particular input or output of that IC. U1 is a chip selector that enables the appropriate addressable latch (U2, U3, U4 or U8). The microprocessor simultaneously applies an address to the address bus, data on the CRUOUT line and a CRUCLK to the chip select IC. U9 on the A-1 PC board also applies an enable signal to the chip select IC. The enable signal and CRUCLK signal together enable U1. U1 then enables the appropriate latch and the data on the CRUOUT line causes the appropriate latch output to go high or low. If the latch output is connected to a level shifter, U5 will apply +45 volts to the appropriate segment bus line or U6 will apply +45 volts to the appropriate digit line. Because the display level shifters require multiplexed data, the display data is continuously changing at a rate faster than the eye can detect. Latch outputs to LED are changed only when the state of the indicators are changed.

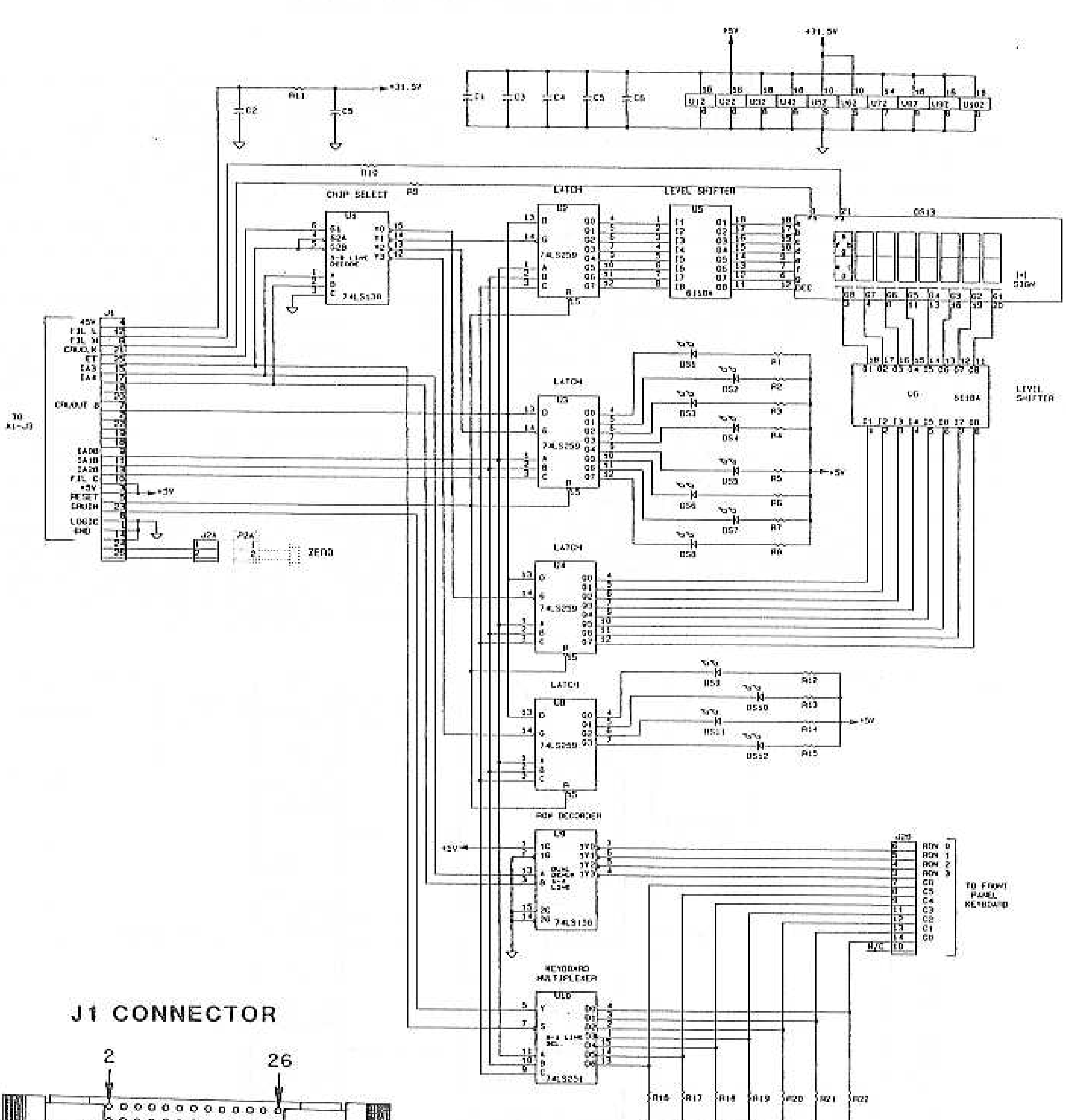
The front panel keys are connected in a matrix of 4 rows and 7 columns. A line from each row of switches is connected to one output of U9. A line from each column of switches is connected to one input of U10, a data selector/multiplexer (74LS251).

Pullup resistors hold the U10 inputs high until a key is pressed and the output of U9 for that switch row is low.

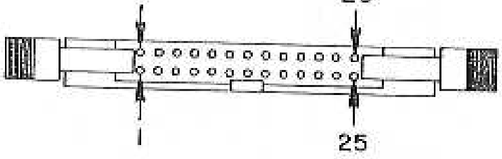
The microprocessor applies a series of codes to the address lines that will cause U9 on the A-1 PC board to enable U10 and will select combinations of rows and columns for each switch. If a key is pressed, the switch will transfer the U9 output (low) for that row to the U10 input for that column, and an output from U10, pin 8 will be applied to the CRUIN line. The signal on the CRUIN line will tell the microprocessor that the addressed key has been pressed.



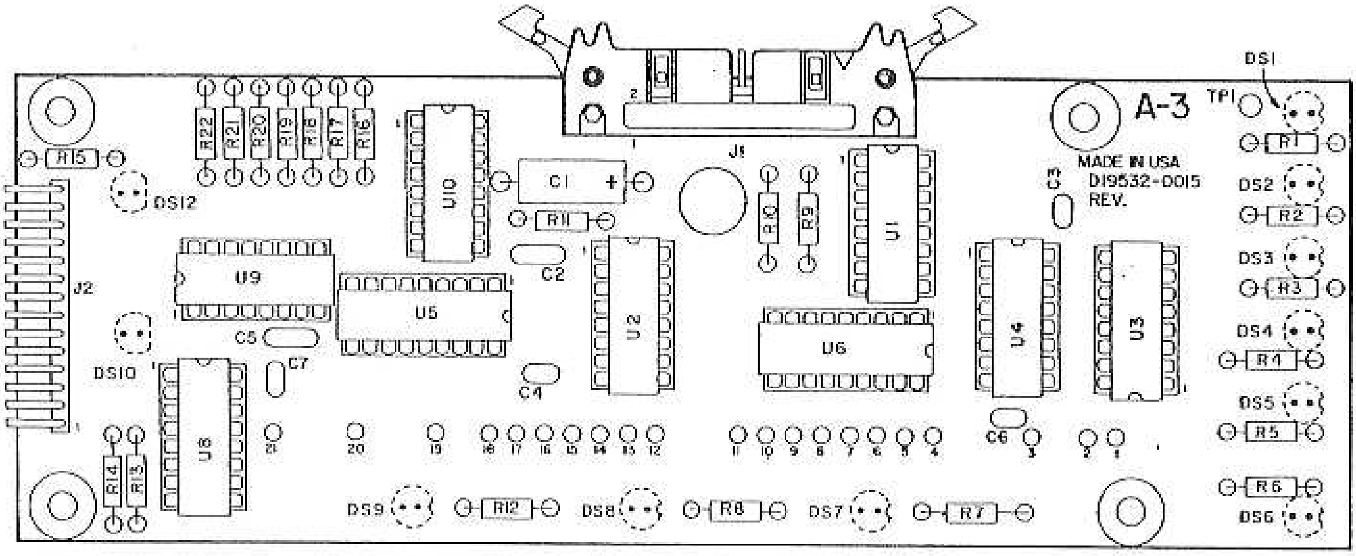
A-3 BLOCK DIAGRAM



J1 CONNECTOR



A-3 DISPLAY/KEYBOARD INTERFACE SCHEMATIC



A-3 COMPONENT LAYOUT

PARTS LIST

SYMBOL	DESCRIPTION	W-T PART NUMBER
C1	47uF -10% +75% 10V alum	17760-0137
C2,5	0.1uF ± 10% 100V cer	15623-0120
C3,4,6,7	0.01uF ± 10% 100V cer	15620-0123
DS1-10,12	Red LED MV5025	15447-0033
DS13	Fluorescent Display	22354-0014
J1	26 pin right-angle connector	17818-0261
J2	14 pin right-angle connector	17731-0133
R1-8,12, 13,15	430 ohm 5% ¼W CC	14477-0641
R9,10	5.1 ohm 5% ¼W CC	14477-0187
R11	680 ohm 5% ½W CC	15670-0692
R16-22	2.2K ohm 5% ¼W CC	14477-0815

SYMBOL	DESCRIPTION	W-T PART NUMBER
U1	74LS138	14315-0589
U2-4,8	74LS259	14135-0837
U5,6	6118A	14323-0373
U9	74LS156	14315-0928
U10	74LS251	14315-0829
XU1-4,8-10	16 pin IC socket	14361-0038
XU5,6	18 pin IC socket	14461-0046
	Screw 4-24 x ¼	14491-0015
	Nylon LED spacer	17820-0010

NOTE

Revision C changed R16-R22 from 10K ohm to 2.2K ohm to improve keystroke interface.

Revision D deleted U7.

Revision E changed the value of R11.

A-4 PARALLEL BCD INTERFACE
PC CARD 20469-0010

CIRCUIT DESCRIPTION

The A-4 parallel BCD interface PC card provides latched parallel BCD data for peripheral equipment, such as printers or remote displays.

The A-4 PC card consists of a PC card select circuit (U6), a latch select circuit (U7), a data selector (U1), 4 addressable BCD latches, output buffers (U9 through U14), and over/under gates (Q1 and Q2). Refer to the block diagram.

An address code on U6 selects the A-4 PC card and U6 enables data selector U1 and latch selector U7.

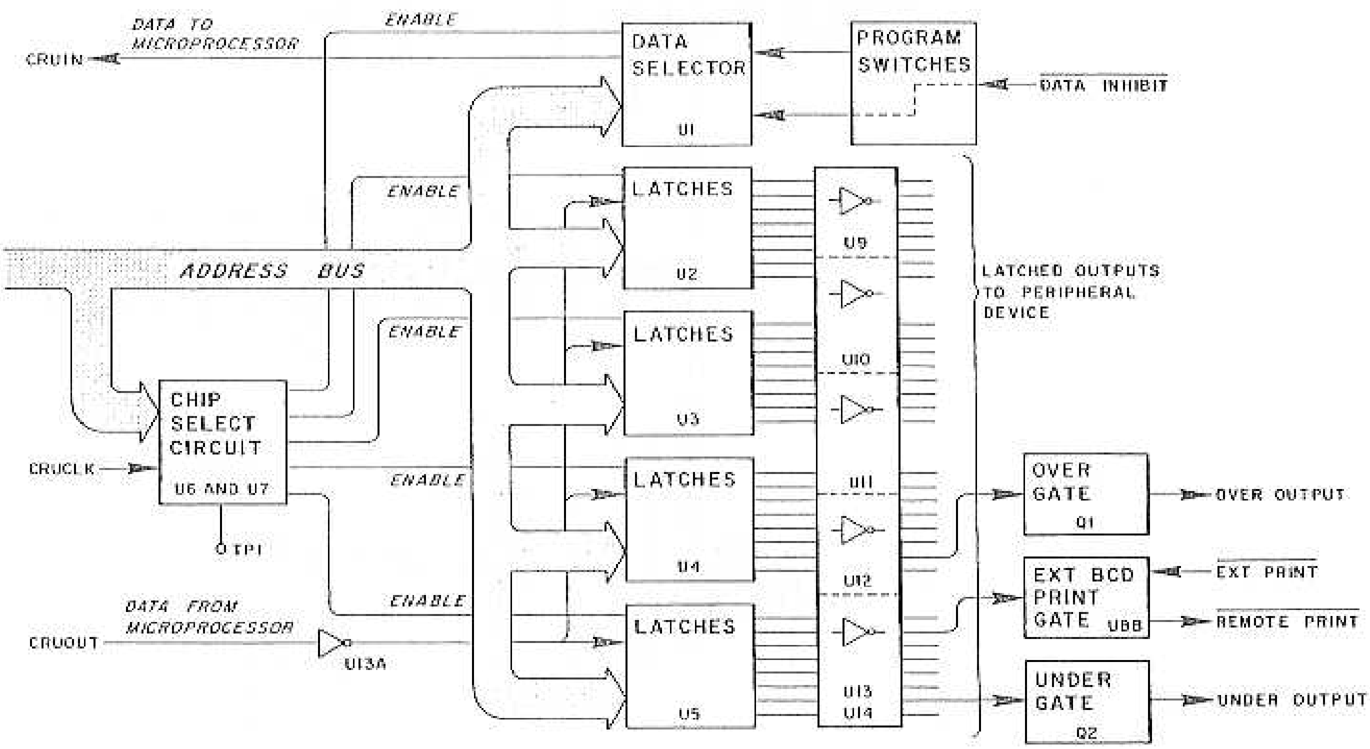
An address code on U1 selects data to be read by the microprocessor on the CRUIN line.

An address code and CRUCLK on U7 selects each latch while an address code on U2, U3, U4 and U5 selects individual latches. Microprocessor data on the CRUOUT line is inverted by U13A and loaded into the selected latch output.

The latches store and supply latched BCD data between load cycles. The latch outputs are inverted by U9, U10, U11, U12, U13, and U4 which isolate the latch outputs from the peripheral device inputs.

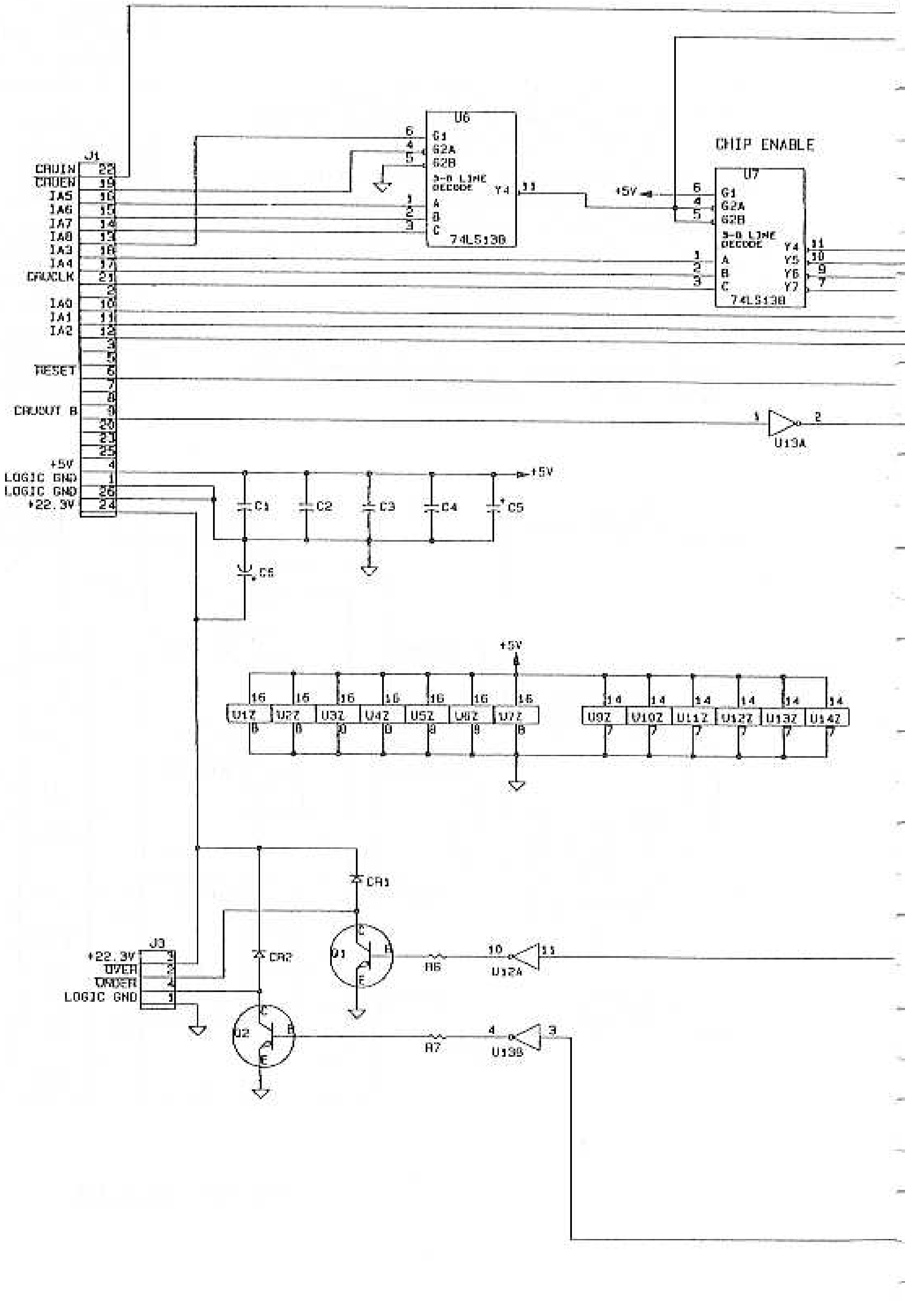
Q1 and Q2 provide switching for over and under outputs, respectively. CR1 and CR2 protect the gates from current surges if an inductive load, such as a relay is connected to them.

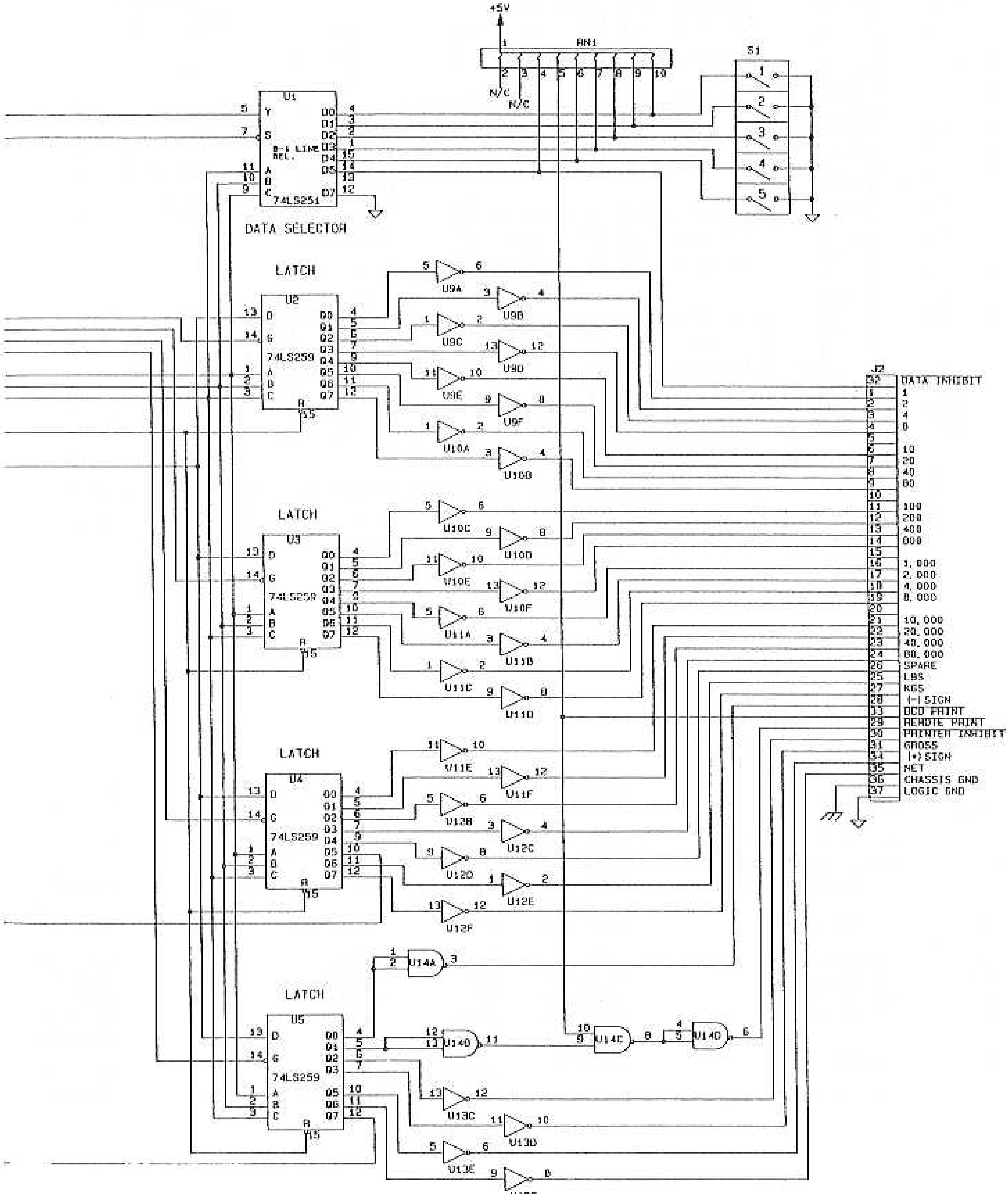
U14C provides a "remote print" command to a printer if a "print" command is actuated by pressing the data send key or by an external print switch.



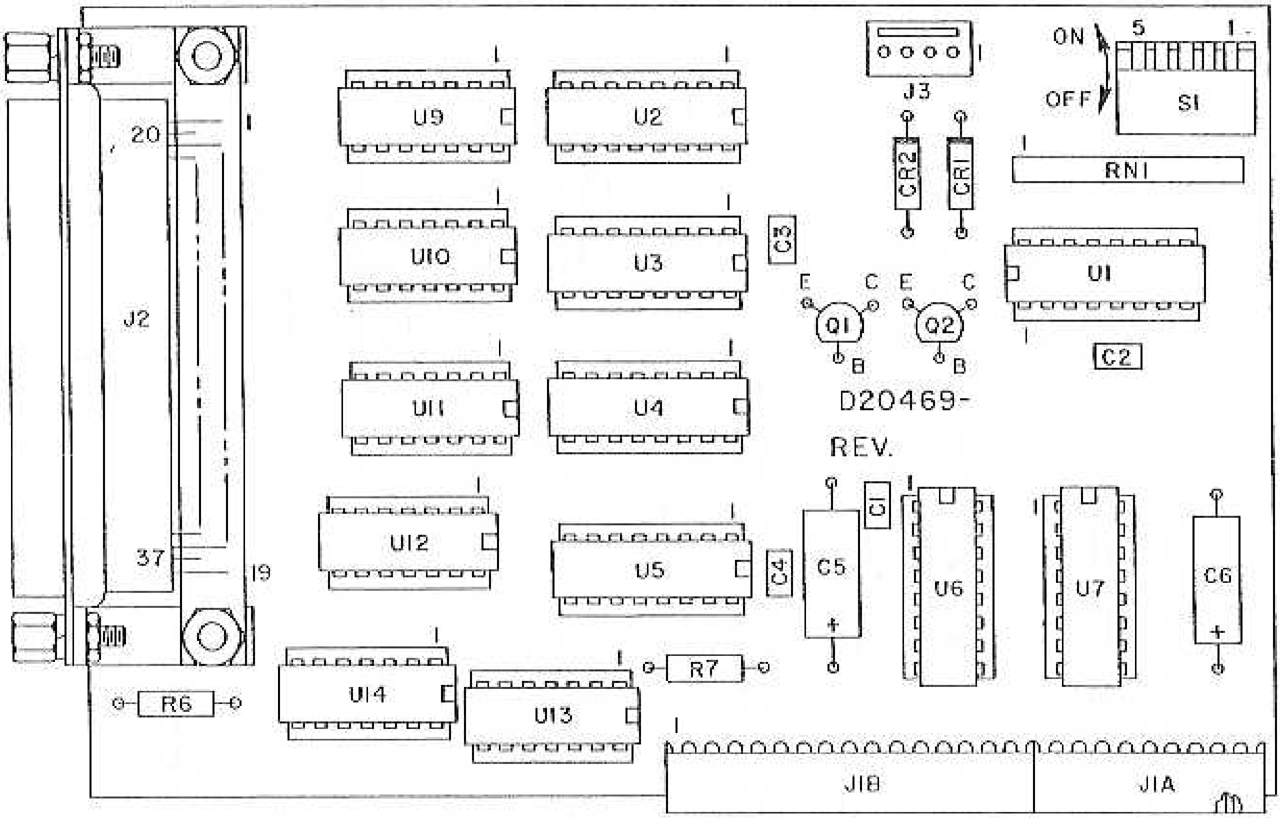
A-4 BLOCK DIAGRAM

A-4 PARALLEL BCD INTERFACE SCHEMATIC





+5V
RN1
S1
N/C
U1
8-1 LINE SEL.
74LS251
DATA SELECTOR
LATCH
U2
74LS259
LATCH
U3
74LS259
LATCH
U4
74LS259
LATCH
U5
74LS259
U14A
U14B
U14C
U14D
J2
DATA INHIBIT
1
2
4
8
10
20
40
80
100
200
400
800
1,000
2,000
4,000
8,000
10,000
20,000
40,000
80,000
SPARE
LBS
KGS
(-) SIGN
BCD PRINT
REMOTE PRINT
PRINTER INHIBIT
GROSS
(+) SIGN
NET
CHASSIS GND
LOGIC GND



A-4 COMPONENT LAYOUT

PARTS LIST
A-4 PARALLEL BCD (W-T P/N 20469-0010)

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
C1-4	0.01uF ±10% 100V cer	15620-0123	R6,7	330 ohm 5% 1/4W CC	14477-0617
C5	47uF -10% +75% 10V alum	17760-0137			
C6	68uF -10% +75% 35V alum	17763-0084	RN1	10K ohm resistor network	17852-0045
CR1,2	1N4004	15668-0043	S1	5 pole switch	14329-1054
J1A	10 pin connector	17733-0099	U1	74LS251	14315-0829
J1B	16 pin connector	17733-0156	U2-5	74LS259	14315-0837
J2	37 pin connector	17798-0042	U6,7	74LS138	14315-0589
J3	4 pin connector	17794-0038	U9-13	74LS04	14315-0399
			U14	74LS00	14315-0423
Q1,2	2N3904	15665-0012			
			XU1-7	16 pin IC socket	14361-0038
R1-5	10K ohm 5% 1/4W CC	14477-0971	XU9-14	14 pin IC socket	14361-0020

A-5 SERIAL INTERFACE PC CARD
WT P/N 19496-0027

A-5.1 CIRCUIT DESCRIPTION

The A-5 Serial Interface PC Card provides an asynchronous ASCII serial or current loop communication link between a Weigh-Tronix indicator and a peripheral device such as a printer, computer, or programmable controller.

The card consists of an asynchronous communications controller (U1), a chip selector (U6), a data selector (U5), programming switches, level shifters (U2), current loop gate circuitry (Q1), and a current loop to voltage converter (U4).

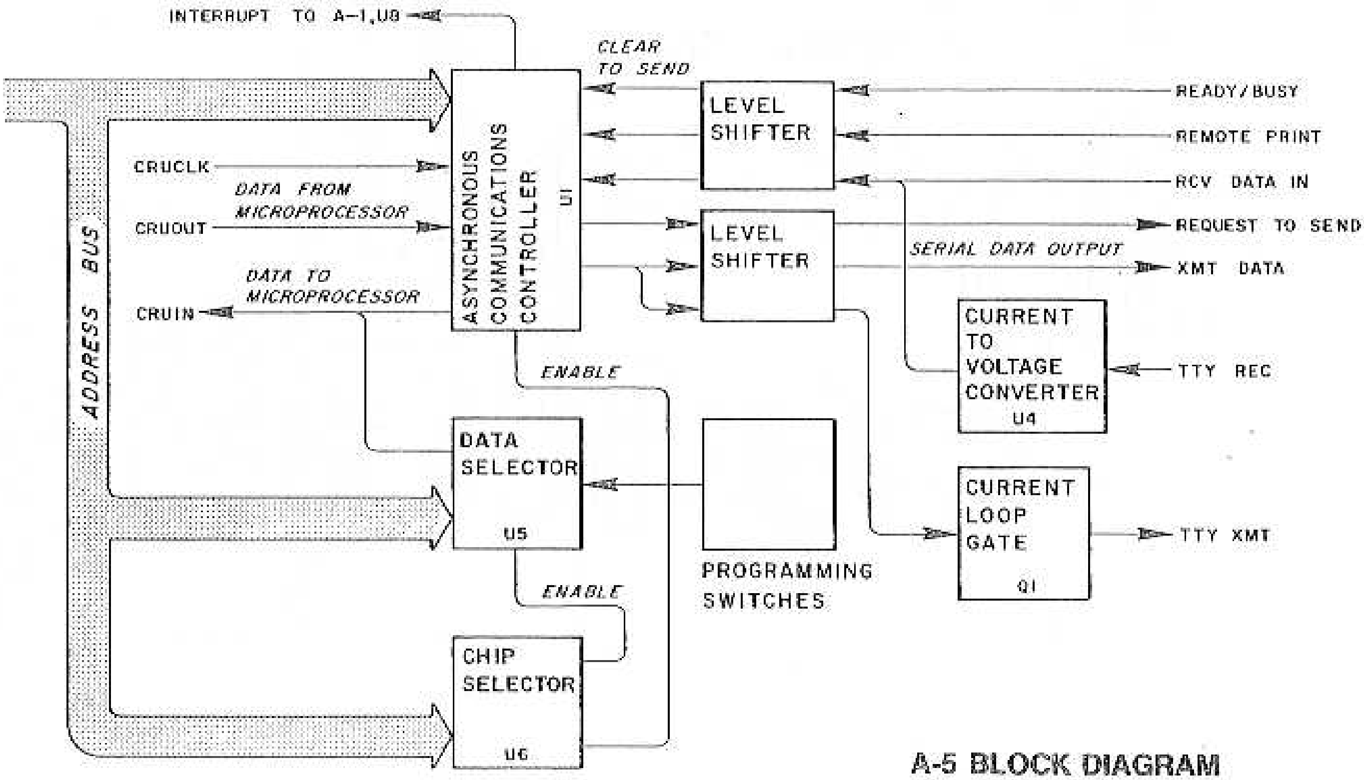
The heart of the card is the asynchronous communications controller (U1) which connects the A-1 Card's microprocessor system to the peripheral device. When enabled by the chip selector (U6), U1 is responsible for receiving data from the microprocessor, requesting permission from the peripheral device to transmit data, and upon receiving a READY signal from the peripheral device transmitting the data to it.

U6, the chip selector, also enables U5, the data selector, allowing the microprocessor to obtain from the programming switch settings the baud rate, parity, and data transmission format information that it requires to successfully transmit data to the peripheral device.

If the programming switches are properly set for current loop transmissions, Q1 will convert the transmitted data into digital (0 to 20 milliamp) current loop output.

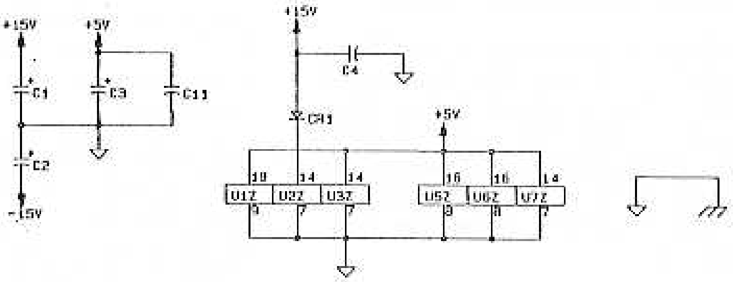
If the card should happen to be connected to a device that does not provide a READY/BUSY signal, S1-3 should be set to ON so that the REQUEST TO SEND signal that is sent out by the communications controller will be fed back into the system.

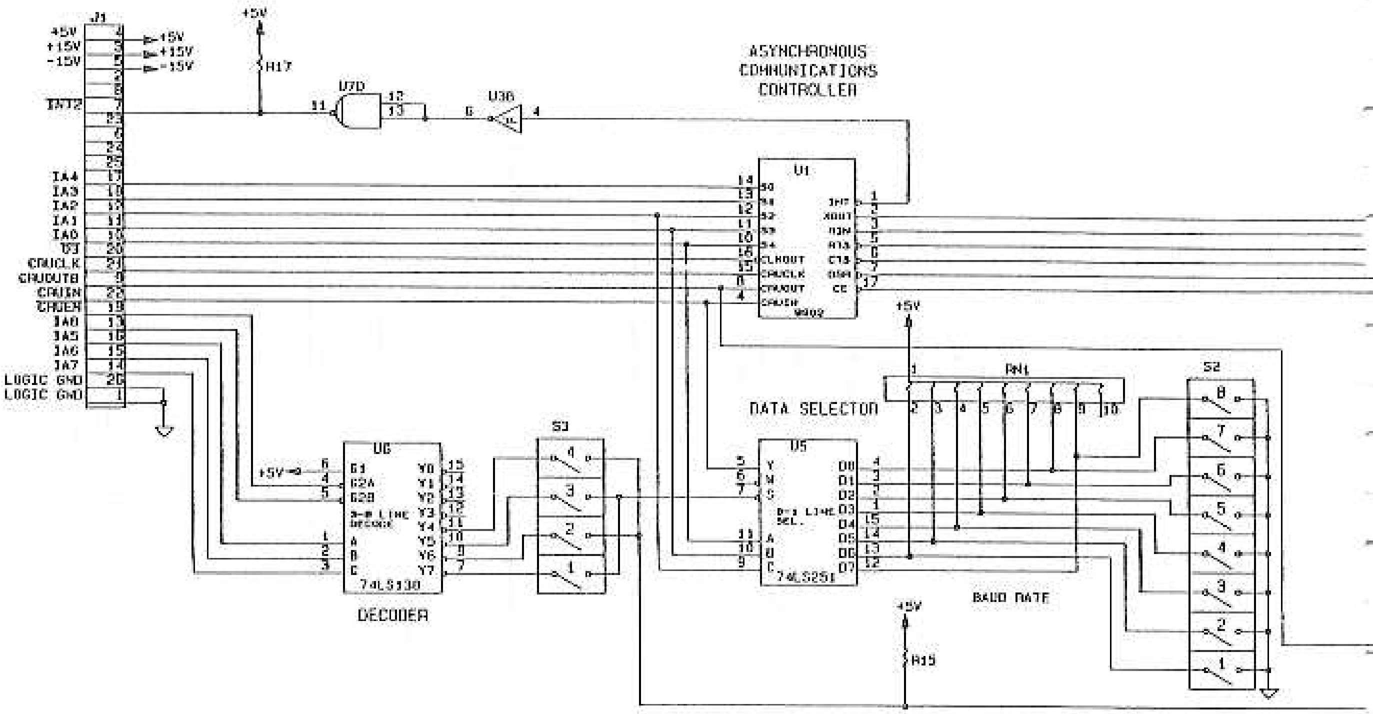
The card can also accommodate an external print switch that, when properly cross-coupled, allows NAND gates U7C and U7D to generate a data transmission each time a logic low is simultaneously applied to the RESET and SET lines. A data transmission can also be generated when a logic low is applied to the DATA SET READY line. (Refer to the schematic on the next page for details.)

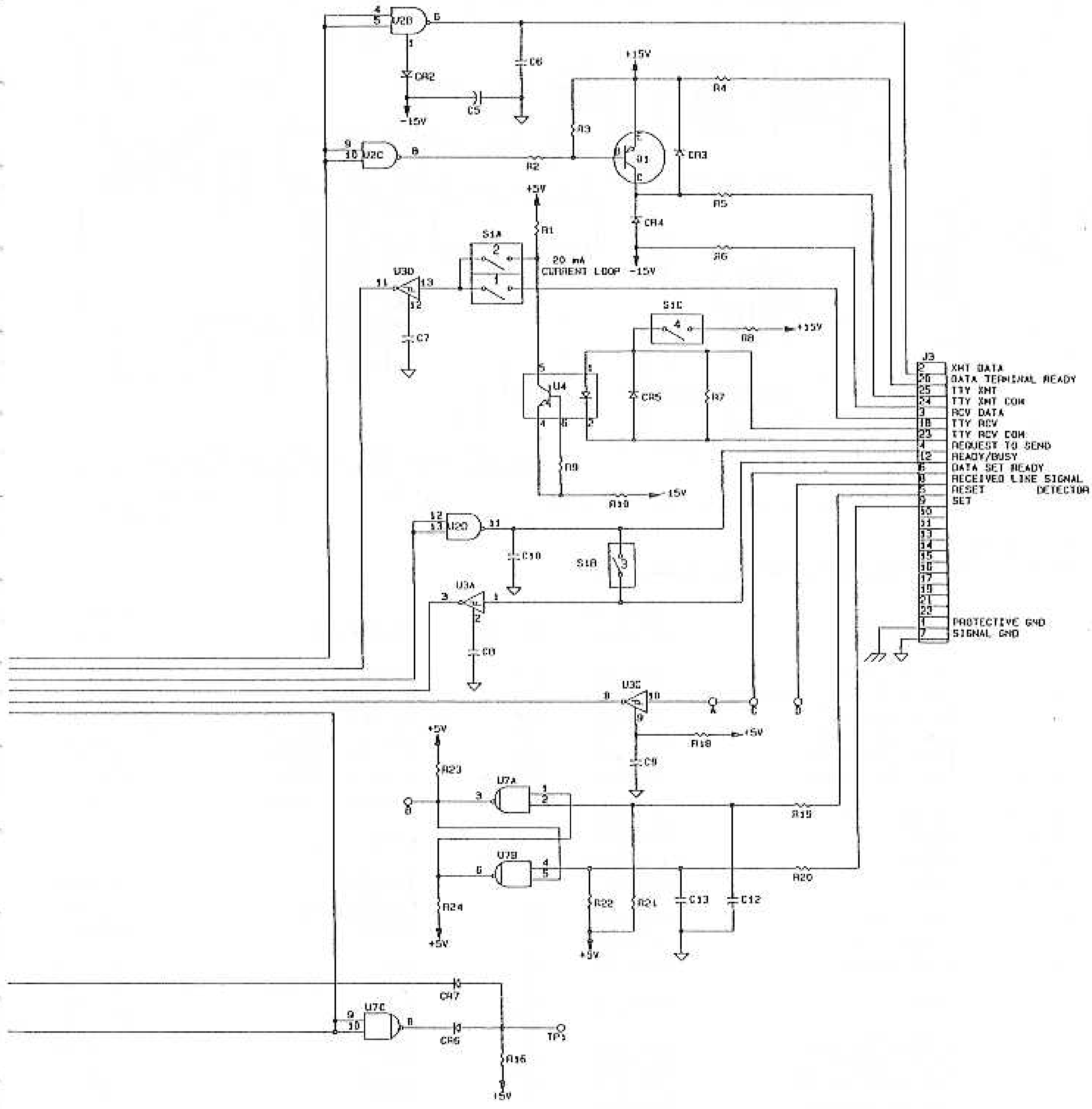


A-5 BLOCK DIAGRAM

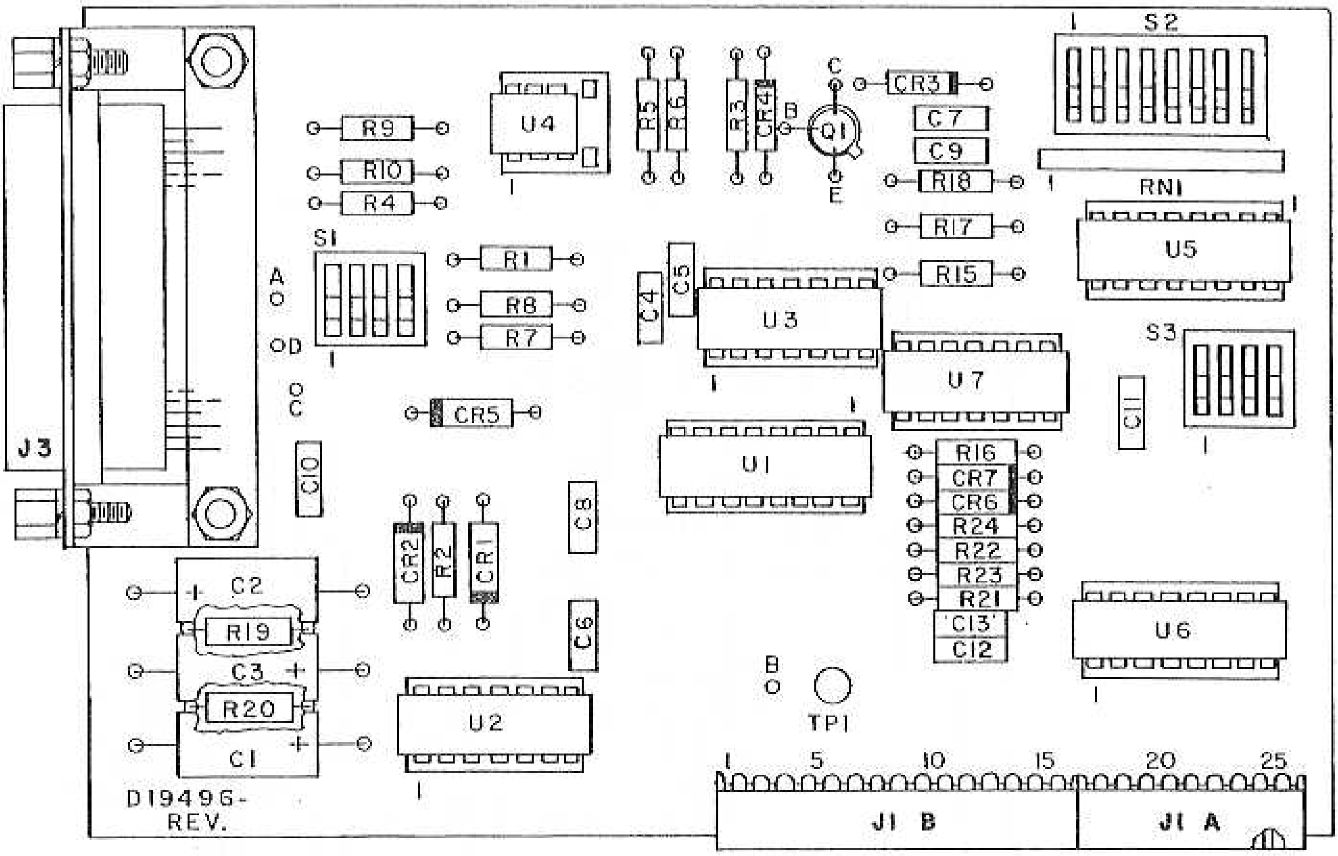
NOTE: WHEN AN EXTERNAL DATA SEND IS ACTIVATED BY A DUAL REQUEST, (RESET, SET) CUT THE FOIL FROM A TO C AND INSTALL A JUMPER BETWEEN A AND B, THEN REMOVE R18.







A-5 SERIAL INTERFACE



PARTS LIST
A-5 SERIAL INTERFACE PC CARD (W-T P/N 19496-0027)

SYMBOL	DESCRIPTION	W-T PART NUMBER
C1, C2	22uF -10% 16V alum	17761-0110
C3	47uF -10% +75% 10V alum	17760-0137
C4, C5	0.01uF ±10% 100V cer	15620-0123
C6-C10	47pF ±10% 200V cer	15619-0217
C11	0.01uF ±10% 100V cer	15620-0123
C12, C13	0.1uF ±10% 100V cer	15623-0120
CR1, CR2	1N4004	15668-0043
CR3, CR4	1N914	15668-0035
CR5	1N4004	15668-0043
CR6, CR7	1N914	15668-0035
J1A	10 pin connector	17733-0099
J1B	16 pin connector	17733-0156
J3	25 pin connector	17798-0091
Q1	2N2907A	14468-0022
R1	4.7K ohm 5% 1/4W CC	14477-0898
R2	15K ohm 5% 1/4W CC	14477-1011
R3	1.2K ohm 5% 1/4W CC	14477-0757
R4	2.2K ohm 5% 1/4W CC	14477-0815
R5	680 ohm 5% 1/2W CC	15670-0692
R6	680 ohm 5% 1/2W CC	15670-0692
R7	120 ohm 5% 1/4W CC	14477-0518
R8	680 ohm 5% 1/2W CC	15670-0692
R9	47K ohm 5% 1/4W CC	14477-1136

SYMBOL	DESCRIPTION	W-T PART NUMBER
R10	10K ohm 5% 1/4W CC	14477-0971
R15	4.7K ohm 5% 1/4W CC	14477-0898
R16	2.2K ohm 5% 1/4W CC	14477-0815
R17	22K ohm 5% 1/4W CC	14477-1052
R18	5.1K ohm 5% 1/4W CC	14477-0906
R19, R20	47 ohm 5% 1/4W CC	14477-0419
R21-R24	1.2K ohm 5% 1/4W CC	14477-0757
RN1	Resistor Network	17852-0045
S1	4 pole DIP switch	14329-0047
S2	8 pole DIP switch	14329-0088
S3	4 pole DIP switch	14329-0047
U1	9902	15657-0194
U2	75188	14323-0340
U3	75189A	14323-0332
U4	4N35	14323-0324
U5	74LS251	14315-0829
U6	74LS138	14315-0589
U7	74LS03	14315-1058
XU1	18 pin IC socket	14361-0046
XU2, XU3	14 pin IC socket	14361-0020
XU4	8 pin IC socket	14361-0012
XU5, XU6	16 pin IC socket	14361-0038
XU7	14 pin IC socket	14361-0020

A-6 CUTOFF INTERFACE PC CARD
PC CARD 20000-0016

A-6.1 CIRCUIT DESCRIPTION

The A-6 Cutoff Interface PC Card provides low current logic control for switching external devices on or off at preprogramed or operator-selected levels.

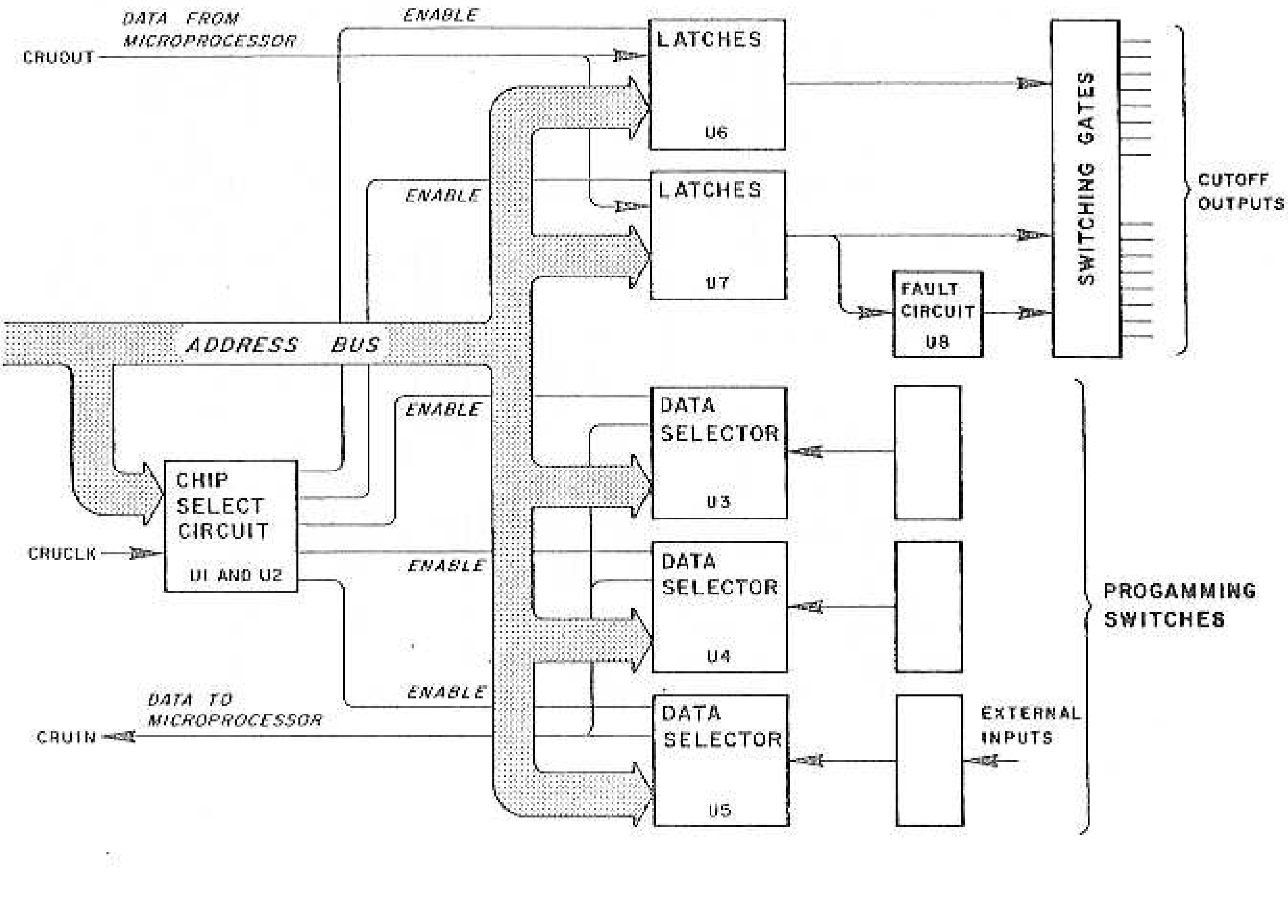
The A-6 PC card consists of a Decoder/Chip Select Circuit (U1 and U2), three data selectors (U3, U4, and U5), two addressable data latches (U6 and U7), and control switching gates (Q1-Q16).

The heart of the card is the Decoder/Chip Select Circuitry. This circuitry, upon receiving the proper signal from the microprocessor, enables either the Data Selector Circuitry or the Cutoff Card's addressable gate latches.

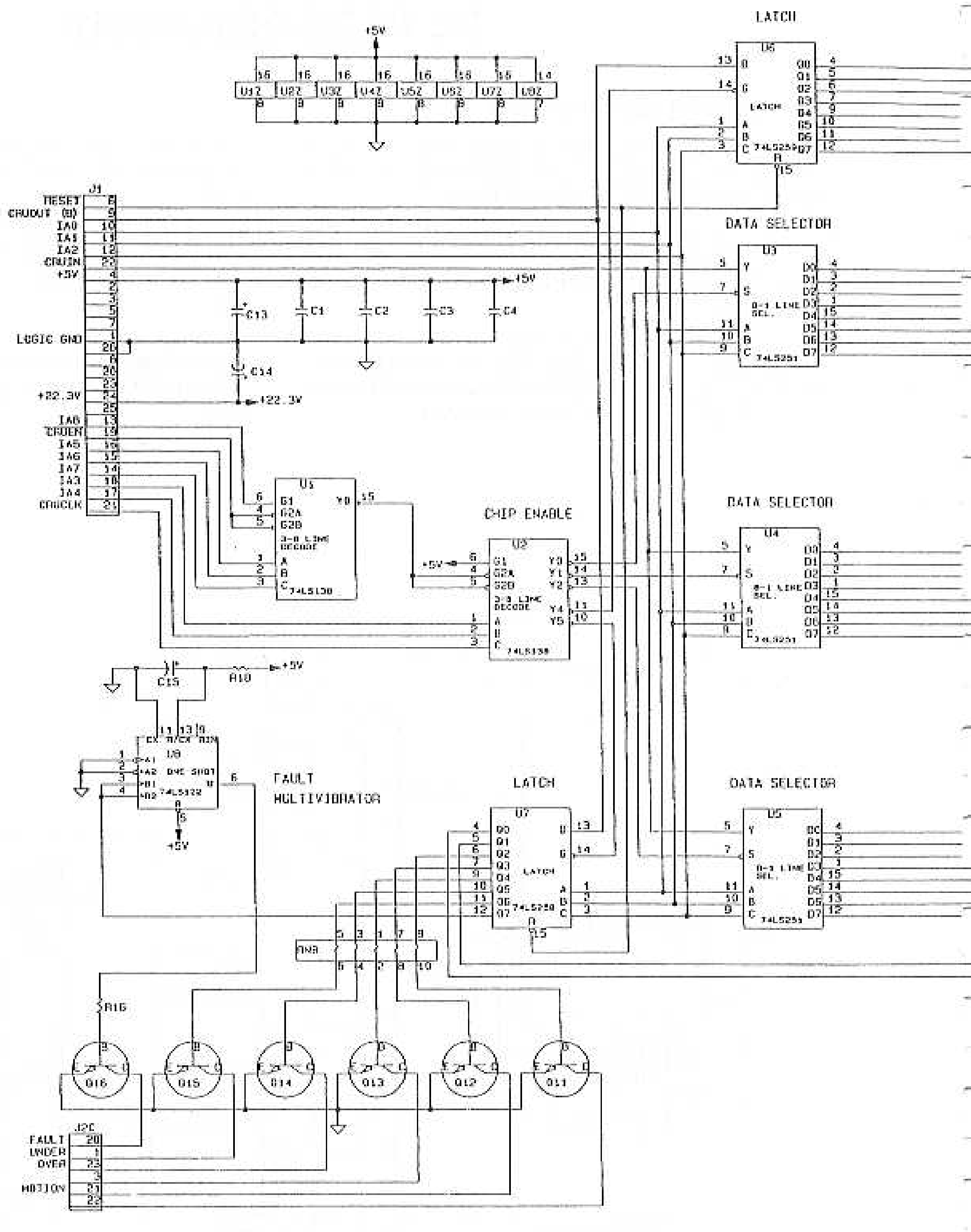
If a data selector is enabled, data will be sent over the microprocessor's CRUIN line for the microprocessor to read.

If an addressable latch is enabled, the microprocessor will send data over the CRUOUT line to the latch which controls the opening and shutting of a particular cutoff gate.

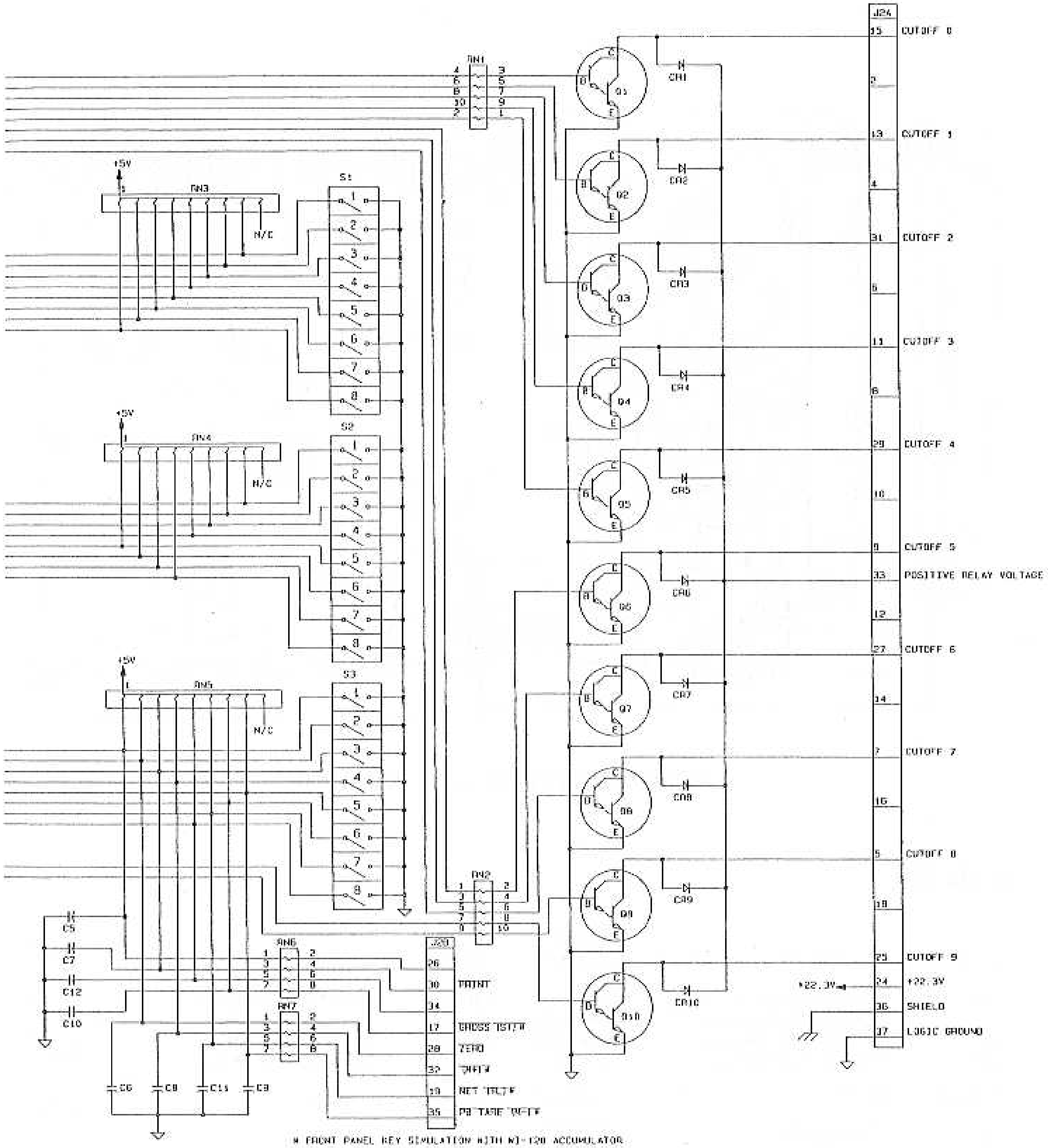
These latches will remain ON until data on the CRUOUT line equals the preprogramed or operator-selected level and will turn OFF as the data equals or exceeds the preselected level.



A-6 BLOCK DIAGRAM

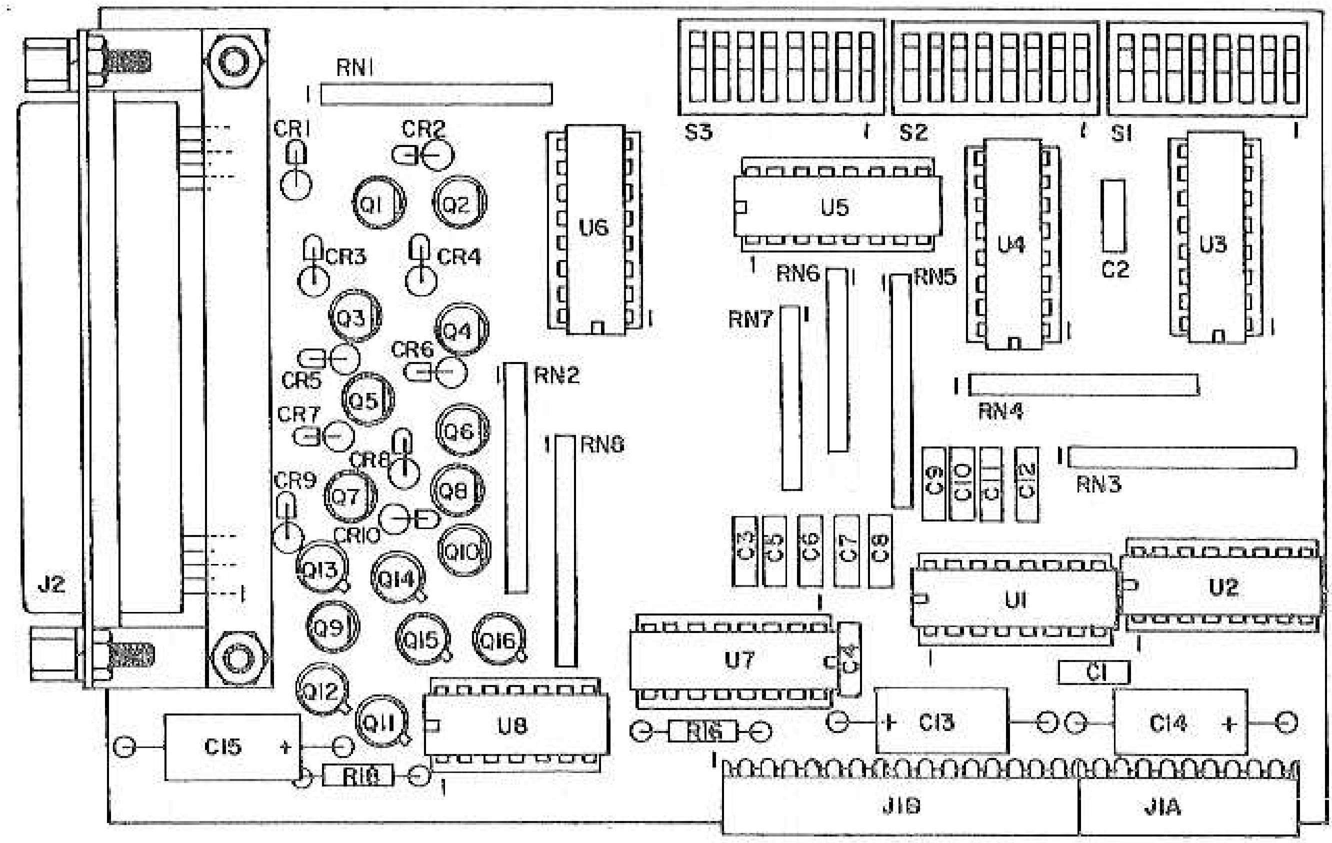


LATCH
DATA SELECTOR
DATA SELECTOR
DATA SELECTOR
CHIP ENABLE
LATCH
FAULT
MULTIVIBRATOR
LOGIC GND
+22.3V
+5V



* FRONT PANEL KEY SIMULATION WITH WI-120 ACCUMULATOR

A-6 CUTOFF INTERFACE SCHEMATIC



A-6 CUTOFF INTERFACE PC CARD

Parts List

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
C1-C2	0.01uF ± 10% 200V cer	15622-0121	RN1, RN2	100K ohm Resistor Network	17852-0011
C13	47uF -10% +75% 10V alum	17760-0137	RN3-RN5	10K ohm Resistor Network	17852-0045
C14	10uF -10% +75% 35V alum	17763-0092	RN6, RN7	100 ohm Resistor Network	17852-0037
C15	33uF -10% +75% 10V alum	17760-0129	RN8	10K ohm Resistor Network	17852-0029
CR1-CR10	1N4004	15668-0043	S1-S3	8 pole DIP switch	14329-0088
J1A	16 pin connector	17733-0156			
J1B	10 pin connector	17733-0099	U1, U2	74LS138	14315-0589
J2	37 pin connector	17798-0109	U3-U5	74LS251	14315-0829
			U6, U7	74LS259	14315-0837
Q1-Q10	2N5308	15665-0111	U8	74LS122	14315-0548
Q11-Q16	2N2222A	14468-0014			
R16	10K ohm 5% 1/4W CC	14477-0971	XU1-XU7	16 pin IC socket	14361-0038
R18	39K ohm 5% 1/4W CC	14477-1110	XU8	14 pin IC socket	14361-0020

DIGITAL TO ANALOG PC CARD
WT P/N 23438-0020 Rev E

CIRCUIT DESCRIPTION

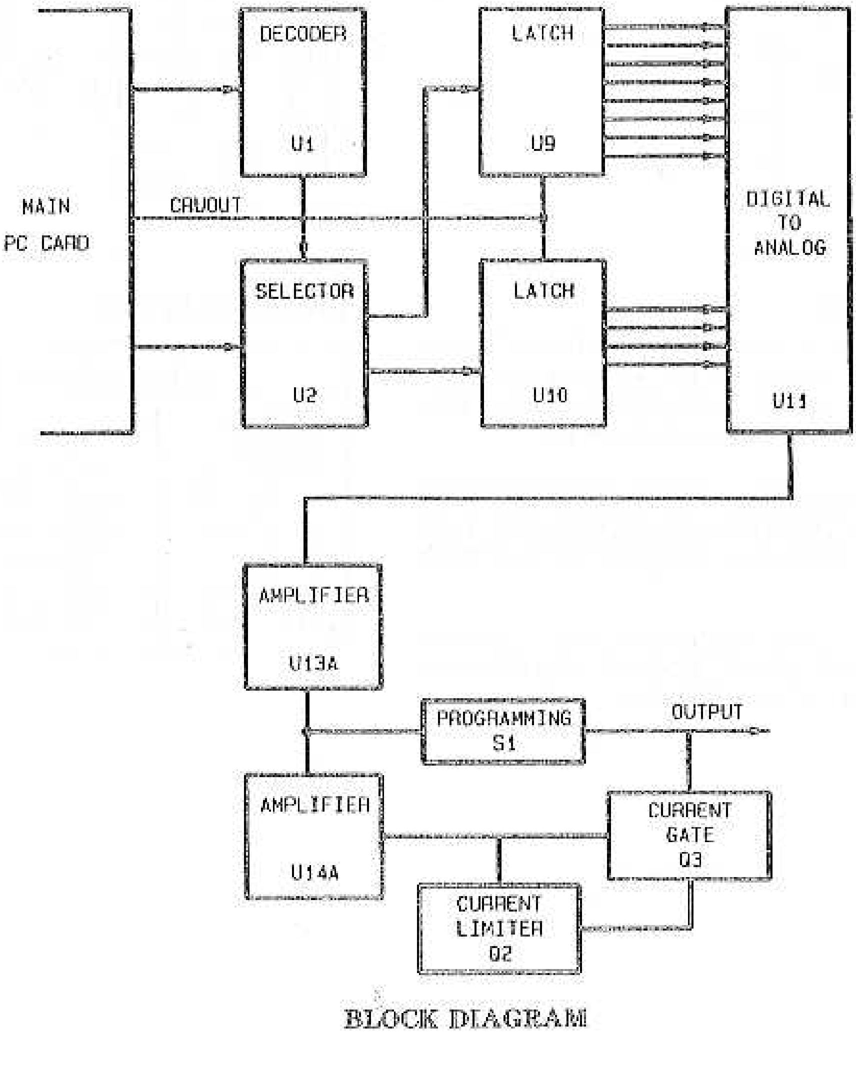
This Digital to Analog PC Card provides a selectable range of current or dc voltage to a peripheral device. Output from this card is proportional to the displayed weight in the normal operating mode and proportional to the gross weight in the peak hold operating mode.

Inputs from the main pc card to the decoder U1 will enable the selector circuit U2. U2 will receive a message from the main pc card to enable latch U9 or latch U10.

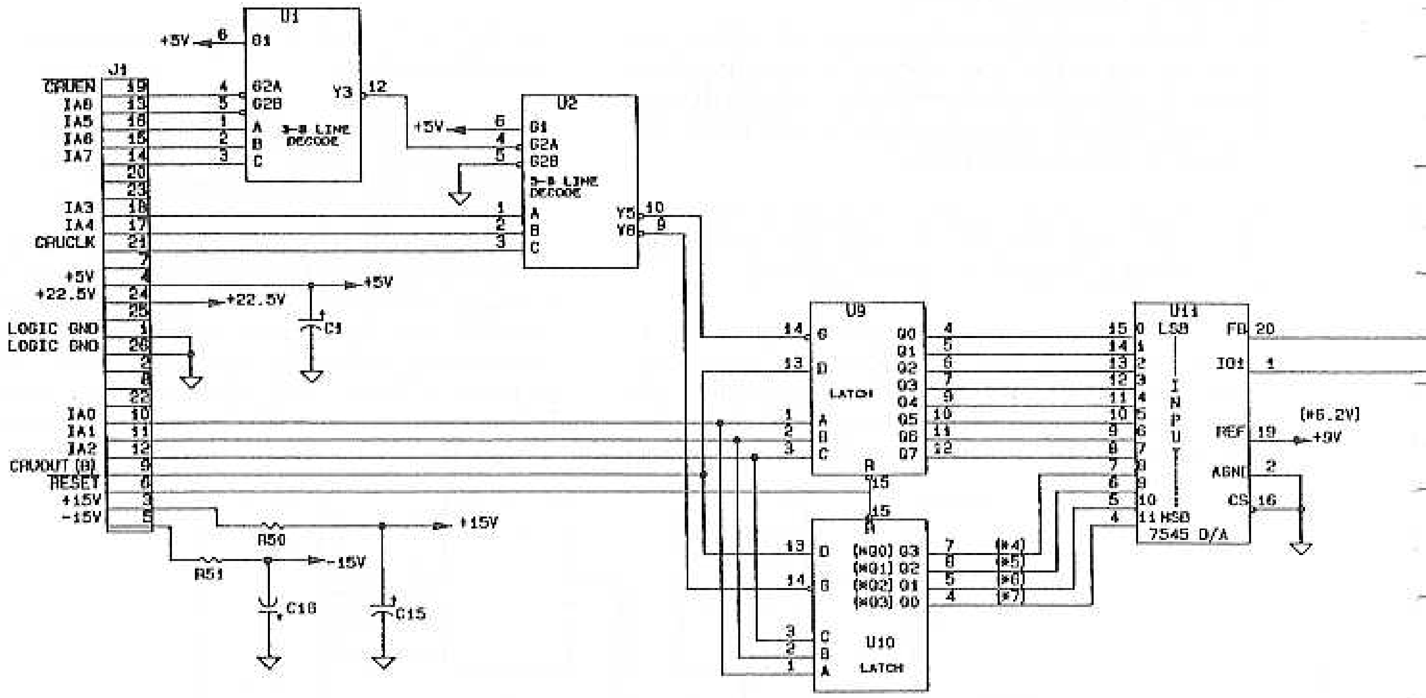
A message from the main pc card will be sent to the latches on the CRUOUT line. This digital signal received by the latches will cause the appropriate latch output to go high or low. The combined twelve outputs from the latches will be read by the digital to analog circuit U11. The output from U11 will be an analog voltage which will be amplified by U13A.

After the voltage is amplified by U13A, it passes through programming switch assembly S1 which limits the amount of voltage output to the peripheral device.

The components responsible for conversion of output voltage to current output are S1, U14A, Q2 and Q3. When voltage is fed into this set of components, the voltage is amplified by U14A and passed on to the current gate Q3. Q3 in turn, provides current output to J2 pin 2 in the programmed milliamps set by S1. (Q2 serves as a current limiter which turns off Q3 if excessive current is drawn through Q3.)



BLOCK DIAGRAM



ADJUSTMENTS

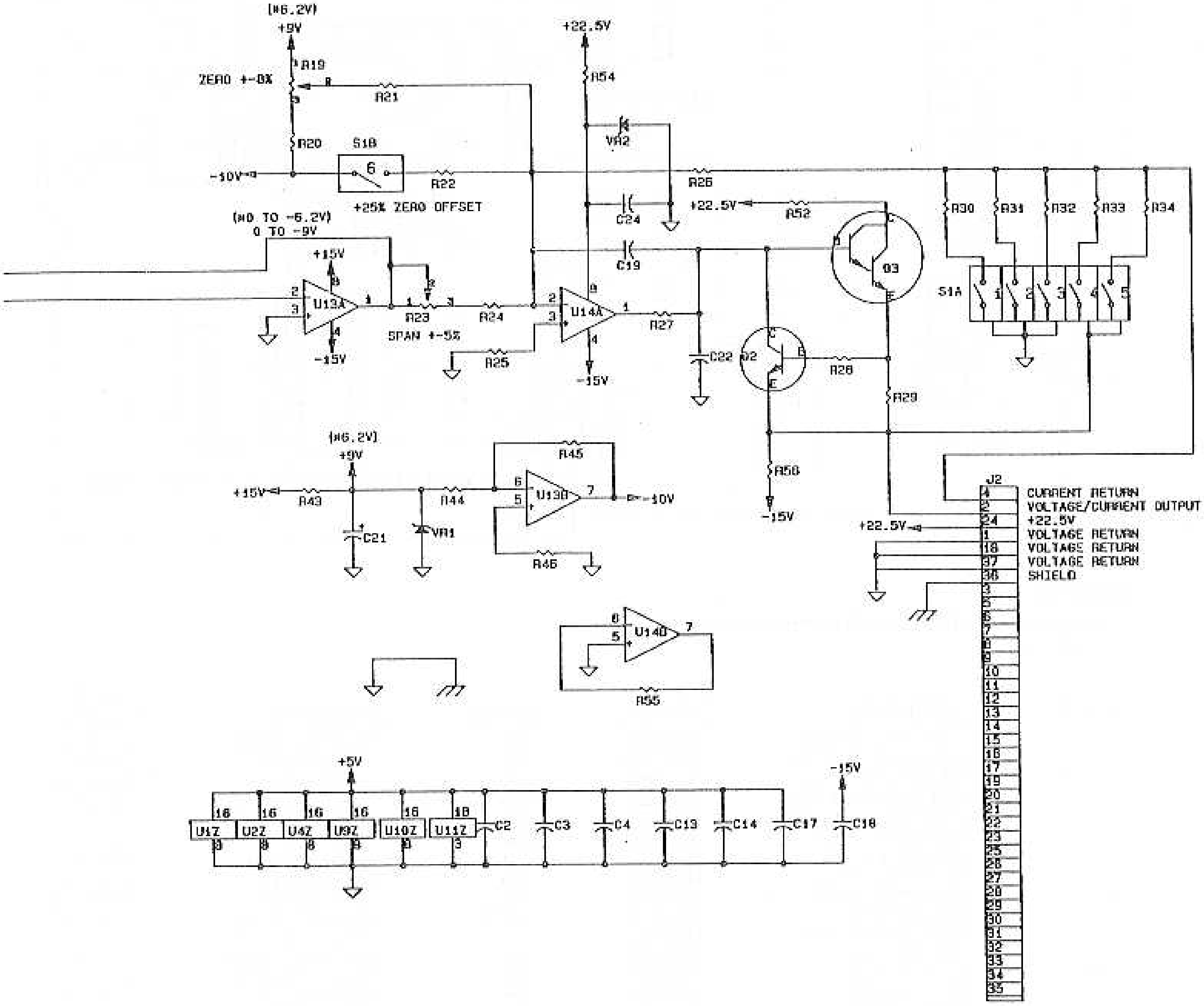
To select the limits of the current or voltage that this analog card will provide to the peripheral device, refer to the OUTPUT PROGRAMMING TABLE and set S1-1 through S1-6 for the desired current or voltage output range.

Once this is done, use R19 to adjust the zero reference so that the card is supplying the correct amount of current or voltage to the peripheral device when the display reads zero.

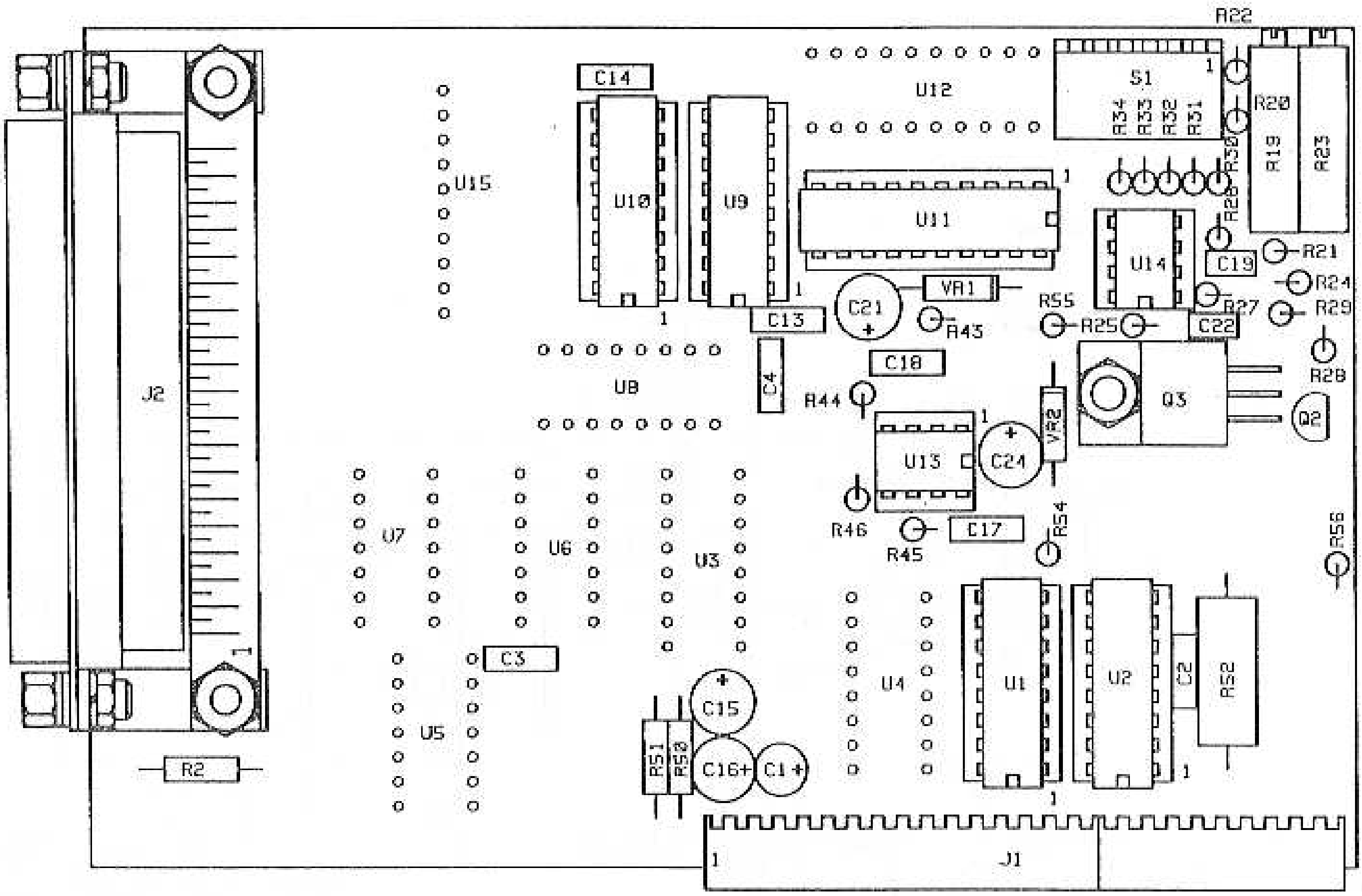
Then, use R23 to span the output to the peripheral device so that the card is supplying the proper amount of current or voltage when the scale is loaded to capacity.

PROGRAMMING

ANALOG OUTPUT PROGRAMMING						
OUTPUT RANGE	SWITCH 1					
	1	2	3	4	5	6
0 - 10 VDC	OFF	OFF	OFF	OFF	ON	OFF
0 - 5 VDC	OFF	OFF	OFF	ON	OFF	OFF
1 - 5mA	OFF	OFF	ON	OFF	OFF	ON
4 - 20mA	OFF	ON	ON	OFF	OFF	ON
10 - 50mA	ON	ON	ON	OFF	OFF	ON



DIGITAL TO ANALOG SCHEMATIC
*Revision E



PARTS LIST

DIGITAL TO ANALOG PC CARD (WT P/N 23438-0020)
***Revision E**

SYMBOL	DESCRIPTION	W-T PART NUMBER
C1	CAPACITOR, 47UF-10V	17992-0095
C2-4,13,14,17,18	CAPACITOR, 0.1UF-100V	15623-0120
C15,16,21,24	CAPACITOR, 22UF-35V	17995-0076
C19	CAPACITOR, 100PF-200V	15619-0134
C22	CAPACITOR, .01UF-100V	15620-0123
J1	CONNECTOR, 10 PIN	17733-0099
J1	CONNECTOR, 16 PIN	17733-0156
J2	CONNECTOR, 37 PIN	17798-0109
Q2	TRANSISTOR, 2N3904	15665-0012
Q3	TRANSISTOR, TIP-122	16271-0032
R19,23	POTENTIOMETER, 20K	14335-0031
R20	RESISTOR, 1.10K	15673-2935
R20*	RESISTOR, 23.2K	15673-4204
R21	RESISTOR, 1.00M	15673-5771
R21*	RESISTOR, 475K	15673-5466
R22	RESISTOR, 511K	15681-5490
R22*	RESISTOR, 412K	15681-5409
R23*	POTENTIOMETER, 10K	14335-0023
R24	RESISTOR, 75.0K	17873-2772
R24*	RESISTOR, 53.6K	17873-2632
R25	RESISTOR, 33K	14477-1094
R26	RESISTOR, 16.2K	17873-2137
R27,28	RESISTOR, 100 OHM	14477-0492
R29	RESISTOR, 4.7 OHM	14477-0179
R30	RESISTOR, 66.5 OHM	15681-1762
R31	RESISTOR, 133 OHM	15681-2059
R32	RESISTOR, 412 OHM	15681-2521
R33	RESISTOR, 34.8K	17873-2459
R34	RESISTOR, 86.6K	17873-2830
R43	RESISTOR, 634 OHM	15677-2709
R43*	RESISTOR, 1.0K	15677-2899
R44	RESISTOR, 90.9K	17873-2855
R44*	RESISTOR, 61.9K	17873-2699
R45	RESISTOR, 100K	17873-2897
R46	RESISTOR, 47K	14477-1136
R50,51	RESISTOR, 22 OHM	14477-0336
R52	RESISTOR, 82 OHM	15671-0477
R54	RESISTOR, 560 OHM	14477-0674
R55	RESISTOR, 10 OHM	14477-0252
R56	RESISTOR, 3.9K	14477-0872
S1	SWITCH, SIDE TOGGLE - 6	14329-1060
U1,2	IC, 74LS138	14315-0580
U9,10	IC, 74LS259	14315-0837
U11	IC, AD7545	15657-0418
U13,14	IC, 1458	14323-0118
VR1	DIODE, ZENER - 1N938	15669-0513
VR1*	DIODE, ZENER - 1N827	15669-0554
VR2	DIODE, ZENER - 1N5248B	15669-0521
XU1,2,9,10	SOCKET, IC - 16 PIN	14361-0038
XU11	SOCKET, IC - 20 PIN	14361-0137
XU13,14	SOCKET, IC - 8 PIN	14361-0012

ANALOG PC CARD
PC CARD 22696-0011

CIRCUIT DESCRIPTION

The Analog Output PC Card provides a selectable range of current and/or d.c. voltage to a peripheral device. Output from the card is proportional to the gross weight applied to the scale.

The card receives two inputs, a reference voltage and a weight voltage, from P25 on the Microprocessor/A-to-D PC Card.

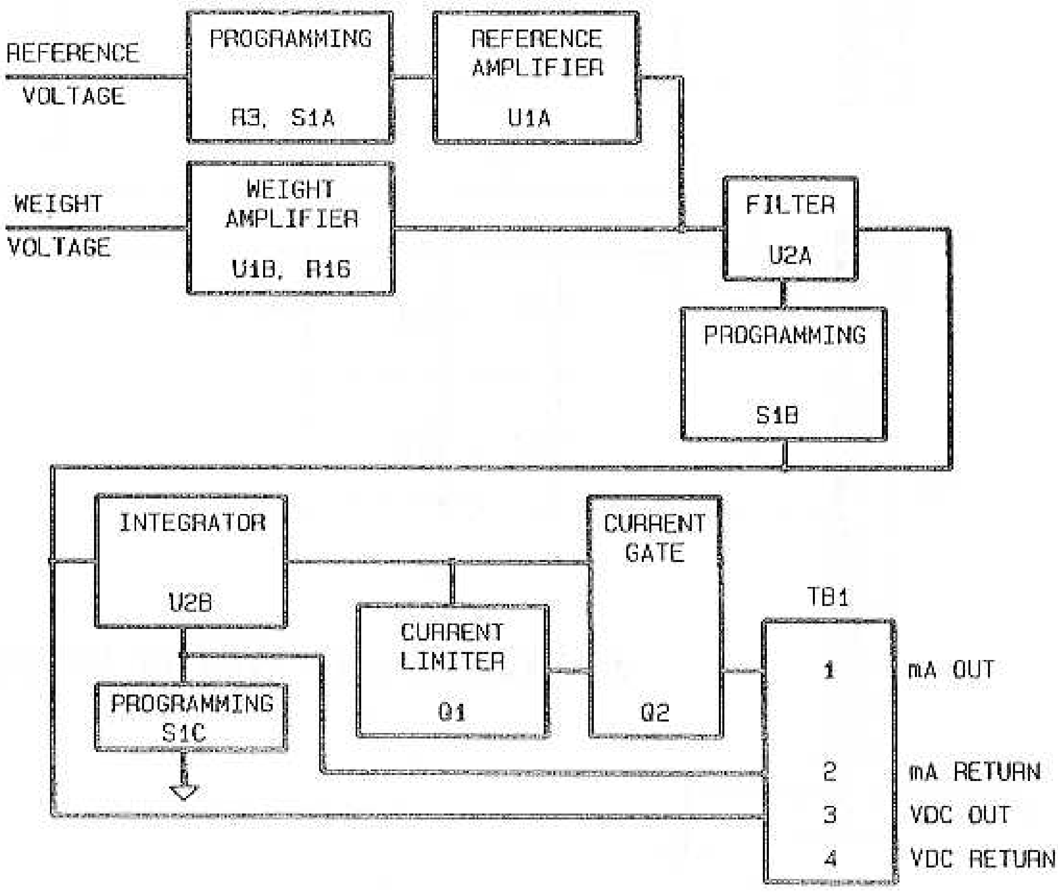
The reference voltage enters the card through J2-3. From there, it passes through R3, the Zero Reference Adjustment, and S1A, the switch that sets the output range of U1A.

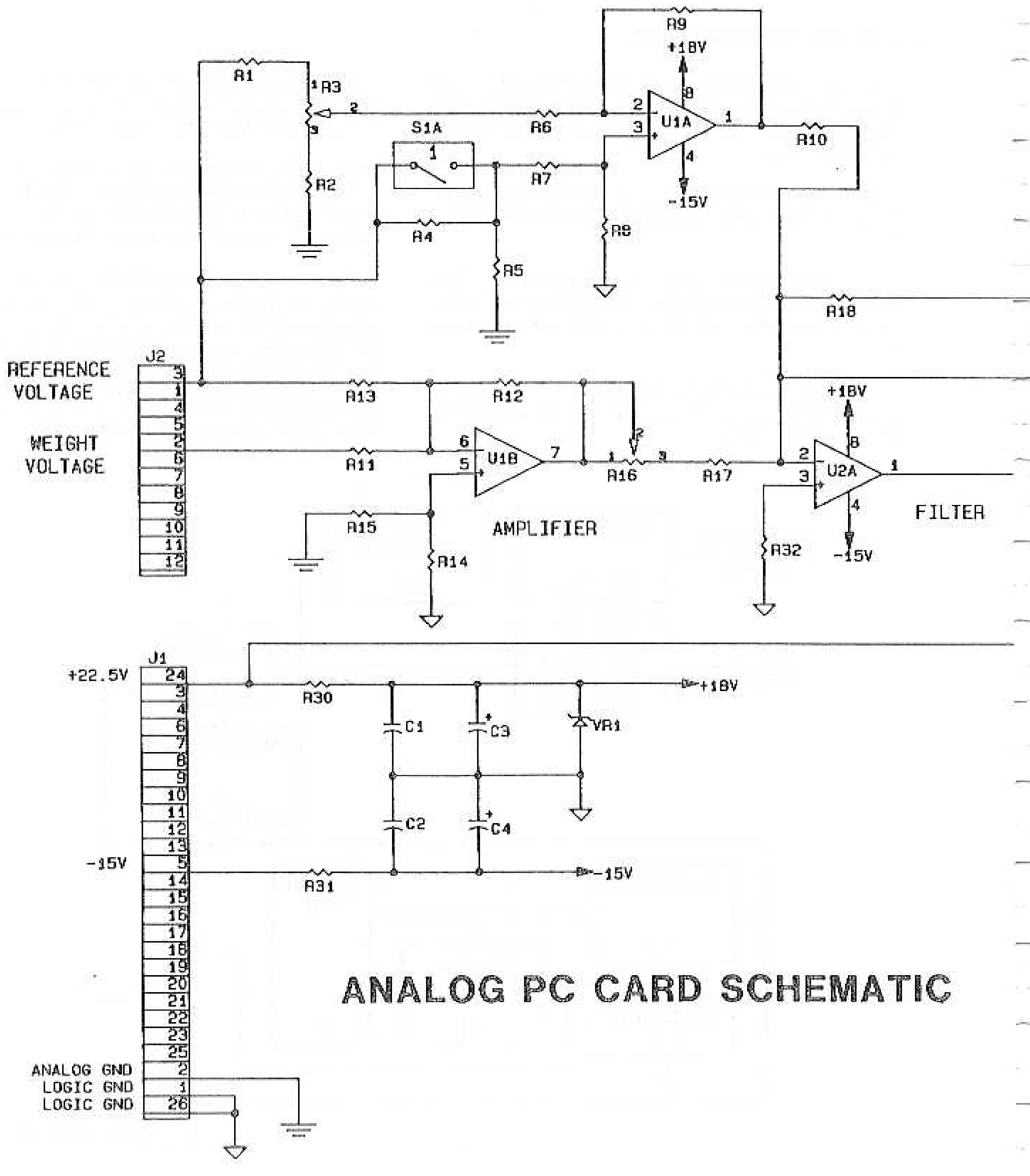
Weight voltage enters the card through J2-2. From there, it is amplified and filtered by U1B and passed through R16, the Span Adjustment.

Once filtered and adjusted, the reference and weight voltages, which are of opposite polarity, are combined together and applied to a U2A, a filter.

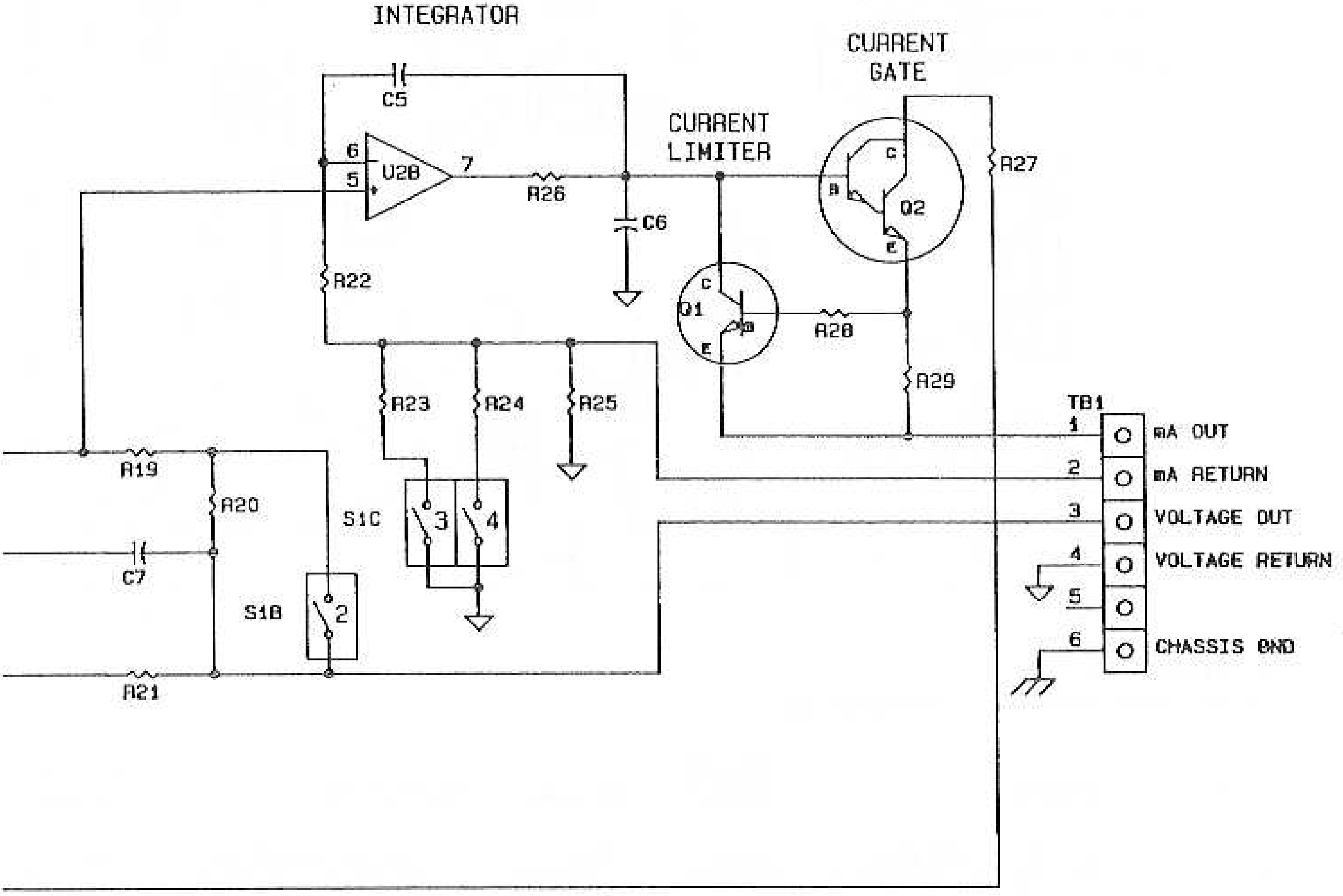
After the combined voltage is filtered by U2A, it passes through S1B (S1- 2) which limits the amount of voltage that is simultaneously applied to TB1, pin 3 as voltage output and to the circuitry that develops current output.

The components responsible for the conversion of output voltage to current output are S1C (S1-3 & S1-4), U2B, Q1, and Q2. When voltage is fed into this set of components, the voltage is integrated by U2B and passed on to the current gate Q2. Q2, in turn, provides current output to TB1 pin 1 in the programmed milliamps set by S1C. (Q1 serves as a current limiter which turns off Q2 if excessive current is drawn through Q2.)





ANALOG PC CARD SCHEMATIC



ADJUSTMENTS

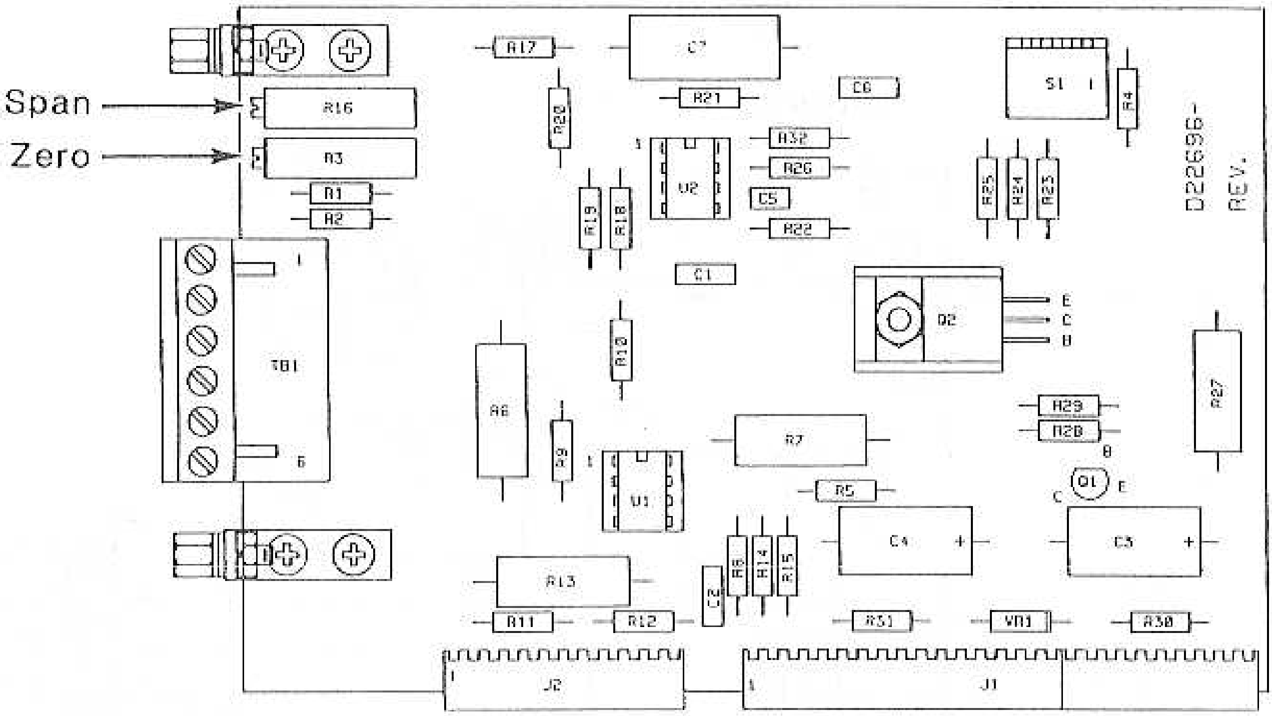
To select the limits of the current or voltage that the Analog card will provide to the peripheral device, refer to the OUTPUT PROGRAMMING Table and set S1-1 through S1-4 for the desired current or voltage output range.

Once this is done, use R3 to adjust the zero reference so that the card is supplying the correct amount of current or voltage to the peripheral device when no weight is on the scale.

Then, use R16 to span the output to the peripheral device so that the card is supplying the proper amount of current or voltage when the scale is loaded to capacity.

PROGRAMMING

ANALOG OUTPUT PROGRAMMING				
OUTPUT RANGE	SWITCH 1			
	1	2	3	4
1-5 Milliamps	ON	ON	OFF	OFF
4-20 Milliamps	ON	ON	OFF	ON
10-50 Milliamps	ON	ON	ON	ON
0-5 VDC	OFF	OFF	OFF	OFF
0-10 VDC	OFF	ON	OFF	OFF



Parts List

ANALOG OUTPUT PC CARD (W-T P/N 22696-0011)

SYMBOL	DESCRIPTION	W-T PART NUMBER
C1, 2, 6	Cap., .01UF 10% 200V cer	15622-0121
C3, 4	Cap., 22UF -20% ±75% 35V alum	17763-0118
C5	Cap., 100PF 10% 200V cer	15619-0134
C7	Cap., 1UF 10% 50V polycarb	14331-0175
J1	Connector, 16 socket	17733-0156
J1	Connector, 10 socket	17733-0099
J2	Connector, 12 socket	17733-0115
Q1	Transistor, 2N3904	15665-0012
Q2	Transistor, TIP122	16271-0032
R1, 2	Res., 4.99K ±1% 1/8W film	15681-3560
R3	Pot., 10K	14335-0023
R4, 5	Res., 10K ±1% 1/8W film	15681-3859
R6, 7, 13	Res., 1.33M ±1% 1/2W film	15679-5800
R8, 9	Res., 549K ±1% 1/8W film	15681-5524
R10	Res., 110K ±1% 1/8W film	15681-4857
R11, 12, 14	Res., 54.9K ±1% 1/8W film	15681-4568
R15	Res., 52.3K ±1% 1/8W film	15681-4543
R16	Pot., 50K	14335-0056
R17	Res., 84.5K ±1% 1/8W film	15681-4741
R18	Res., 20K ±1% 1/8W film	15681-4147
R19	Res., 47.5K ±1% 1/8W film	15681-4501
R20	Res., 68.1K ±1% 1/8W film	15681-4659
R21, 26, 28, 31	Res., 100 ohm ±5% 1/4W CC	14477-0492
R22	Res., 22K ±5% 1/4W CC	14477-1052
R23	Res., 60.4 ohm ±1% 1/8W film	15681-1721
R24	Res., 121 ohm ±1% 1/8W film	15681-2018
R25	Res., 365 ohm ±1% 1/8W film	15681-2471
R27	Res., 82 ohm 1W	15671-0477
R29	Res., 4.7 ohm ±5% 1/4W CC	14477-0179
R30	Res., 560 ohm ±5% 1/4W CC	14477-0674
R32	Res., 42.2K ±1% 1/8W film	15677-4457
S1	Switch, 4 position	14329-0047
TB1	Terminal Block, Header	18009-0532
TBP	Terminal Block, Plug-6	18009-0052
U1, 2	IC, 1458	14323-0118
VR1	Diode, Zener-1N5248B	15669-0521
XQ2	Heatsink	15556-0022
XU1, 2	Socket, IC-8 pin	14361-0012

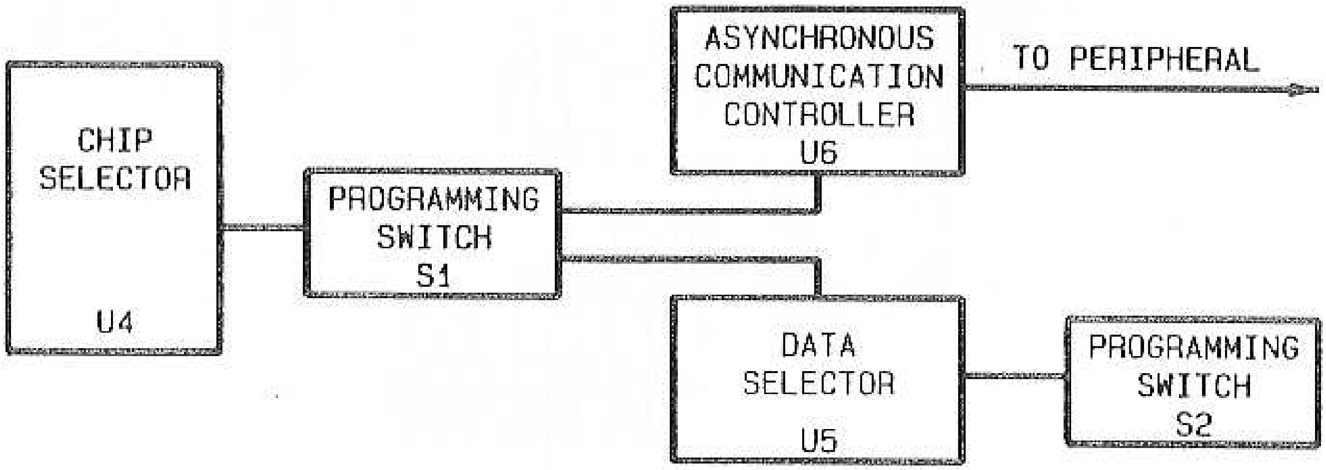
RS 422/485 PC CARD
WT/PN 22514-0037

CIRCUIT DESCRIPTION

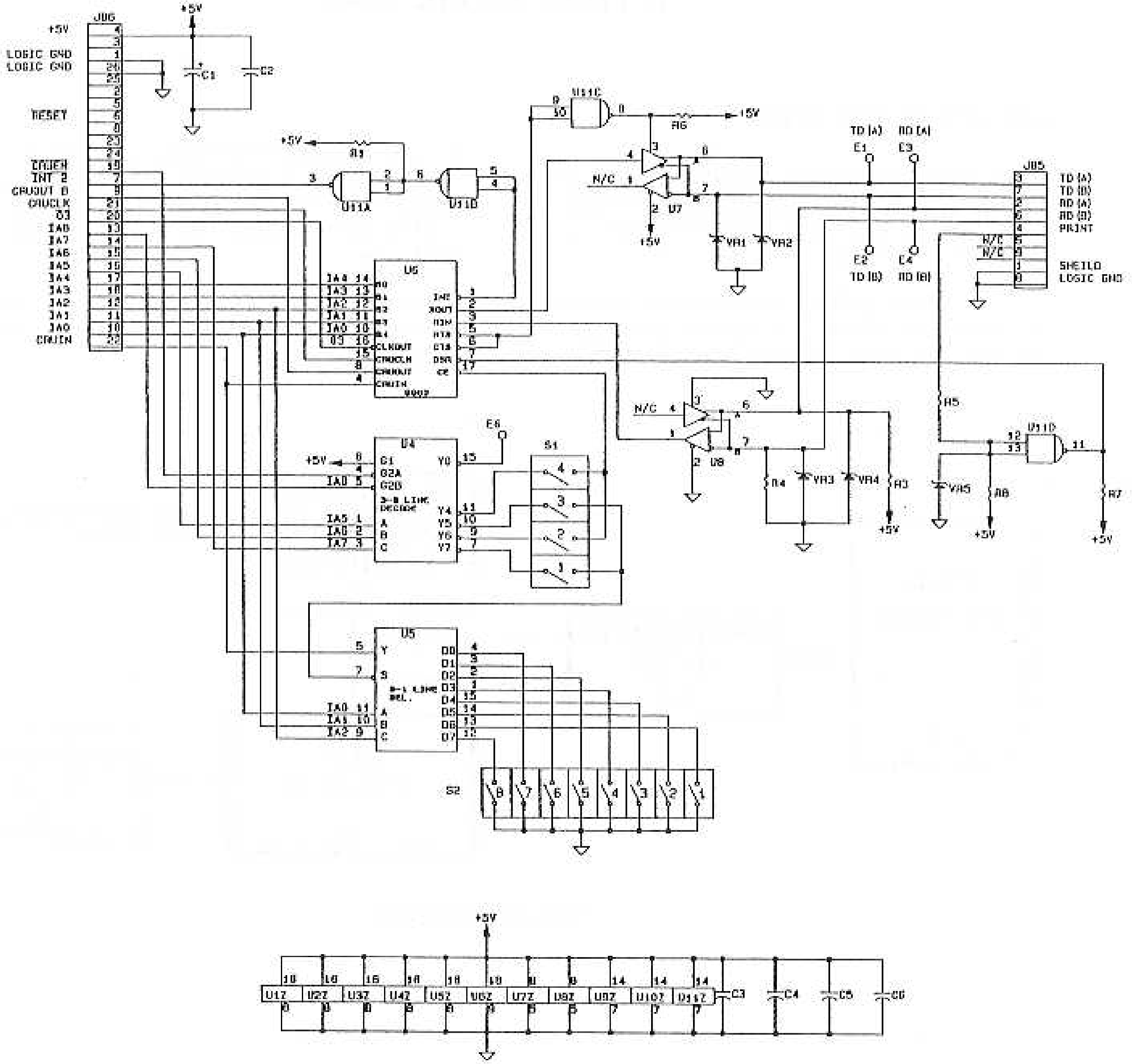
This RS 422/485 Serial Interface PC Card provides an asynchronous communication link between your indicator and a peripheral device such as a printer, computer, or programmable controller.

The heart of this card is the asynchronous communications controller (U6) which connects the main pc card's microprocessor to the peripheral device. When U6 is enabled by the chip selector (U4) through S1, it will receive data from the microprocessor and request permission from the peripheral device to transmit data. Upon receiving a READY signal from the peripheral device, U6 will transmitt data to it.

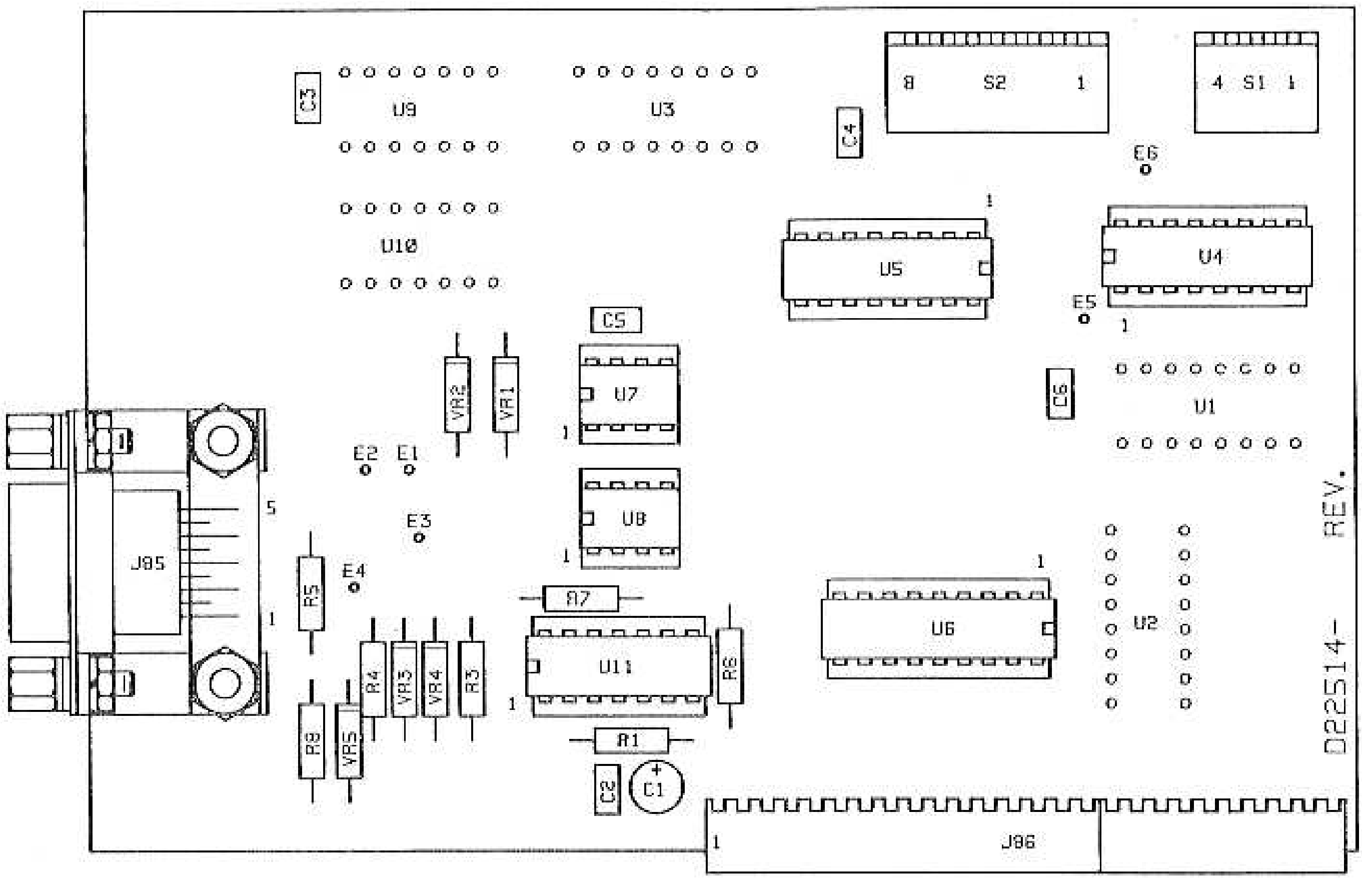
U4 also enables the data selector (U5), through S1. This allows the microprocessor to obtain programmed switch settings from S2.



BLOCK DIAGRAM



RS 422/485 SCHEMATIC



PARTS LIST

RS 422/485 PC CARD (WT P/N 22514-0037)

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
C1	CAPACITOR, 47UF-10V	17992-0095	U4	IC, 74LS138	14316-0539
C2-6	CAPACITOR, 0.1UF-100V	15620-0123	U5	IC, 74LS251	14316-0829
J85	CONNECTOR, 9 SOCKET	17798-0075	U6	IC, 9902	15657-0194
J86	CONNECTOR, 10 SOCKET	17733-0099	U7,8	IC, 75176	14323-0555
J86	CONNECTOR, 16 SOCKET	17733-0156	U11	IC, 74LS03	14315-1058
R1,6,7	RESISTOR, 3.0K	14477-0849	VR1-5	DIODE, ZENER - 1N751A	15669-0034
R3,4,8	RESISTOR, 1.0K	14477-0732	XU4,5	SOCKET, IC - 16 PIN	14361-0038
R5	RESISTOR, 100 OHM	14477-0492	XU6	SOCKET, IC - 18 PIN	14361-0046
S1	SWITCH, 4 POS.	14329-1045	XU7,8	SOCKET, IC - 8 PIN	14361-0012
S2	SWITCH, 8 POS.	14329-1086	XU11	SOCKET, IC - 14 PIN	14361-0020

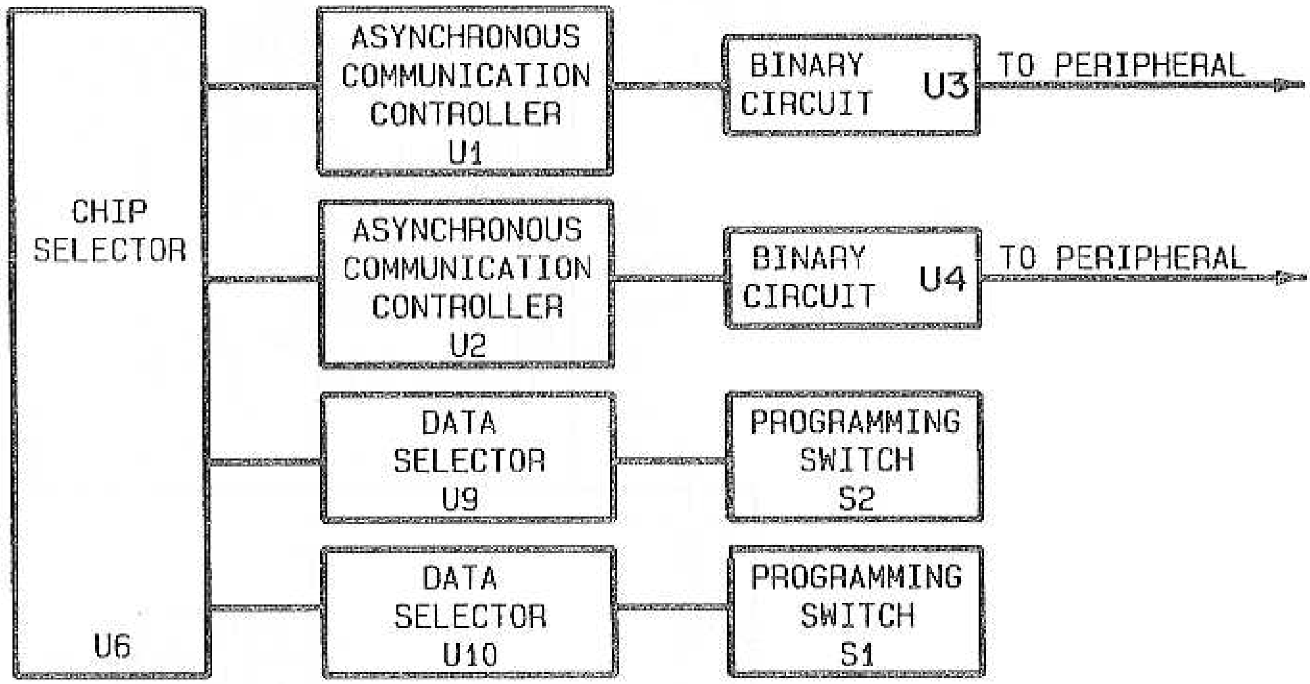
DUAL RS 422/485 PC CARD
WT/PN 21962-0010

CIRCUIT DESCRIPTION

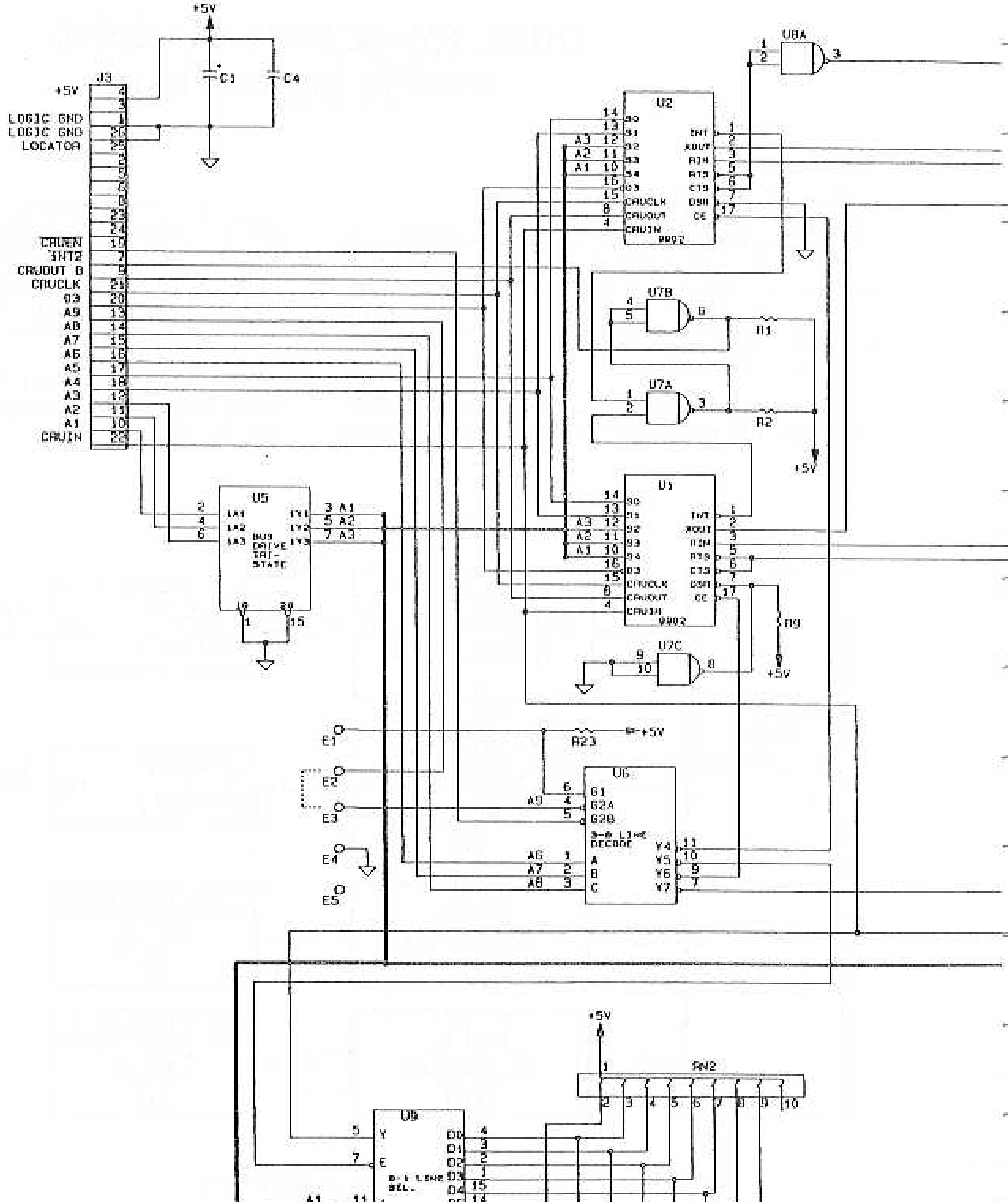
This card provides a dual-port asynchronous ASCII serial-communications interface between the microprocessor on the main pc card and peripheral devices such as a computer, remote display or printer. The two ports are individually switch-selectable for either full or half duplex operation as required.

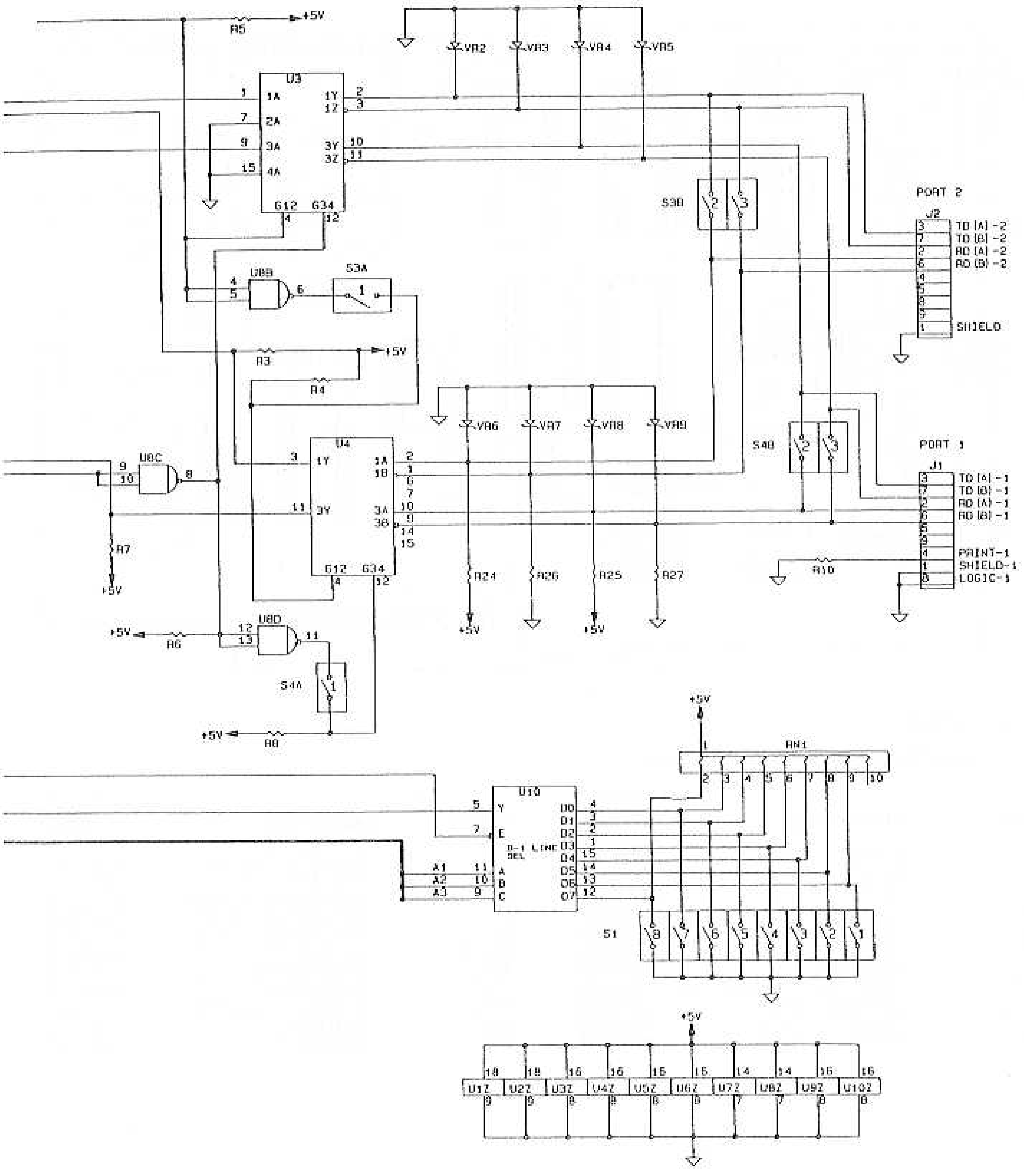
The heart of this card is two asynchronous communications controllers (U1 & U2) which connect the main pc card's microprocessor to a peripheral device through U3 or U4. When U1 or U2 are enabled by the chip selector (U6) they will receive data from the microprocessor and request permission from the peripheral device to transmit data. Upon receiving a READY signal from the peripheral device, U1 or U2 will transmit data to it.

U6 also enables data selectors U9 and U10. This will allow the microprocessor to obtain programmed switch settings from S1 and S2.

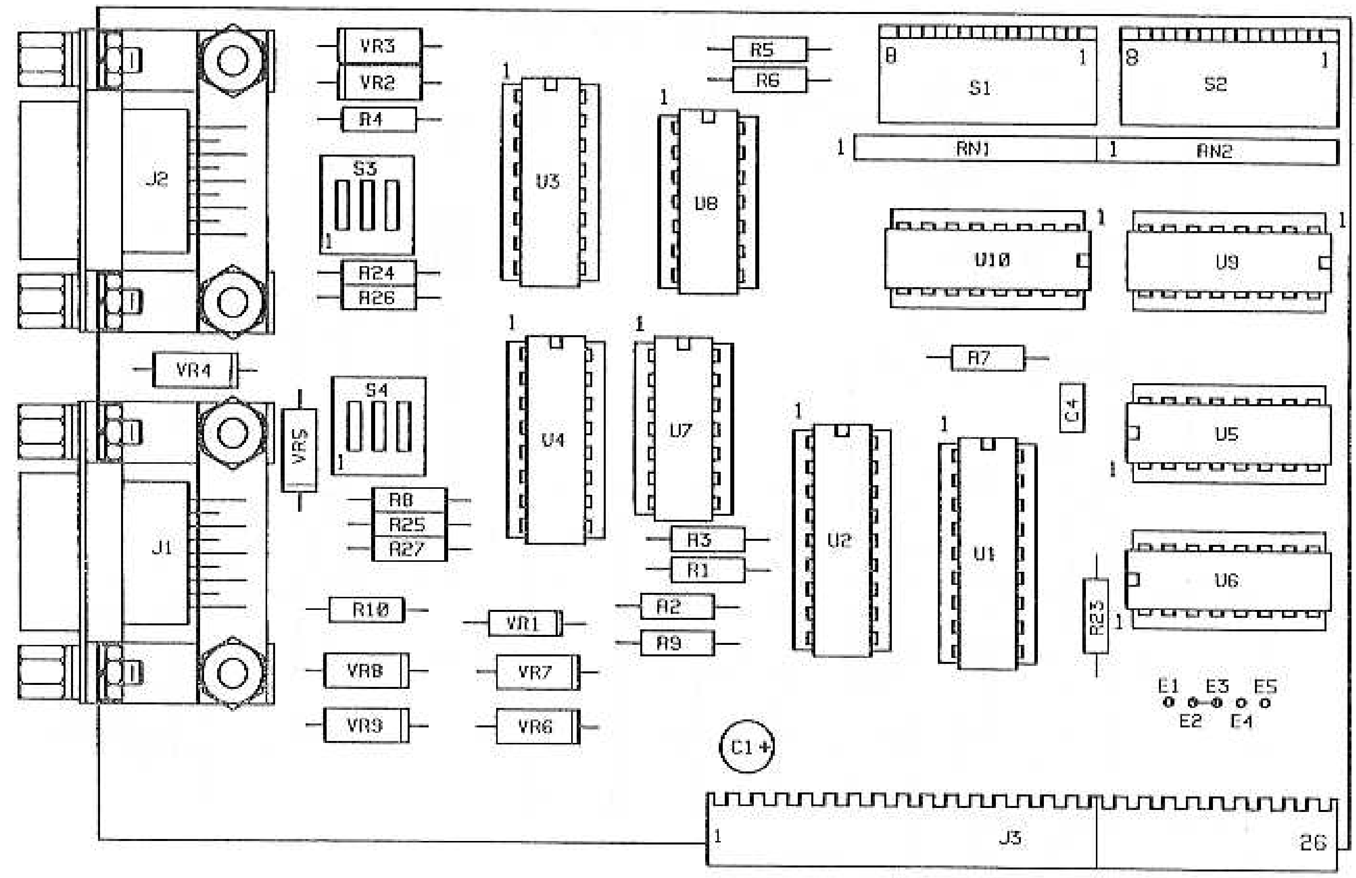


BLOCK DIAGRAM





DUAL RS 422/485 SCHEMATIC



PARTS LIST

Dual RS 422/485 PC CARD (WT P/N 21962-0010)

SYMBOL	DESCRIPTION	W-T PART NUMBER	SYMBOL	DESCRIPTION	W-T PART NUMBER
U1,2	IC, 9902	15657-0194	C1	CAPACITOR, 47UF-10V	17992-0095
U3	IC, 75174	14323-0514	C4	CAPACITOR, .01UF	15620-0123
U4	IC, 75175	14323-0522	J1,2	CONNECTOR, 9 PIN-FEMALE	17954-0067
U5	IC, 74LS367	14315-0936	J3	CONNECTOR, 10 SOCKET	17733-0009
U6	IC, 74LS138	14315-0589	J3	CONNECTOR, 16 SOCKET	17733-0156
U7,8	IC, 74LS03	14315-1068	R1-9,23	RESISTOR, 3.0K	14477-0649
U9,10	IC, 74LS251	14315-0629	R10	RESISTOR, 10 OHM	14477-0252
VR2-9	DIODE, ZENER - 1N5341B, 6.2V	15669-0471	R24-27	RESISTOR, 10K	14477-0732
XU1,2	SOCKET, IC - 18 PIN	14061-0046	RN1,2	RESISTOR, NETWORK-10K	17352-0045
XU3-6,9,10	SOCKET, IC - 16 PIN	14061-0038	S1,2	SWITCH, 8 POS.	14329-1086
XU7,8	SOCKET, IC - 14 PIN	14061-0020	S3,4	SWITCH, 3 POS.	14329-0039

MULTIPLEXED OUTPUT PC CARD
PC CARD 22514-0029

CIRCUIT DESCRIPTION

The Multiplexed Output PC Card consists of two decoders (U1 & U2), an addressable latch (U3) and logic circuitry (U9 & U10). During normal operations, this card is responsible for providing two sets or "bytes" of multiplexed data from the indicator to another device such as a remote display. These sets of data are then used by the receiving device to update one of its display digits.

When the first set of data is ready to be transmitted by the host unit, its microprocessor addresses and enables U1.

This causes U1 to enable U2 so that it can accept the CRUCLK (Communications Register Clock) signal transmitted by the host unit's microprocessor.

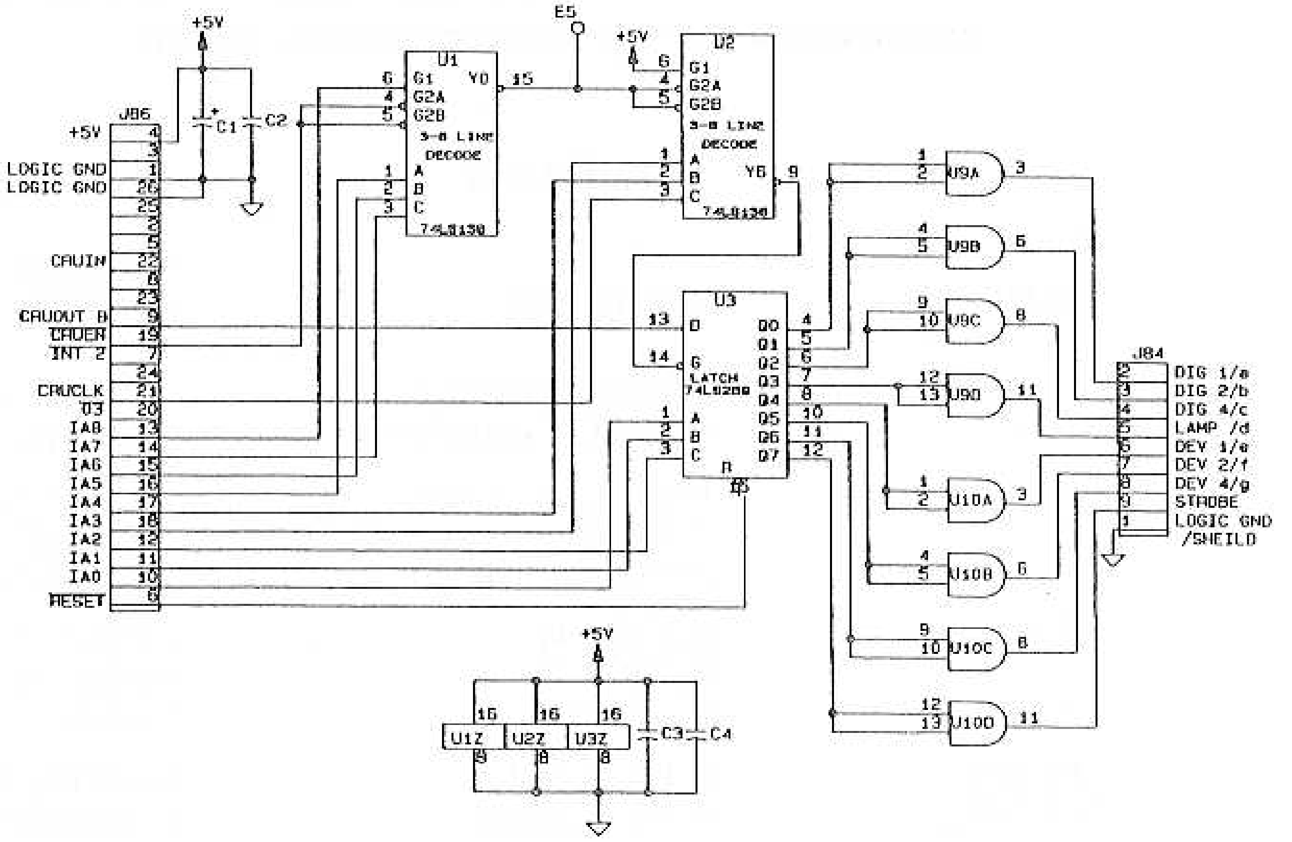
U2 then uses this CRUCLK signal as the timing reference to enable U3 to read serial data transmitted from the host unit's microprocessor via the CRUOUT (Communications Register Output) line.

As the first set of data, the digit-select byte, is received by U3, it is decoded, latched and passed through the logic circuitry to the device which is connected to the host unit.

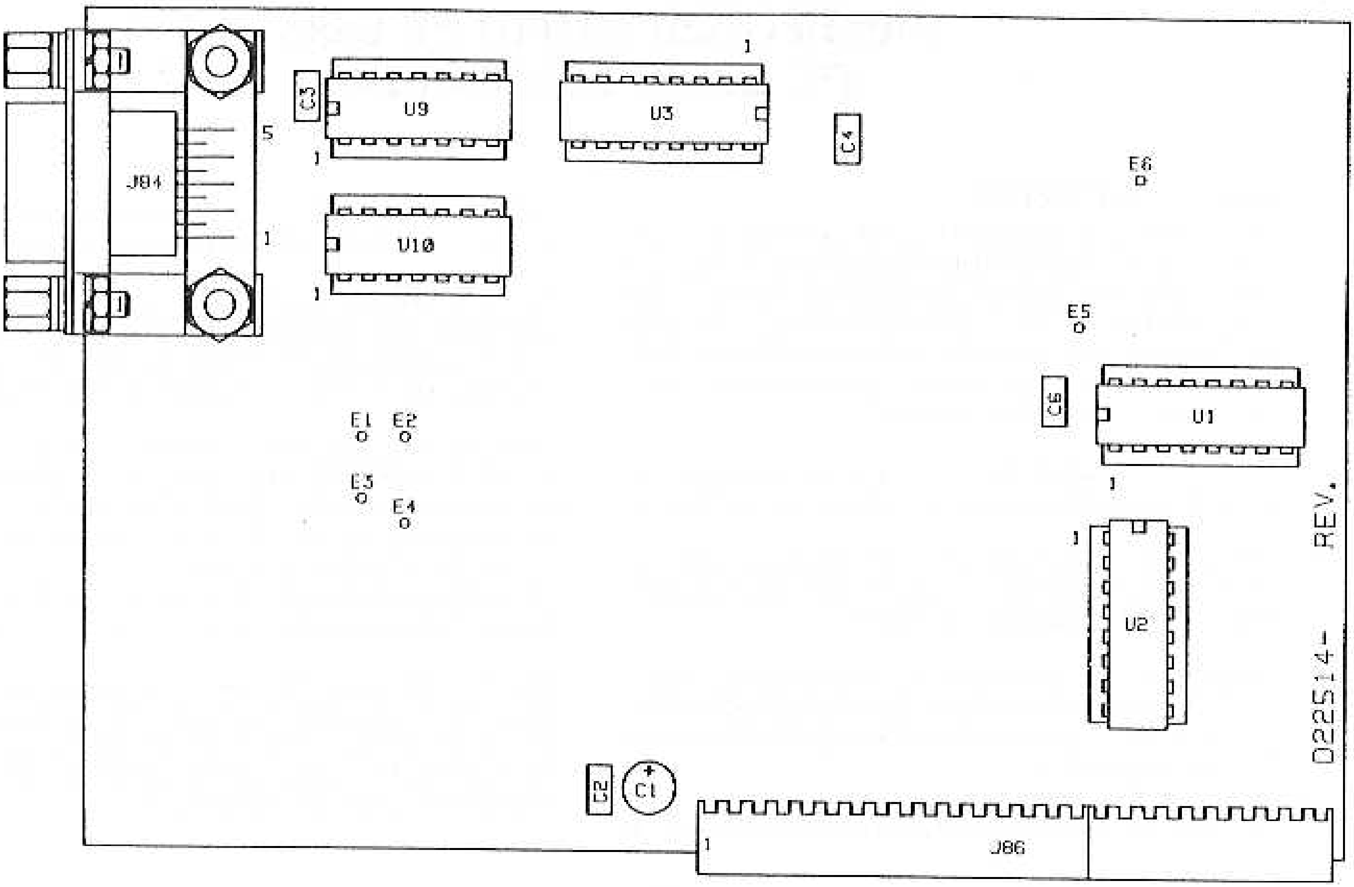
The part of the digit-select byte to be decoded by U3 is the STROBE bit (Q7). When this bit is latched in a logic high state and passed through the logic circuitry, the device to which the output is sent can read the data-select byte.

After the interval that allows the receiving unit to read the decoded digit-select byte, the host unit transmits a second set of data, the segment-select byte. As with the first data byte, the last part of the segment-select byte decoded by U3 is the STROBE bit. Once it has been decoded and Q7 is latched in a logic low state, the device to which the host unit is connected reads the segment-select byte.

U3 is reset when the host unit is powered up. When this is done, the host unit's power supply circuitry issues a logic low on the RESET line which sets all of U3's output lines to a logic low state. The card is then ready to receive data from the host unit's microprocessor.



MULTIPLEXED OUTPUT PC CARD SCHEMATIC



MULTIPLEXED OUTPUT PC CARD COMPONENT LAYOUT

PARTS LIST

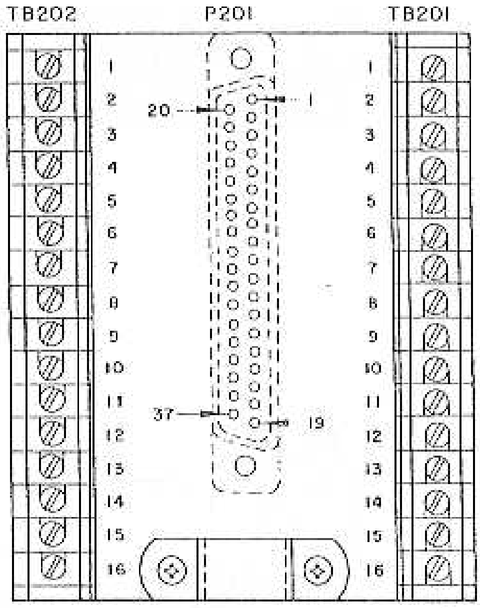
SYMBOL	DESCRIPTION	W-T PART NUMBER
C1	10V-47UF Capacitor	17992-0095
C2-C4	100V-.01UF Capacitor	15620-0123
J84	9-Socket Connector	17798-0075
J86	16-Socket Connector	17733-0156
J86	10-Socket Connector	17733-0099
U1, U2	IC, 74LS138	14315-0589
U3	IC, 74LS259	14315-0837
U9, U10	IC, 74LS08	14315-0282
XU1-XU3	16-Pin IC Socket	14316-0038
XU9, XU10	14-Pin IC Socket	14361-0020

A-14 BCD INTERCONNECT PC CARD 19540-0015

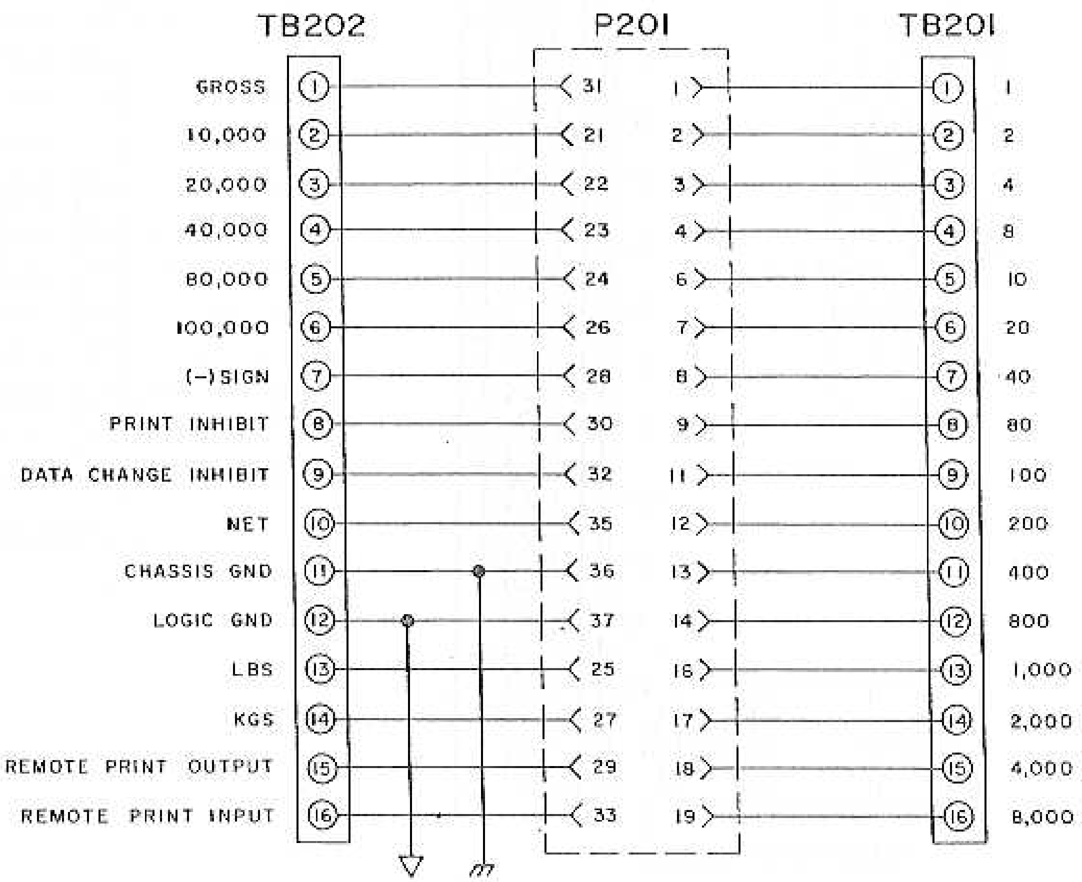
The A-14 interconnect PC card is a printed circuit terminal board with a connector that provides connection of individual wires from a peripheral device to the connector on the A-4 BCD PC card.

PARTS LIST

DESG.	DESCRIPTION	PART NO.
P201	37 pin connector	17819-0096
TB201, TB202	PC board terminal block	17813-0167
	Cable clamp	17810-0079



COMPONENT LAYOUT



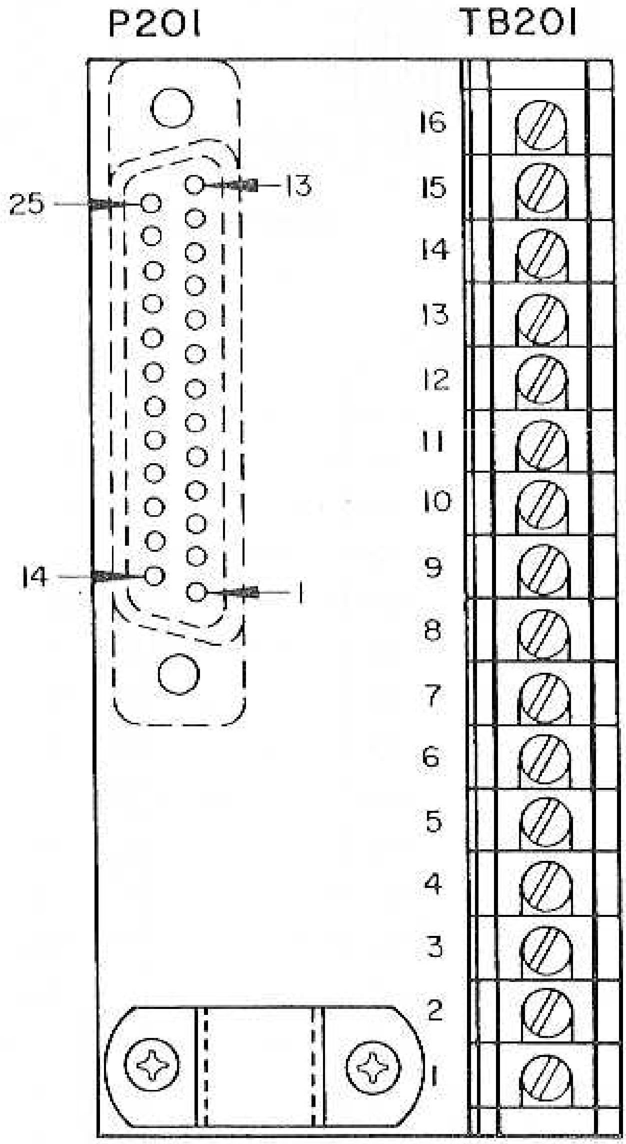
SCHEMATIC

A-15 SERIAL INTERCONNECT
PC CARD 19544-0011

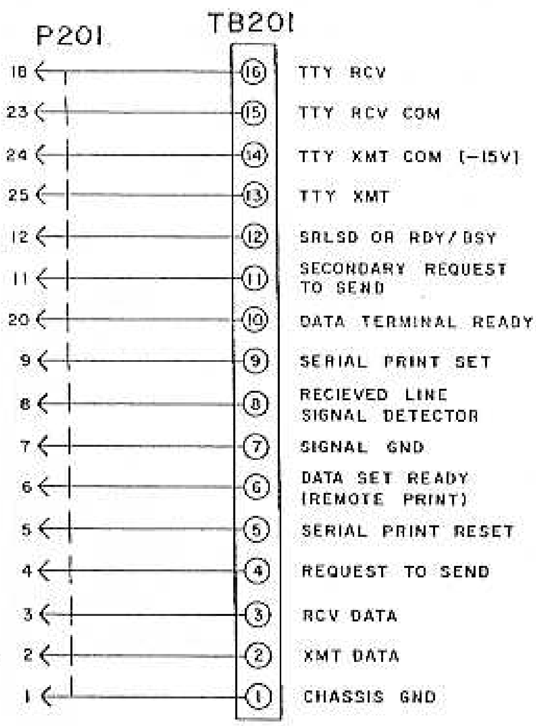
The A-15 interconnect PC card is a printed circuit terminal board with a connector that provides connection of individual wires from a peripheral device to the connector on the A-5 serial PC card.

PARTS LIST

DESG.	DESCRIPTION	PART NO.
P201	25 pin connector	17819-0039
TB201, TB202	PC board terminal	17813-0167
	Cable clamp	17810-0046



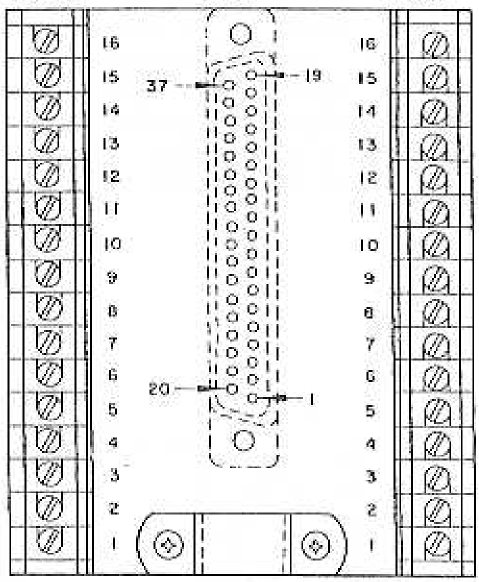
COMPONENT LAYOUT



SCHEMATIC

A-16 CUTOFF INTERCONNECT
PC CARD 20164-0018

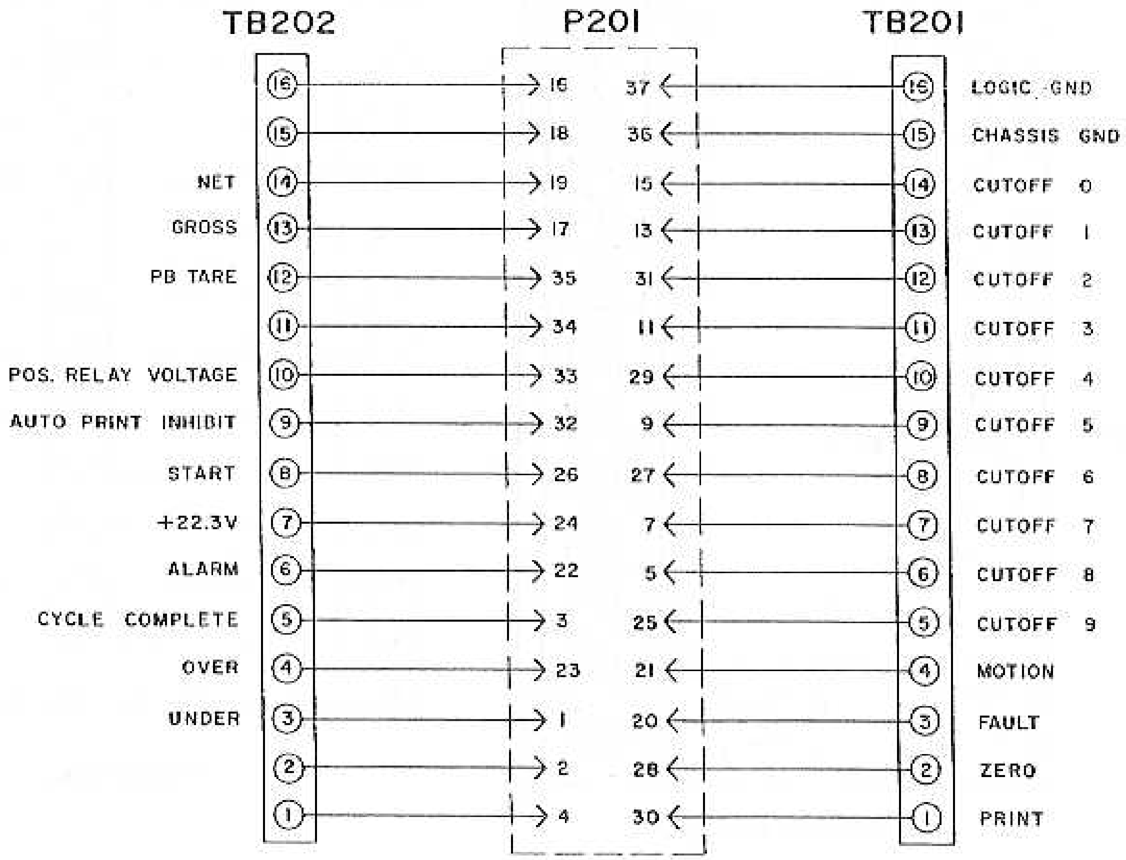
The A-16 interconnect PC card is a printed circuit terminal board with a connector that provides connection of individual wires from peripheral device to the connector on the A-6 cutoff PC card.



COMPONENT LAYOUT

PARTS LIST

DESG.	DESCRIPTION	PART NO.
P201	37 pin connector	17819-0047
TB201, TB202	PC board terminal	17813-0167
	Cable clamp	17810-0079

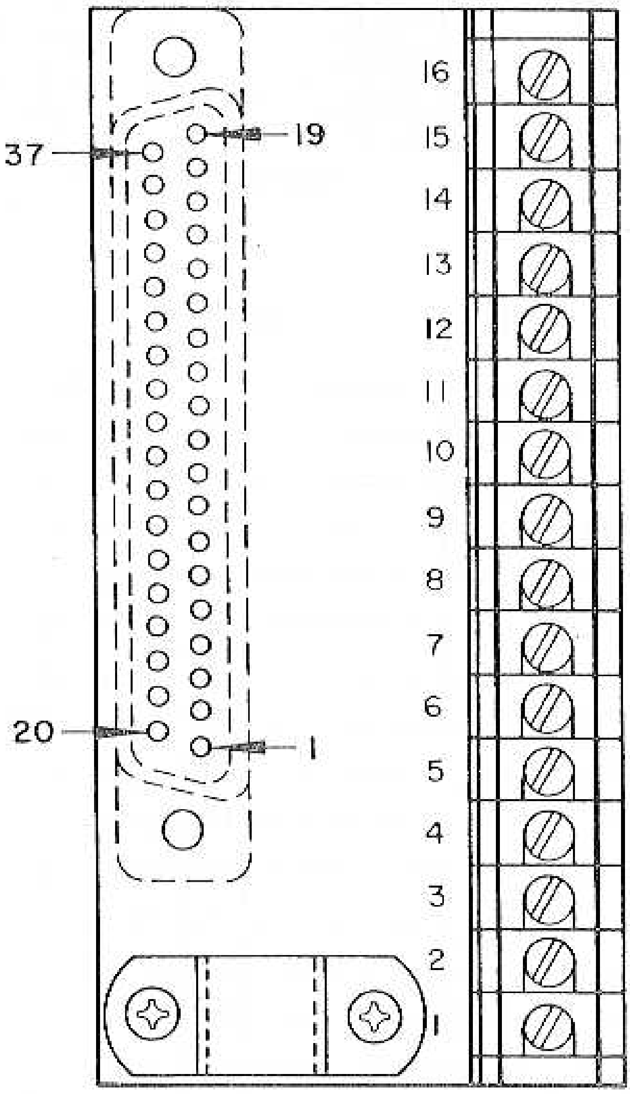


A-17 CUTOFF INTERCONNECT PC CARD 20160-0012

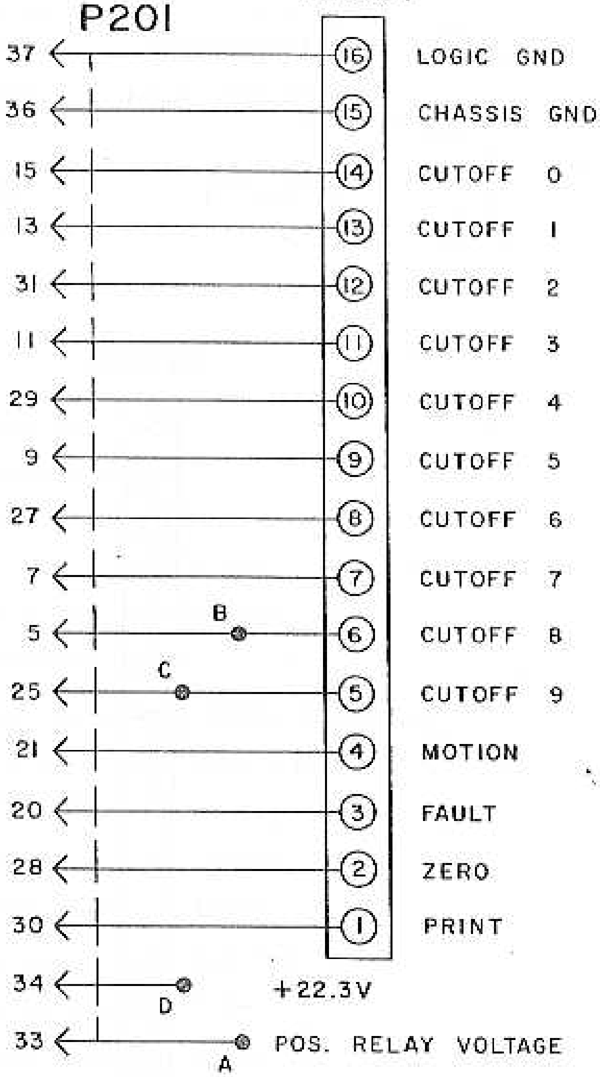
The A-17 interconnect PC card is a printed circuit terminal board with a connector that provides connection of individual wires from a peripheral device to the connector on the A-6 cutoff PC card where there is not enough room to accommodate an A-16 interconnect PC card. Jumper points are available for modifying the connections available.

PARTS LIST

DESG.	DESCRIPTION	PART NO.
P201	37 pin connector	17819-0047
TB201, TB202	PC board terminal	17813-0167
	Cable clamp	17810-0046



COMPONENT LAYOUT



SCHEMATIC