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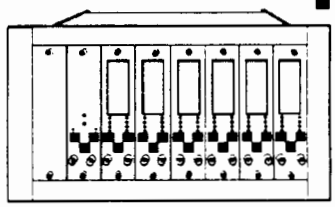
Find the *GE / Bently Nevada 3300/40-03-01-00-00-00* at our website: *Click HERE*

DOCUMENT NO. 82344-01

3300/40 ECCENTRICITY MONITOR

OPERATION MANUAL

BENTLY NEVADA



NOTICE

READ THE FOLLOWING BEFORE INSTALLING OR OPERATING EQUIPMENT.

Bently Nevada Corporation has attempted to identify areas of risk created by improper installation and/or operation of this product. These areas of information are noted as WARNING or CAUTION for your protection and for the safe and effective operation of this equipment. Read all instructions before installing or operating this product. Pay particular attention to those areas designated by the following symbols.

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

CAUTION

Machine Protection Could Be Discontinued

SYMBOLS

Special symbols are used in the manual to illustrate specifics in the step–by–step process. For example:



PRESS



FLASHING



OBSERVE



SCREWDRIVER

2344A17

FOREWORD

This document is for personnel who operate the 3300 Monitoring System. The procedures are presented in step-by-step graphic format.

RELATED DOCUMENTS

- 3300 System Overview, 80171
- 3300 System Installation Instructions, 80172
- 3300 System Troubleshooting, 80173
- 3300 Power Supply, 80174
- 3300 System Monitor, 80175
- 3300/40 Eccentricity Monitor Maintenance, 82345-01
- Dynamic Data Manager System, 46390-01

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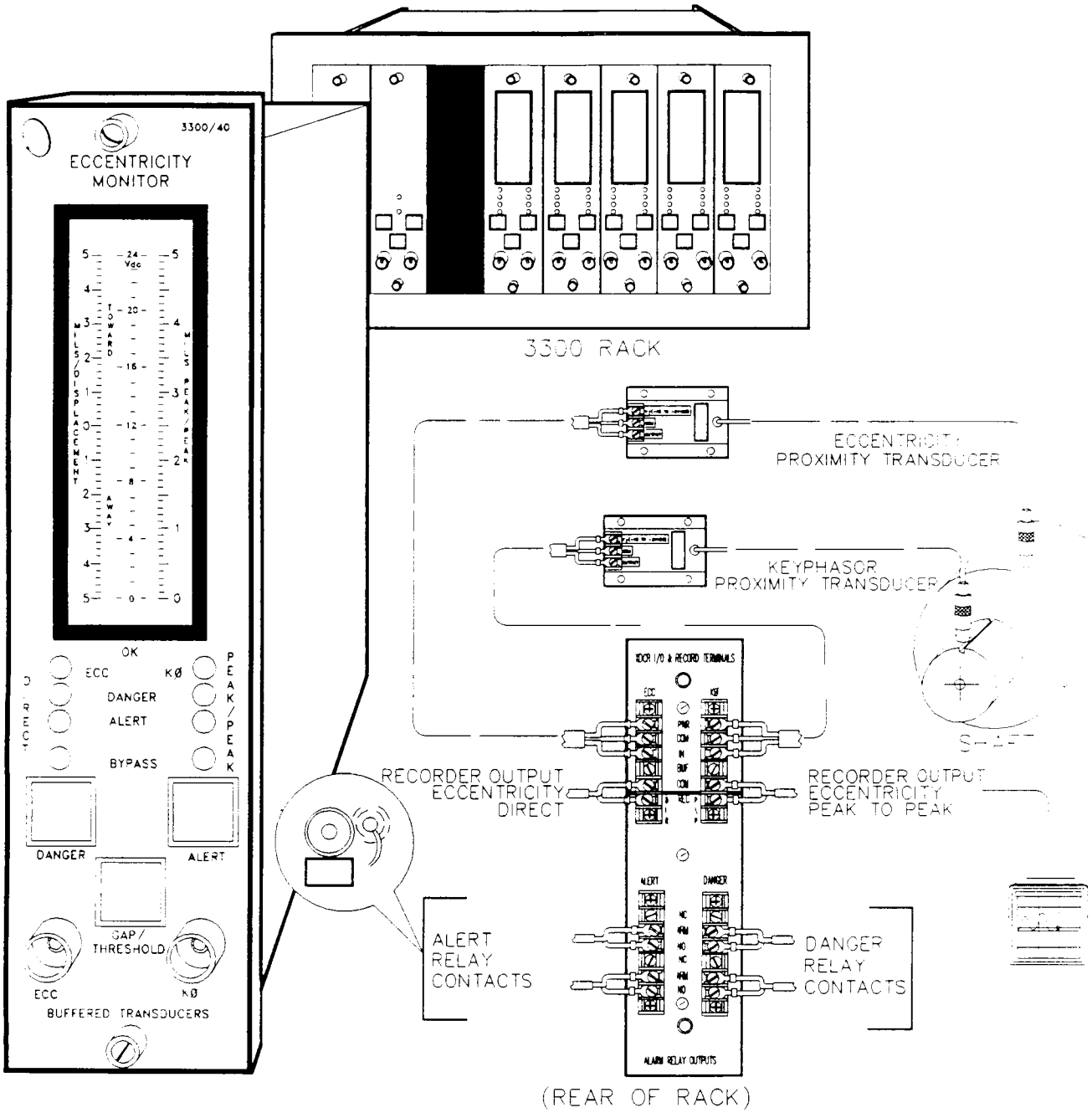
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1 ECCENTRICITY MONITOR SYSTEM



2 MONITOR FUNCTIONS

SHEET 1 OF 2

ECCENTRICITY - Eccentricity (ECC) is defined as the variation between the outer diameter of a shaft surface and the true geometric center line of the shaft. This variation, called shaft bow, can be a fixed mechanical bow, a temporary thermal or gravity bow, or some combination of each. The Eccentricity Monitor measures shaft bow using the input from an eccentricity transducer and a Keyphasor source.

DIRECT AND PEAK TO PEAK - The input signal to the monitor from the eccentricity transducer is split into two channels designated as Direct and Peak to Peak channels.

KEYPHASOR - The Keyphasor (KØ) input is defined as a once-per-shaft-revolution event indicator. The monitor can be programmed to accept the input from a Keyphasor signal routed directly to the monitor through the Signal Input Module, or from either one of two Keyphasor input signals routed to the monitor through the System Monitor and a Keyphasor bus on the system backplane. If these external Keyphasor signals are not available, the monitor can be programmed to use an internal, simulated Keyphasor signal.

KEYPHASOR THRESHOLD VOLTAGE AND HYSTERESIS - The Keyphasor threshold voltage can be programmed for automatic or manual mode, and the Keyphasor hysteresis is jumper selected. For a description of Keyphasor threshold voltage and hysteresis refer to Eccentricity Monitor Maintenance Manual, Part No. 82345-01.

ECCENTRICITY OK - When the eccentricity transducer signal is within its upper and lower OK limits, the transducer is defined as OK. The eccentricity OK detection circuit controls the ECC OK LED and the monitor relay drive to the OK Relay.

KEYPHASOR OK - The Keyphasor (KØ OK) LED goes on if the Keyphasor input is within 1 to 600 RPM, and if the change in rpm between consecutive cycles is not greater or less than 50%. If the Keyphasor input goes NOT OK, the peak to peak channel is clamped to zero.

TIMED OK/MONITOR DEFEAT - Timed OK/Monitor Defeat prevents faulty transducer wiring from causing false alarms. If the eccentricity input signal level is not within the upper and lower OK limits, the ECC OK LED goes off, the BYPASS LEDs go on, the Direct and Peak to Peak channels are disabled, and the OK Relay deenergizes. If the eccentricity input signal level is restored within the upper and lower OK limits for 60 seconds, the ECC OK LED starts flashing at 1 Hz to indicate the OK state is restored, the BYPASS LEDs go off, and monitoring is enabled. The RESET switch on the front panel of the System Monitor must be pressed to stop the ECC OK LED from flashing (it remains on). If the eccentricity channel remains in the NOT-OK state, the MONITOR BYPASS switch on the monitor circuit board can be set to put the monitor out of service. Without this feature, the OK Relay could not be reactivated. When Timed OK/Monitor Defeat Mode is selected, the NOT-OK Nonlatching Mode must be selected. The recorders and communication processor output signals are clamped to zero scale, and the LCD display registers zero if the transducer is NOT OK.

OK RELAY - The OK Relay is located on the Power Input Module. Every channel in the rack must be OK or bypassed to energize the OK Relay.

DIRECT ALARM ENABLED/DISABLED - Direct Eccentricity can be programmed for alarm enabled or disabled. If the disabled option is selected, Direct Eccentricity is still displayed on the LCD display, but the alarm setpoints are not used.

FIRST OUT - Separate First Out circuits exist for Alert and Danger alarms. A monitor with First Out option selected flashes a channel alarm LED if that monitor channel is the first in the rack to go into alarm. Pressing the RESET switch acknowledges the First Out.

MONITOR BYPASS AND DANGER BYPASS - The monitor can be bypassed by setting the Monitor Bypass switch on the monitor circuit board. When the switch is set, the OK LEDs go off and the BYPASS LEDs come on. Bypassing the monitor in the NOT-OK state will clear the OK relay drive signal. For maintenance functions, a Danger Bypass switch on the monitor circuit board is set to inhibit the Danger relay drive. This also turns on the BYPASS LEDs. Other front panel functions are not affected. The Danger Bypass function can be enabled with a programming jumper.

2 MONITOR FUNCTIONS

ALARM RELAYS - Monitor alarms can be programmed for both latching and nonlatching mode. In the nonlatching mode, the alarm resets automatically when the alarm condition no longer exists. In the latching mode, the alarm must be reset manually by pressing the RESET switch on the front panel of the System Monitor (or by closing external Reset contacts). The alarm will not reset if the alarm condition still exists.

BUFFERED OUTPUT - The ECC and KØ coaxial cable connectors on the front panel of the monitor, and terminals on the Signal Input Relay Module, provide buffered signals from respective transducers that can be used for connection of external equipment.

RECORDER OUTPUT - A recorder output is provided for each channel of eccentricity (Direct and Peak to Peak). Depending on the option selected, the recorder output levels, proportional to full scale, are either 0 to -10 Vdc, +1 to +5 Vdc, or +4 to +20 mA.

SELF TEST - The monitor has three catagories of self test: power-up, cyclic, and user-invoked.

- Power-up self test is performed automatically each time the monitor power is turned on. A series of basic tests and transducer OK tests are performed.
- Cyclic self test is performed automatically during monitor operation. Errors encountered during cyclic tests disable the monitor, and flash an LCD bargraph error code. Should the error be intermittent, the monitor will return to operation, but the error codes are stored for retrieval during user-invoked self tests. Stored error codes are annunciated by the OK LEDs flashing at 5 Hz provided that the channel is OK.
- User-invoked test performs power-up self test and allows error messages stored during cyclic tests to be read and cleared. Stored errors are annunciated by the OK LEDs flashing at 5 Hz and the error codes displayed on the front panel LCD bargraph.

3 MONITOR OPTIONS

ECCENTRICITY MONITOR

PART NUMBER 1200/40	FULL-SCALE RANGE AA		TRANSDUCER OPTION BB	ALARM RELAY CC	AGENCY APPROVAL DD	RANGE EF
	DIRECT	PEAK TO PEAK				
	01 = 5-0-5 MILS	0-5 MILS	01 = 7200.5mm OR 8mm TRANSDUCER 200 mV/MIL 8 V/mm	00=NONE	00= NOT REQUIRED	01=4-20 mA
	02 = 10-0-10 MILS	0-10 MILS		01=5A EPOXY SEALED	01= CSA	02=0-50 **
	03 = 20-0-20 MILS	0-20 MILS	02 = 7200.11mm TRANSDUCER 100 mV/MIL 4 V/mm	02=5A HERMETICALLY SEALED	02= BASEEFA	
	04 = 30-0-30 MILS	0-30 MILS	03 = 7200.14mm TRANSDUCER 100 mV/MIL 4 V/mm	03=QUAD RELAYS EPOXY SEALED	03= FACTORY MUTUAL	
	05 = 50-0-50 MILS *	0-50 MILS *				
	* = 100-0-100 MICROMETERS	0-100 MICROMETERS				
	10 = 200-0-200 MICROMETERS	0-200 MICROMETERS				
	13 = 500-0-500 MICROMETERS	0-500 MICROMETERS				
	14 = 1000-0-1000 MICROMETERS *	0-1000 MICROMETERS *				

* USED ONLY WITH 11mm OR 14mm TRANSDUCERS

** USED ONLY WITH 8mm OR 8mm TRANSDUCERS

4 PROGRAMMABLE OPTIONS

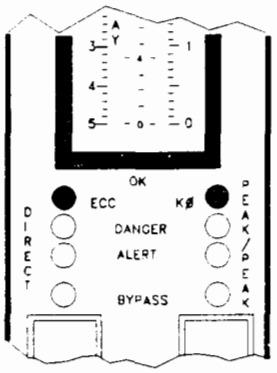
PROGRAMMABLE OPTIONS

FIRST OUT	o ENABLED* o DISABLED
ALARM DELAYS	o 0.1 SECOND o 1 SECOND o 3 SECONDS* o 6 SECONDS
ALERT MODE	o LATCHING* o NONLATCHING
DANGER MODE	o LATCHING* o NONLATCHING
DIRECT ALARM	o ENABLED* o DISABLED
RECORDER OUTPUTS	o 4 TO 20 mA* o +1 TO +5 Vdc o 0 TO -10 Vdc

KEYPHASOR THRESHOLD	o MANUAL * o AUTOMATIC
DANGER BYPASS SWITCH	o ENABLE o DISABLED *
KEYPHASOR SOURCE	o EXTERNAL * o INTERNAL 1 o INTERNAL 2 o SIMULATED
KEYPHASOR HYSTERESIS	o 0.0 Vdc o 0.5 Vdc * o 1.25 Vdc o 2.0 Vdc

*SHIPPED WITH OPTION INSTALLED

5 OK



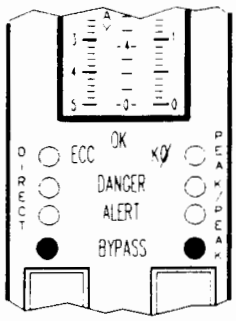
NOTE: THE OPERATING RANGES FOR THE ECCENTRICITY AND KEYPHASOR TRANSDUCERS ARE MONITORED. THEREFORE, THE PERFORMANCE OF EITHER TRANSDUCER CAN CAUSE A NOT-OK CONDITION (DEENERGIZED RELAY) AND **OK** LED TO GO OFF.

OK LED DISPLAY **ECC**	**OK**	**KØ**	CONDITION	OK RELAY DRIVE*
●	OK	●	**ECC** AND **KØ** TRANSDUCERS IN OPERATING RANGE.	ON
○	OK	●	RESPECTIVE **ECC** OR **KØ** TRANSDUCER IN NOT-OK CONDITION.	OFF*
●	OK	○		
○	OK	○	MONITOR IN SELF TEST, OR BOTH TRANSDUCERS NOT OK OR MONITOR BYPASSED.*	OFF*
◎	OK	◎	FLASHING AT 5 Hz = ERROR ENCOUNTERED DURING CYCLIC TEST. READ ERROR MESSAGE. (SEE 14)	ON**
◎	OK	●	FLASHING AT 1 Hz = ECCENTRICITY TRANSDUCER HAS BEEN NOT OK SINCE LAST RESET. (ONLY IF TIMED OK/MONITOR DEFEAT IS SELECTED.)	ON

*THE MONITOR CAN BE BYPASSED TO RESTORE RELAY OK CONDITIONS.
**RELAY DRIVE IS OFF WHILE ERROR IS PRESENT.

274404

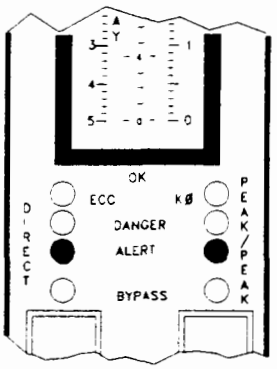
6 BYPASS



LED DISPLAY		CONDITION
DIRECT	**PEAK/PEAK**	
● BYPASS	●	o MONITOR IN DANGER BYPASS MODE o SYSTEM IN POWER-UP MODE o USER-INVOKED SELF TEST IN PROGRESS o TIMED OK/MONITOR DEFEAT o MONITOR BYPASSED o NOT OK KEYPHASOR *

* The PEAK TO PEAK BYPASS LED does not come on when the Keyphasor is above 600 RPM. This prevents the monitor from having a Red LED on when the machine is running above 600 RPM.

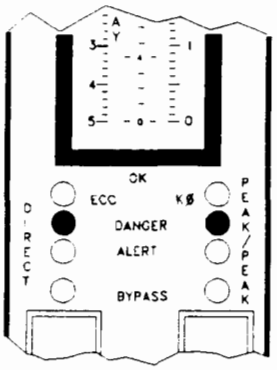
7 ALERT



LED DISPLAY DIRECT	LED DISPLAY PEAK/PEAK	CONDITION	ALERT RELAY DRIVE: DIRECT ALARM ENABLED	ALERT RELAY DRIVE: DIRECT ALARM DISABLED
● ALERT	○	DIRECT OR PEAK/PEAK CHANNEL (OR BOTH) HAS EXCEEDED ALERT LEVEL.	ON	OFF
○ ALERT	●		ON	ON
● ALERT	●		ON	ON
◎ ALERT	○	FIRST OUT CONDITION FOR RESPECTIVE DIRECT OR PEAK/PEAK CHANNEL THAT HAS EXCEEDED ALERT LEVEL. TWO CHANNELS COULD INDICATE FIRST OUT FOLLOWING SELF TEST. *	ON	OFF
○ ALERT	◎		ON	ON

* IF TWO ALARMS OCCUR WITHIN 50 MILLISECONDS, BOTH LEDs COULD FLASH.

8 DANGER



LED DISPLAY DIRECT	LED DISPLAY PEAK/PEAK	CONDITION	DANGER RELAY OPTION: DIRECT ALARM ENABLED	DANGER RELAY OPTION: DIRECT ALARM DISABLED
● DANGER	○	**DIRECT** OR **PEAK/PEAK** CHANNEL (OR BOTH) HAS EXCEEDED ALERT LEVEL.	ON	OFF
○ DANGER	●		ON	ON
● DANGER	●		ON	ON
◎ DANGER	○	FIRST OUT CONDITION FOR RESPECTIVE **DIRECT** OR **PEAK/PEAK** CHANNEL THAT HAS EXCEEDED ALERT LEVEL. TWO CHANNELS COULD INDICATE FIRST OUT FOLLOWING SELF TEST. *	ON	OFF
○ DANGER	◎		ON	ON

* IF TWO ALARMS OCCUR WITHIN 50 MILLISECONDS, BOTH LEDs COULD FLASH.

9 MONITOR RANGES

ECCENTRICITY MONITOR

PART NUMBER 3300/40

FULL-SCALE RANGE — AA

	DIRECT	PEAK TO PEAK
01 =	5-0-5 MILS	0-5 MILS
02 =	10-0-10 MILS	0-10 MILS
03 =	20-0-20 MILS	0-20 MILS
04 =	30-0-30 MILS	0-30 MILS
05 =	50-0-50 MILS•	0-50 MILS•
11 =	100-0-100 MICROMETRES	0-100 MICROMETRES
12 =	200-0-200 MICROMETRES	0-200 MICROMETRES
13 =	500-0-500 MICROMETRES	0-500 MICROMETRES
14 =	1000-0-1000 MICROMETRES•	0-1000 MICROMETRES•

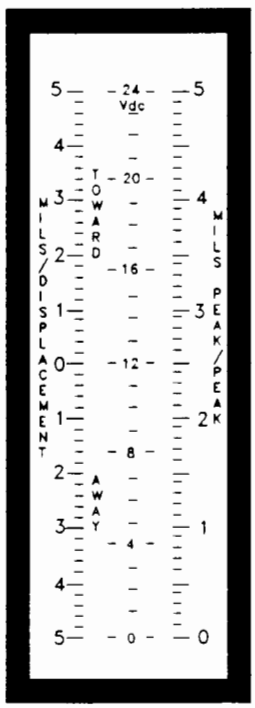
•USED ONLY WITH 11mm OR 14mm TRANSDUCERS.

TRANSDUCER OPTION — BB

01 =	7200, 5mm OR 8mm TRANSDUCER 200 mV/MIL (8 V/mm)
02 =	7200, 11mm TRANSDUCER 100 mV/MIL (4 V/mm)
03 =	7200, 14mm TRANSDUCER 100 mV/MIL (4 V/mm)

NOTE

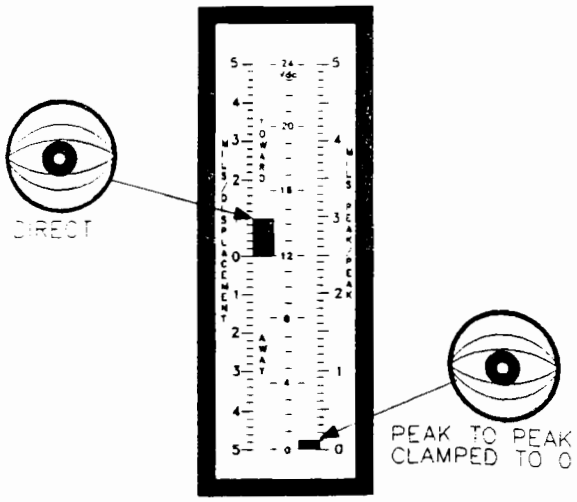
UNITS ON METER SCALE MUST BE COMPATIBLE WITH TRANSDUCER INPUT SELECTED, SEE OPTION AA.



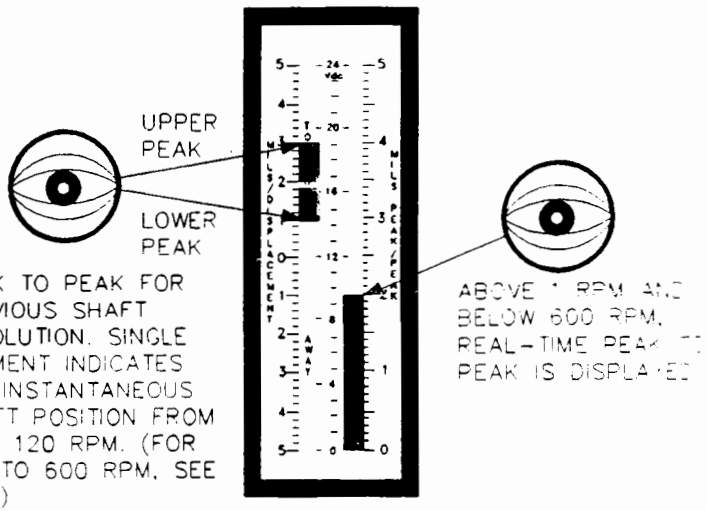
EXAMPLE OF METER SCALE

10 READ DIRECT AND PEAK TO PEAK VALUES

MONITOR CONTINUOUSLY INDICATES MEASURED DIRECT AND PEAK TO PEAK VALUES.



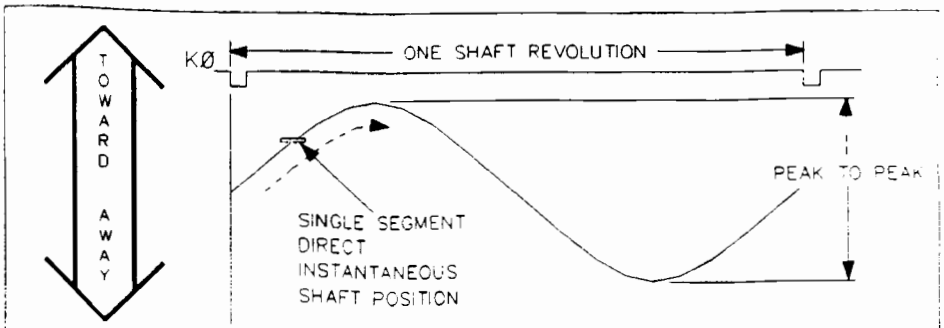
FOR ACTUAL KEYPHASOR INPUT, 0 TO 1 RPM, OR WHEN KEYPHASOR SIGNAL IS LOST



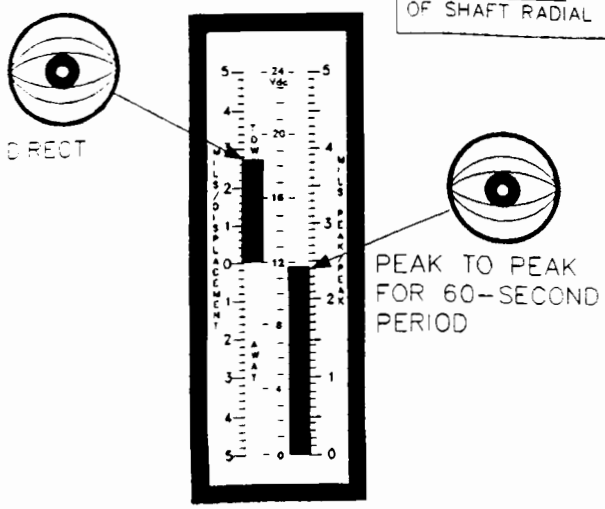
PEAK TO PEAK FOR PREVIOUS SHAFT REVOLUTION. SINGLE SEGMENT INDICATES THE INSTANTANEOUS SHAFT POSITION FROM 1 TO 120 RPM. (FOR 120 TO 600 RPM, SEE VIEW A.)

ABOVE 1 RPM AND BELOW 600 RPM, REAL-TIME PEAK TO PEAK IS DISPLAYED

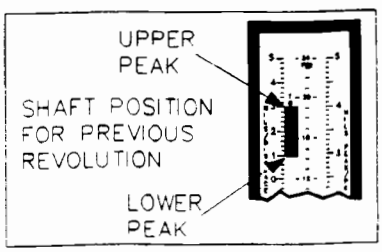
FOR ACTUAL KEYPHASOR INPUT, 1 TO 600 RPM



DIRECT MEASUREMENT IS THE GAP BETWEEN PROBE TIP AND ROTATING SURFACE. PEAK TO PEAK MEASUREMENT IS THE SUMMATION OF THE UPPER AND LOWER PEAKS OF SHAFT RADIAL MOTION DURING A COMPLETE SHAFT REVOLUTION.



FOR SIMULATED KEYPHASOR INPUT, 0 TO 600 RPM



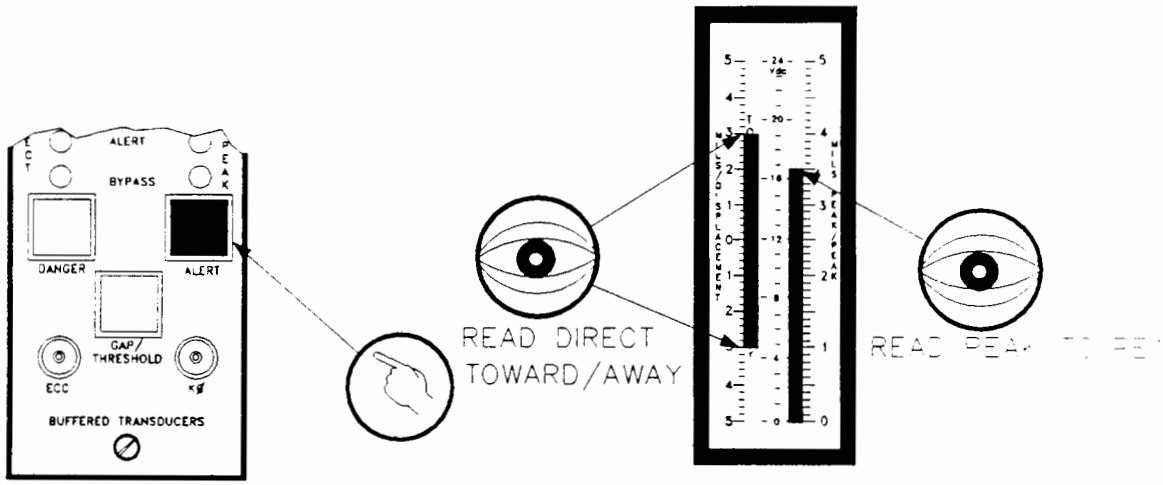
VIEW A

FROM 120 RPM TO 600 RPM, THE SINGLE SEGMENT IS NOT VISIBLE AND ONLY UPPER AND LOWER SHAFT POSITIONS ARE READABLE ON THE BARGRAPH.

234409

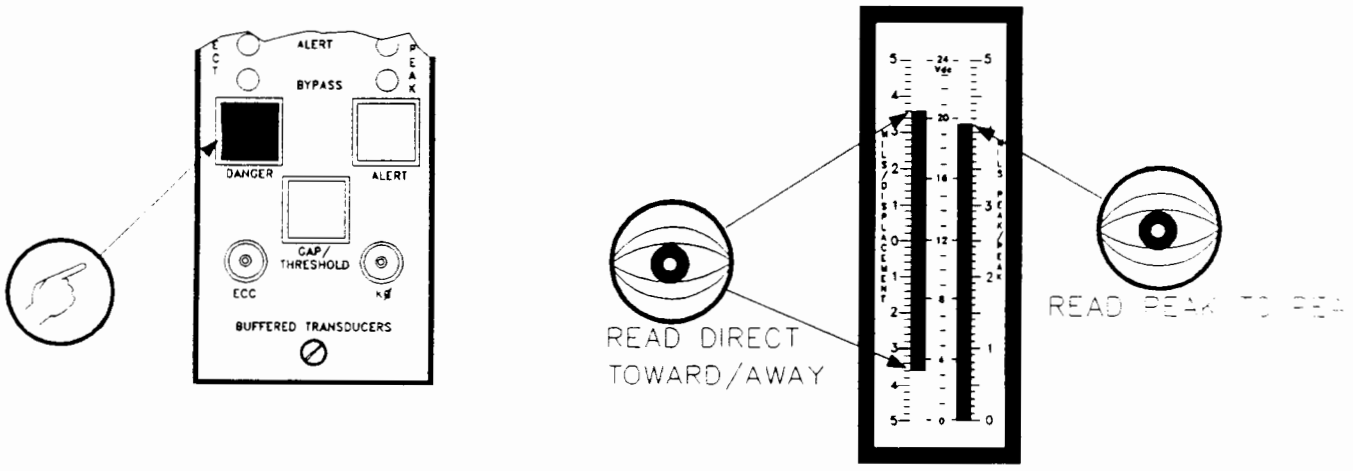
11 READ ALERT SETPOINT LEVELS

1. PRESS **ALERT** SWITCH AND READ ALERT SETPOINTS (FOR BOTH **DIRECT** AND **PEAK/PEAK**) ON METER SCALE.



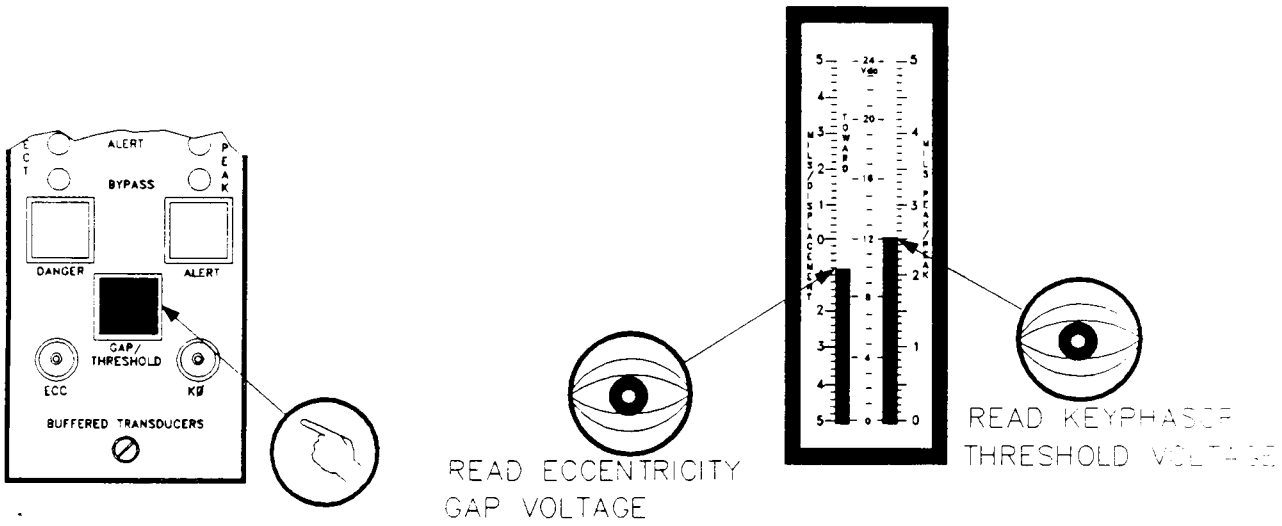
12 READ DANGER SETPOINT LEVELS

1. PRESS **DANGER** SWITCH AND READ DANGER SETPOINTS (FOR BOTH **DIRECT** AND **PEAK/PEAK**) ON METER SCALE



13 READ GAP AND THRESHOLD VOLTAGE LEVELS

1. PRESS **GAP/THRESHOLD** SWITCH AND READ VOLTAGE LEVELS (FOR ECCENTRICITY GAP AND KEYPHASOR THRESHOLD) USING CENTER SCALE ON METER.

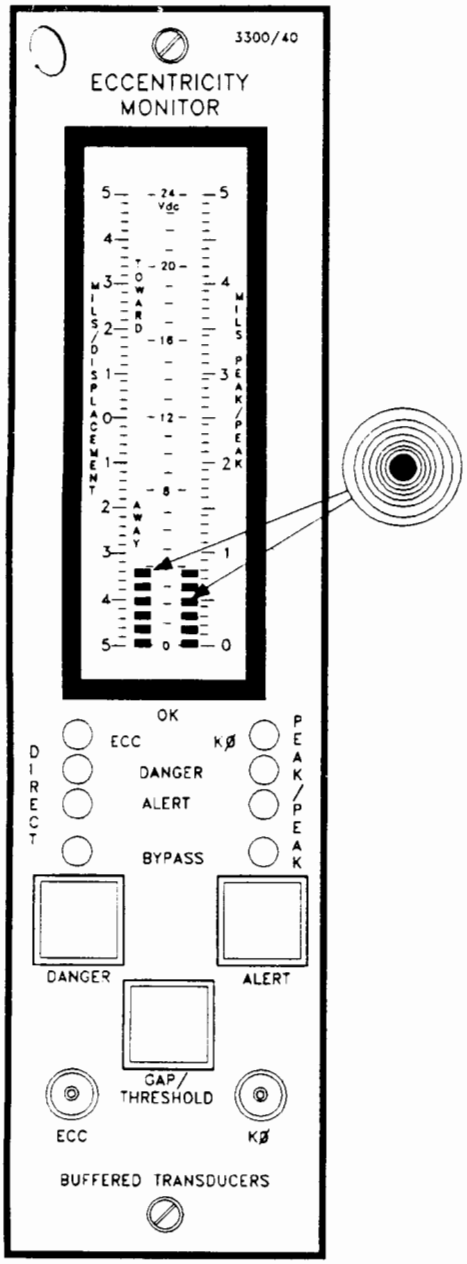


14 SELF TEST

SHEET 1 OF 3

THE MONITOR HAS THREE LEVELS OF SELF TESTS:

- POWER-UP TEST: PERFORMED ONLY WHEN MONITOR IS TURNED ON.
- CYCLIC TEST: PERFORMED CONTINUOUSLY.
- USER-INVOKED TEST: PERFORMED ONLY WHEN INITIATED BY USER.



IF ERRORS ARE DETECTED DURING CYCLIC SELF TESTS:

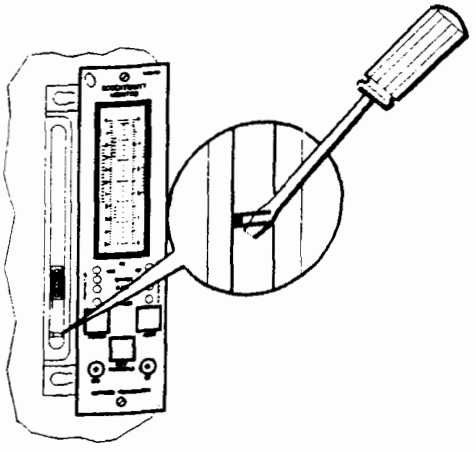
- MONITORING IS ABORTED UNTIL THE ERROR IS RESOLVED.
- ERROR CODE STORED IN MEMORY AND FLASHED ON LCD BARGRAPH DISPLAY.
- **BYPASS** LED GOES ON AND **OK** LED FLASHES AT 5 HZ.
- IF ERROR IS INTERMITTENT AND DISAPPEARS, MONITORING IS RESUMED AND **OK** LED FLASHES AT 5 HZ.
- ERROR CODE STORED. USER-INVOKED TEST DISPLAYS AND CLEARS ERROR.

IF ERRORS ARE DETECTED DURING POWER-UP TEST OR USER-INVOKED TEST:

- MONITORING IS ABORTED UNTIL USER ACTION RESOLVES PROBLEM.
- TEST CAN BE RERUN WITH MONITOR POWER-UP OR USER-INVOKED TEST.

14 SELF TEST

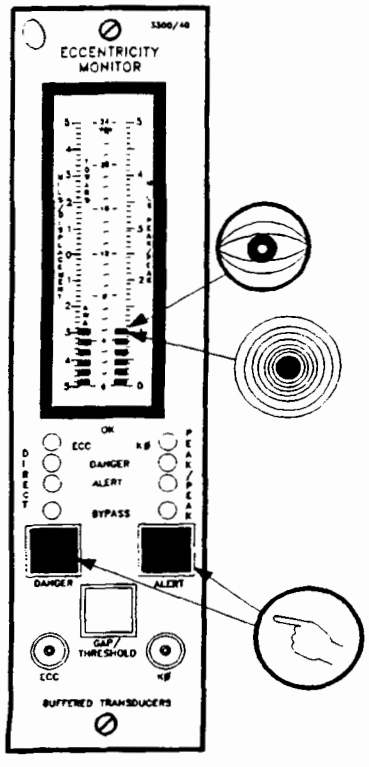
- INITIATE USER-INVOKED TEST BY MOMENTARILY SHORTING ACROSS TWO SELF TEST (ST) PINS.



CAUTION

MACHINE PROTECTION WILL BE DISCONTINUED FOR DURATION OF TEST

- AT COMPLETION OF USER-INVOKED TEST, MONITOR WILL RECALL ANY STORED ERROR CODES. THESE ERROR CODES MUST BE READ AND CLEARED WITH USER INTERACTION TO ALLOW MONITORING TO CONTINUE. TIMED OK/MONITOR DEFEAT IS ACTIVE FOR APPROXIMATELY 60 SECONDS FOLLOWING THIS ACTION.

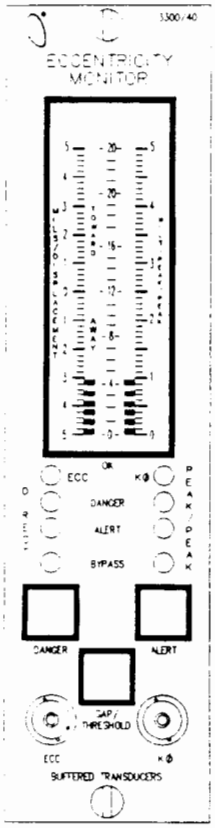


NOTE

ALTHOUGH BOTH COLUMNS ON BARGRAPH FLASH, ERROR CODE IS ONLY THE SUM OF BARGRAPH SEGMENTS DISPLAYED IN ONE COLUMN. EXAMPLE SHOWS ERROR CODE 6.

- READ CODES ON LIST; STEP THROUGH EACH ERROR CODE ON LIST BY PRESSING AND HOLDING **ALERT** SWITCH FOR APPROXIMATELY 1 SECOND.
- AT THE END OF LIST, LCD BARGRAPH DISPLAYS ALL SEGMENTS. TO REREAD LIST, PRESS **ALERT** SWITCH. TO CLEAR LIST FROM MEMORY, PRESS AND HOLD **DANGER** SWITCH FOR APPROXIMATELY 1 SECOND.

14 SELF TEST



ERROR CODE	DESCRIPTION
2.	ROM CHECKSUM HAS FAILED. *
3.	EEPROM FAILURE NO.1. **
4.	EEPROM FAILURE NO.2; ADJUST SETPOINTS.***
5.	+7.5/−VT NODE OUT OF TOLERANCE. **
6.	+VRH NODE OUT OF TOLERANCE. **
7.	+5V NODE OUT OF TOLERANCE. **
8.	MVREF NODE OUT OF TOLERANCE. **
9.	+7.5V NODE OUT OF TOLERANCE. **
10.	+VRL NODE OUT OF TOLERANCE. **
11.	MVREF/−6.5V NODE OUT OF TOLERANCE. **
12.	+5V/−7.5V NODE OUT OF TOLERANCE. **
14.	RAM FAILURE. *
17.	COP WATCHDOG IS NOT ENABLED. *
15.	DIRECT CHANNEL SATURATION ****

* TESTED ONLY AT POWER-UP OR USER-INVOKED SELF TEST. ERRORS NOT RECORDED, BUT ERROR CODES DISPLAYED ON FRONT PANEL METER.

** TESTED ONLY AT CYCLIC SELF TEST. ERRORS 2, 3, AND 14 ARE NONRECOVERABLE; ERRORS 5 THROUGH 12 COULD BE INTERMITTANT AND RECOVERABLE.

*** ERROR 4 IS A SETPOINT SELF TEST FAILURE. THIS MAY BE CORRECTED BY ADJUSTING ALL SETPOINTS IN MONITOR.

**** THIS ERROR CODE INDICATES THAT THE MONITOR HAS SATURATED ITS DIRECT CHANNEL AND MAY BE READING IMPROPER PEAK TO PEAK READINGS. THIS ERROR CODE CAN BE CLEARED WITH USER INVOKED SELFTEST AFTER THE MONITOR HAS BEEN ZEROED SO THAT THE DIRECT CHANNEL IS NOT SATURATING. SEE ECCENTRICITY MONITOR MAINTENANCE MANUAL 82345-01 SECTION 8, FOR MORE INFORMATION TO CLEAR THIS ERROR.

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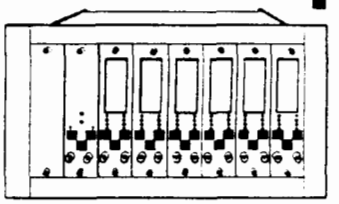
Self Test 13

DOCUMENT NO. 82345-01

3300/40 ECCENTRICITY MONITOR

MAINTENANCE MANUAL

BENTLY NEVADA



NOTICE

READ THE FOLLOWING BEFORE INSTALLING OR OPERATING EQUIPMENT.

Bently Nevada Corporation has attempted to identify areas of risk created by improper installation and/or operation of this product. These areas of information are noted as CAUTION or WARNING for your protection and for the safe and effective operation of this equipment. Read all instructions before installing or operating this product. Take particular attention to those areas designated by the following symbols.

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

CAUTION

Machine Protection Could Be Lost

SYMBOL

This symbol shows where to use a screwdriver.



SCREWDRIVER

Introduction

This manual provides maintenance procedures for the 3000 EccentricityMonitor.

Related Documents

- 3300 System Overview, 80171
- 3300 System Installation Instructions, 80172
- 3300 System Troubleshooting, 80173
- 3300 Power Supply, 80174
- 3300 System Monitor, 80175
- 3300/40 Eccentricity Monitor Operation, 82344-01
- Dynamic Data Manager System, 46390-01

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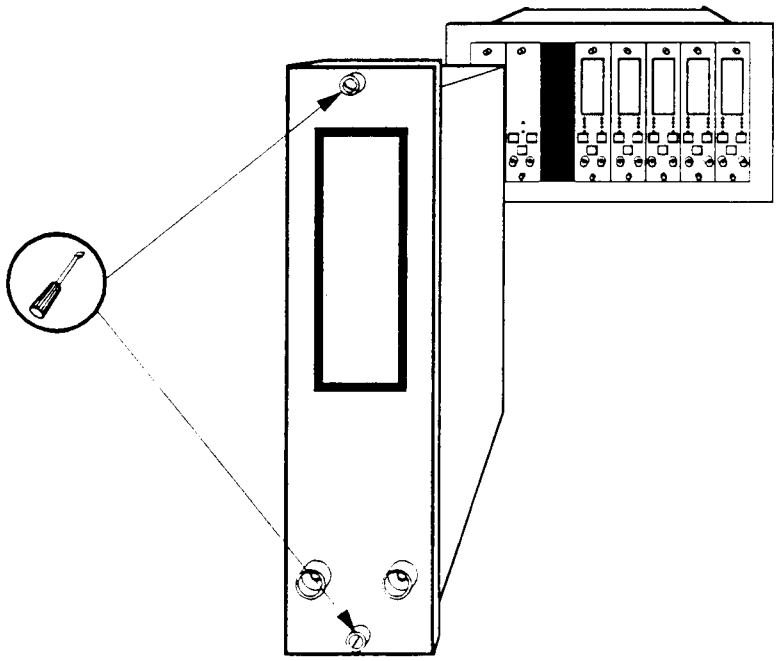
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1. Monitor Removal

CAUTION

The machine is not protected when the monitor is removed from the rack.

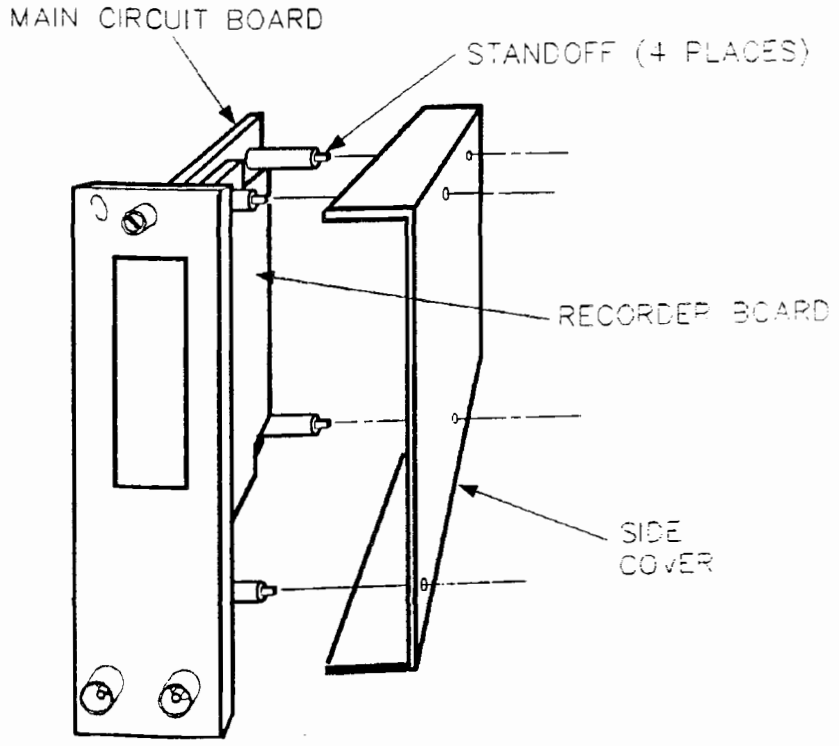
1. Loosen two screws.
2. Pull monitor from rack.



2. Monitor Disassembly

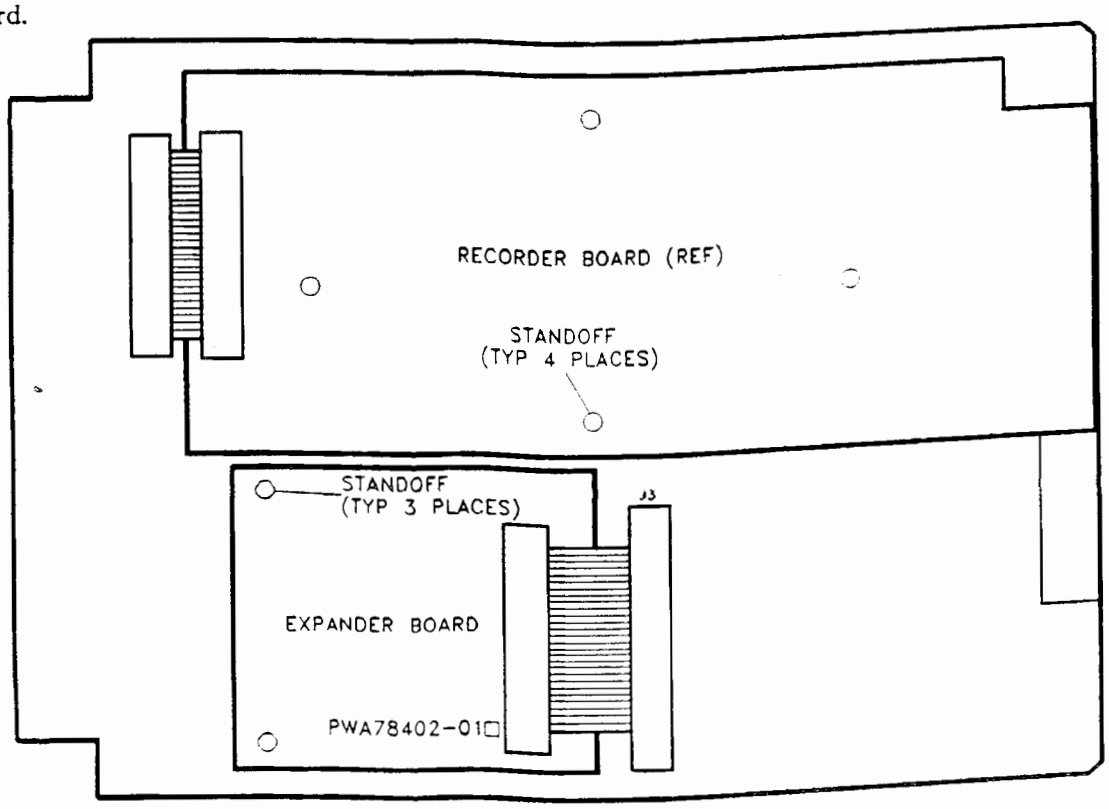
Side Cover Removal

Squeeze the retaining tips on each standoff, and remove the side cover from the monitor.

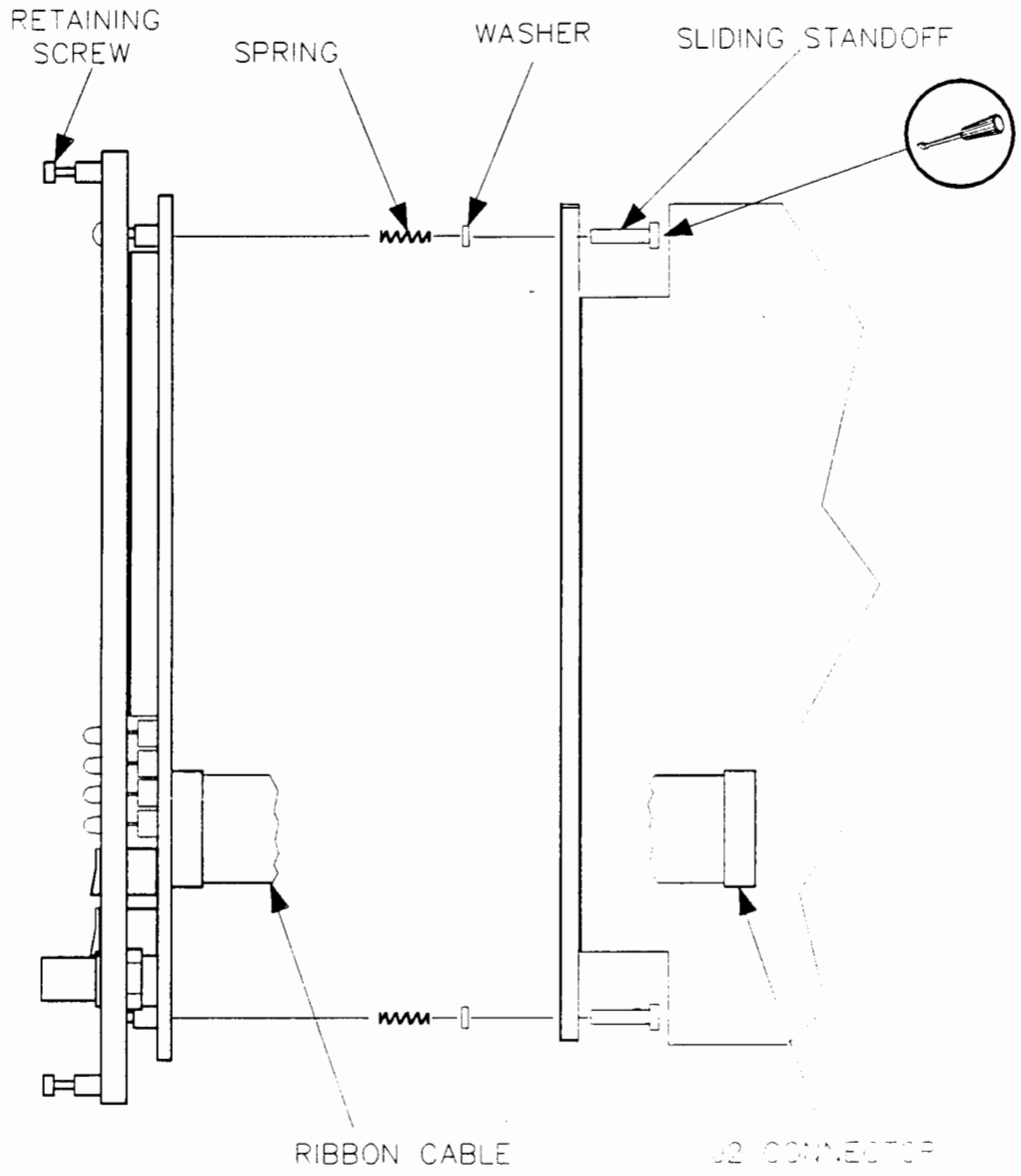


Circuit Board Removal

Squeeze the retaining tips on each standoff, and remove the recorder board and the expander board from the main board.



Front Panel Removal



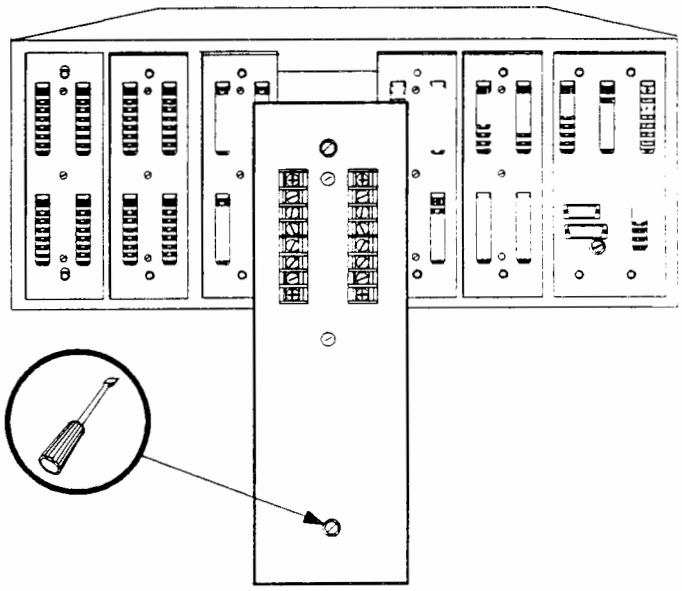
3. Signal Input Relay Modules Dual Relays

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

The Signal Input Relay Module is on the back of the rack. For relay configuration, see Installation Manual. For field wiring, see Section 18. Field Wiring Diagrams.

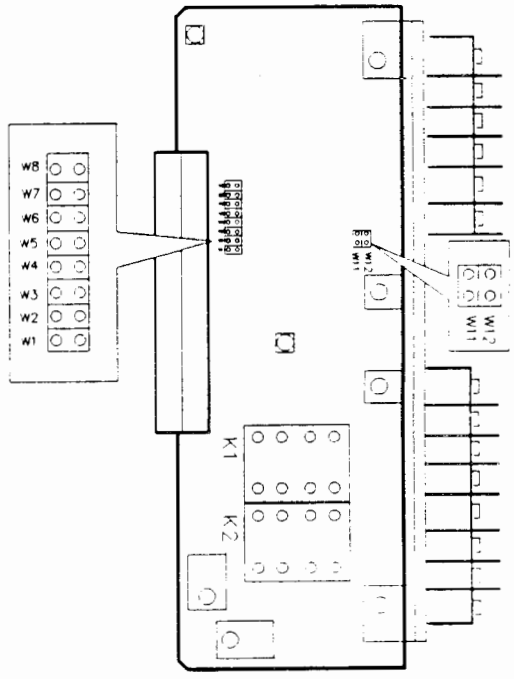


Module Removal

Loosen two screws and remove the module.

Dual Relay Module Options

	Jumper	
Alert Relay	**In**	**Out**
Normally Energized	W3	W4,W11
Normally Deenergized	W4,W11	W3
Danger Relay	**In**	**Out**
Normally Energized	W2	W1,W12
Normally Deenergized	W1,W12	W2

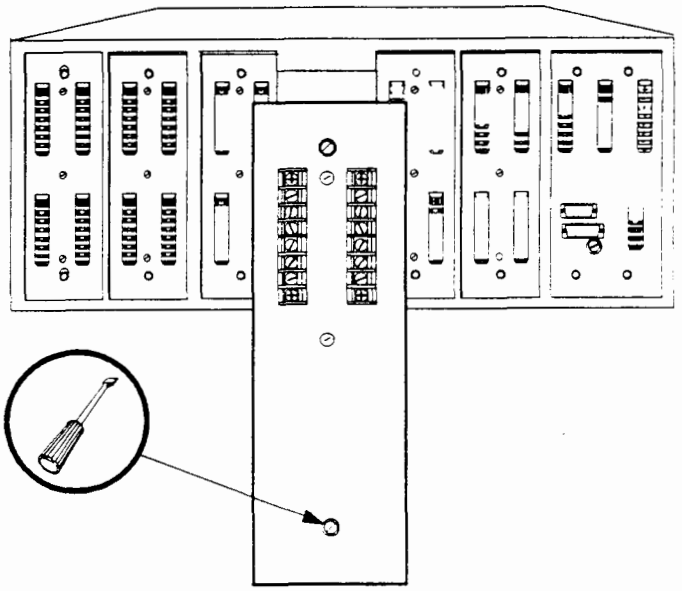


3. Signal Input Relay Modules [Cont.] Quad Relays

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals



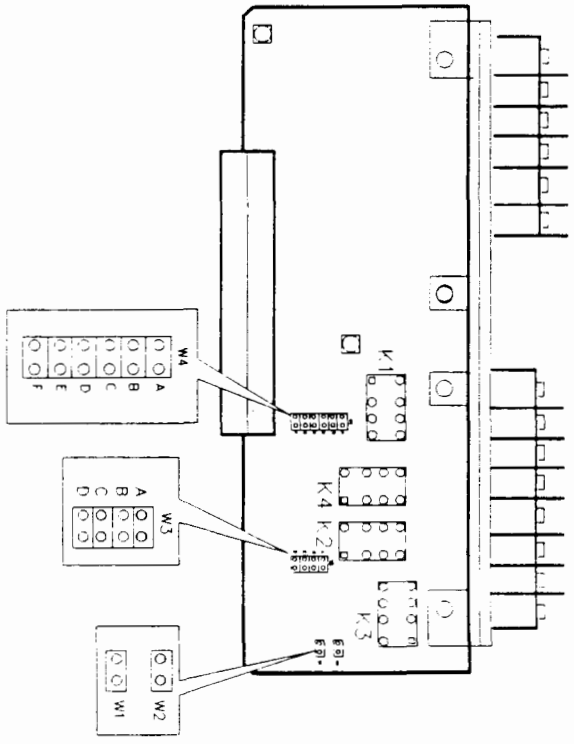
The Signal Input Relay Module is on the back of the rack. For relay configuration, see Installation Manual. For field wiring, see Section 18. Field Wiring Diagrams.

Module Removal

Loosen two screws and remove the module.

Quad Relay Module Options

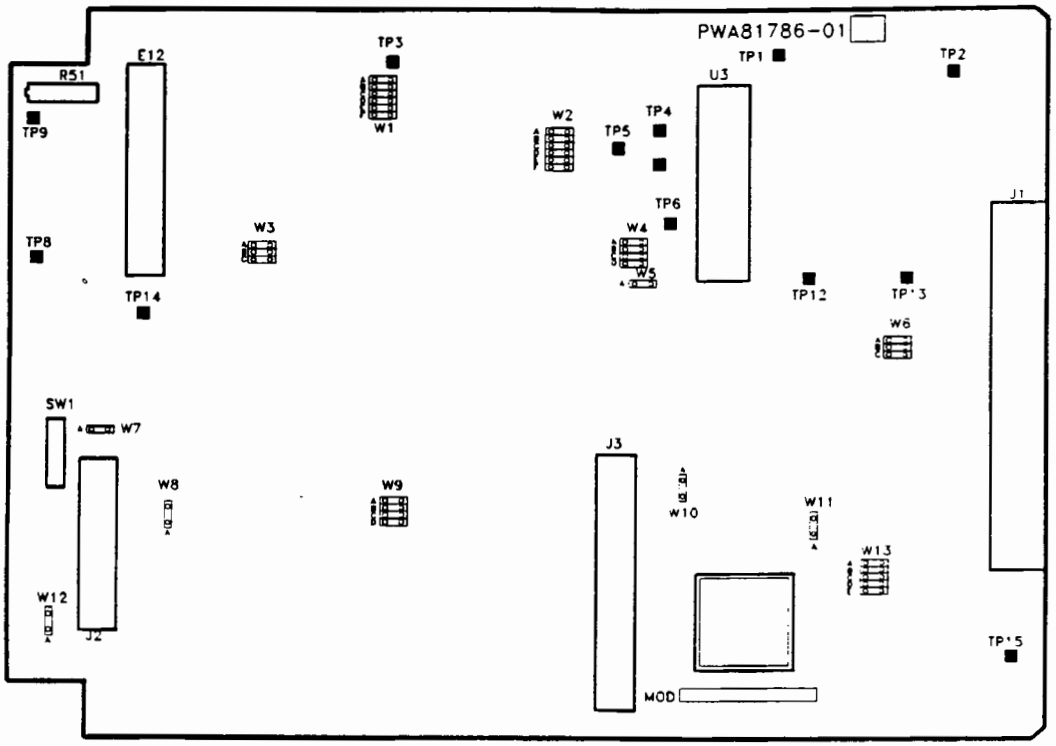
	Jumper	
Alert Relay	**In**	**Out**
Normally Energized	W3A,W4C	W2,W3C W3D,W4D
Normally Deenergized	W2,W3C W3D,W4D	W3A,W4C
Danger Relay	**In**	**Out**
Normally Energized	W4B,W4F	W1,W3B W4A,W4E
Normally Deenergized	W1,W3B W4A,W4E	W4B,W4F



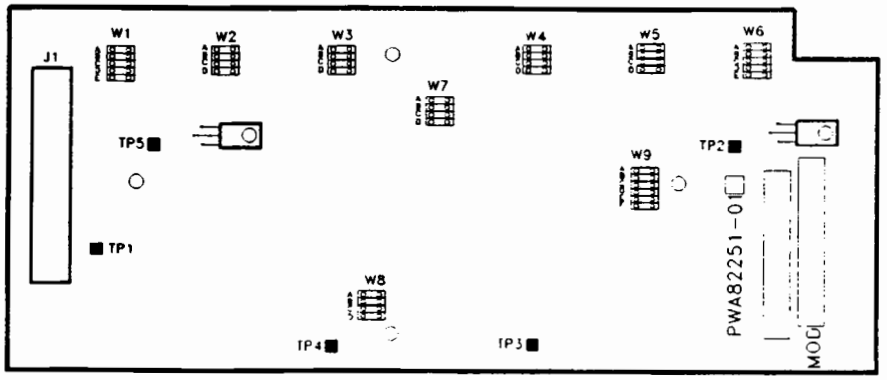
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4. Monitor Options

The Eccentricity Monitor has several user-programmable options. You can change the options by removing and installing jumpers on the printed circuit boards.



Jumper Locations on Main Circuit Board



Jumper Locations on Recorder/Keyphasor Circuit Board

Main Board Option Settings

Most monitor option jumpers are on the *Main Board*. Table 3-1 shows these options and their jumper positions.

Table 3-1. Option Settings on Main Board

Option	Setting	Jumper	
		Install	Remove
Keyphasor Options Hysteresis Voltage	0.2 Volts	W3A	W3B,C
	0.5 Volts*	W3B	W3A,C
	1 .25 Volts	W3C	W3A,B
	2.00 Volts	- - -	W3A, B, C
Threshold Voltage	Automatic	W13B	- - -
	Manual*	- - -	W13B
Keyphasor Source	External* (From Monitor Signal Module)	W6A	W6B, C, W9C
	Internal 1	W6B	W6A, C, W9C
	Internal 2 (From Power Input Module)	W6C	W6A, B, W9C
	Simulated	W9C	W6A, B, C
First Out	Enabled*	W13C	- - -
	Disabled	- - -	W13C
Direct Alarm	Enabled*	W13A	- - -
	Disabled	- - -	W13A
Alert Mode	Latching*	W9B	- - -
	Non-Latching	- - -	W9B
Danger Mode	Latching*	W13D	- - -
	Non-Latching	- - -	W13D
Danger Bypass	Enabled	W7	- - -
	Disabled*	- - -	W7
Alarm Time Delay	0.1 Second	- - -	W9A, D
	1Second	W9D	W9A
	3 Second*	W9A	W9D
	6 Second	W9A, D	- - -

* Options shipped from Bently Nevada

Recorder Output Options

To set the recorder output, remove all jumpers from *Recorder Board* jumper terminals W1, W2, W3, W4, W5, W6, and W7. Install jumpers in accordance with Table 3-2.

Table 3-2. Recorder Output Options

Recorder Output	+4 to +20 mA *	+1 to +5 Vdc	0 to -10 Vdc
Jumper Settings	W1 B, C, E	W1 A, D	W1 A, D
	W2 C	W2 B	W2A
	W3 A, B	W3 C	W3 D
	W4 A, B	W4 C	W4 D
	W5 C	W5 B	W5 A
	W6 B, C, E	W6 A, D	w6 A, D
	W7 C, D	W7 C, D	W7 A, B

* Options shipped from Bently Nevada

Monitor Full Scale Range Options

For the monitor to work correctly, you need to set jumpers to match the transducer type and range. Remove all jumpers from Main Board terminals W1 A-F, W2 A-F, and W4 A-D. Remove all jumpers from Recorder Board terminals *W8 A-D*. Install jumpers in accordance with Table 3-3. Recorder Board jumpers appear in **bold** type. If you change the full scale range, recalibrate the channel (see Section 16, Calibrate Channel).

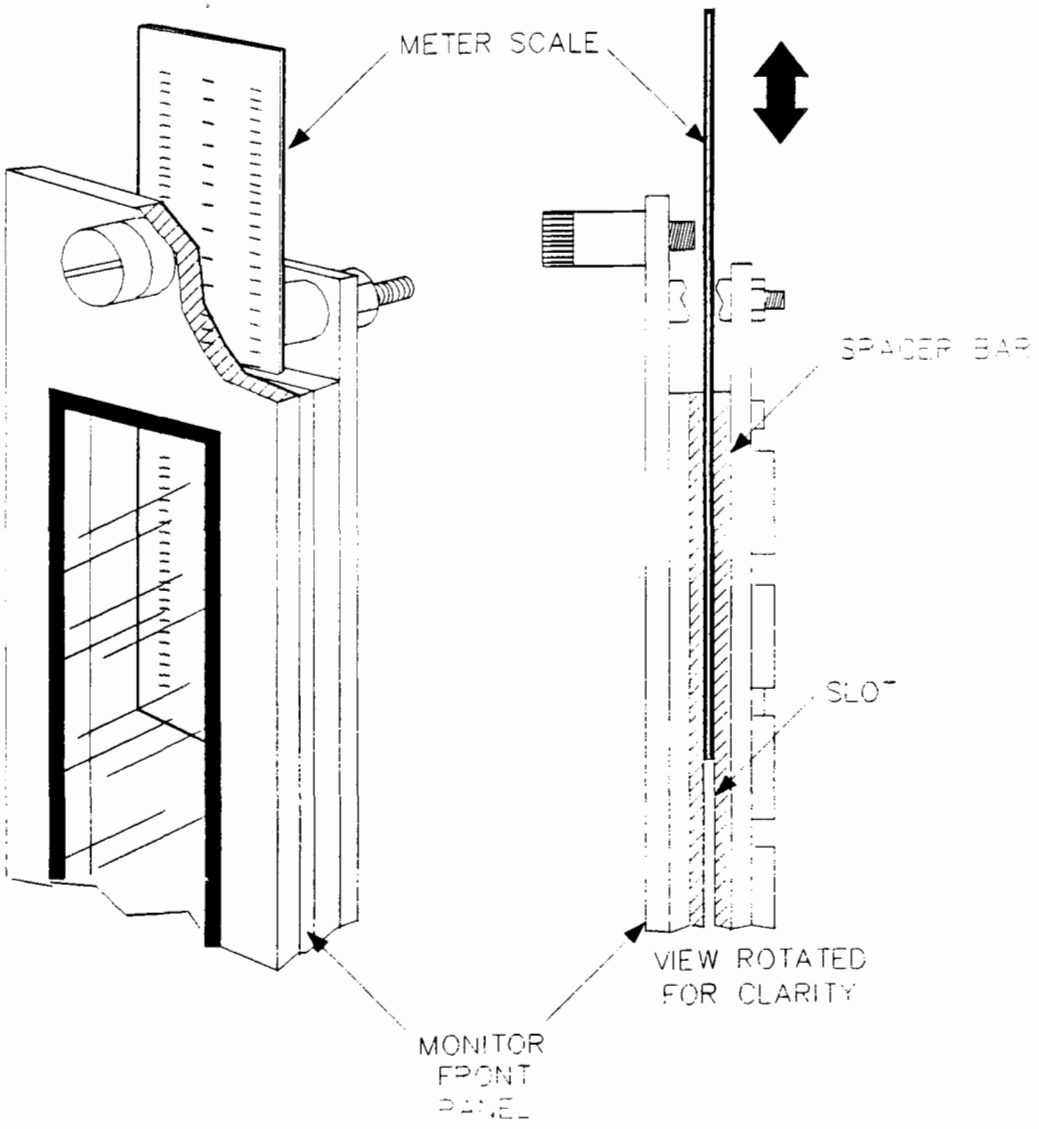
Table 3-3. Transducer Type and Full Scale Range

	7200 Transducer Type		
Range	5mm & 8mm Probe	11mm Probe	14mm Probe
5-0-5 mils	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-5 mils	W4A W4C	W4D **W8B W8C**	W4D **W8B W8C**
10-0-10 mils	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-10 mils	W4C	W4A W4C **W8B W8C**	W4A W4C **W8B** W8C
20-0-20 mils	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-20 mils	W4A	W4C **W8B W8C**	W4C **W8B W8C**
30-0-30 mils	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-30 mils	W1F **W8A W8D**	W1F W4A W4B **W8A W8D**	W1F W4A W4B **W8A W8D**
50-0-50 mils	Not Allowed	W1B W2B W2E	W1A W2B W2E
0-50 mils	Not Allowed	**W8B W8C**	**W8B W8C**
100-0-100 μm	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-100 μm	W4A W4B W4C W4D	W4A W4D **W8B W8C**	W4A W4D **W8B W8C**
200-0-200 μm	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-200 μm	W1E W4A W4C	W4B W4C **W8B W8C**	W4B W4C **W8B** W8C
500-0-500 μm	W1D W2A W2D	W1B W2B W2E	W1A W2B W2E
0-500 μm	W4A	W4C **W8B W8C**	W4C **W8B W8C**
1000-0-1000 μm	Not Allowed	W1B W2B W2E	W1A W2B W2E
0-1000 μ...	Not Allowed	W4A **W8B W8C**	W4A **W8B W8C**

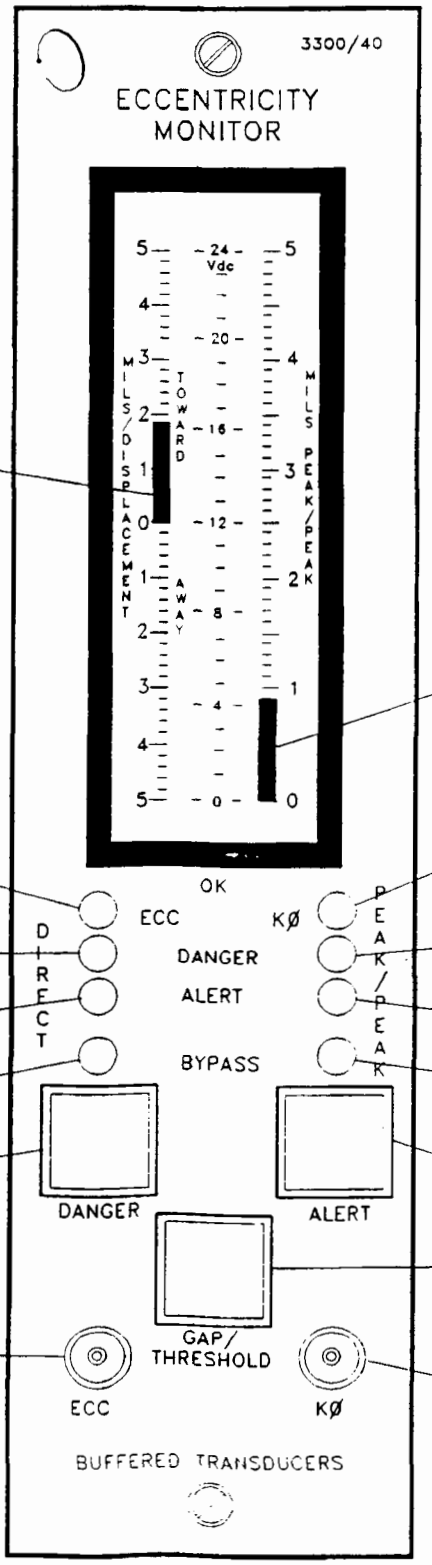
5. Meter Scale Replacement

You can replace the Monitor meter scale to operate with different full scales. The replacement meter scale appears in the back of this manual.

1. Set the monitor full scale range. (See Section 4. Monitor Options.)
2. Cut the meter scale from the back of this manual. Be sure to cut along the marked outline so the meter scale will fit properly.
3. Insert the meter scale in the front panel.



6. Front Panel Features



Bargraph – Indicates instantaneous shaft position

Eccentricity Transducer OK LED

Direct DANGER Alarm

Direct ALERT Alarm

Direct Channel BYPASS LED

Read monitor DANGER alarm setpoints

BNC connector for buffered Eccentricity transducer output

Bargraph – Indicates peak to peak eccentricity amplitude when shaft is rotating between 1 and 600 RPM

Keyphasor OK LED – on from 1 to 600 RPM if Keyphasor rules are valid

Peak to Peak DANGER Alarm

Peak to Peak ALERT Alarm

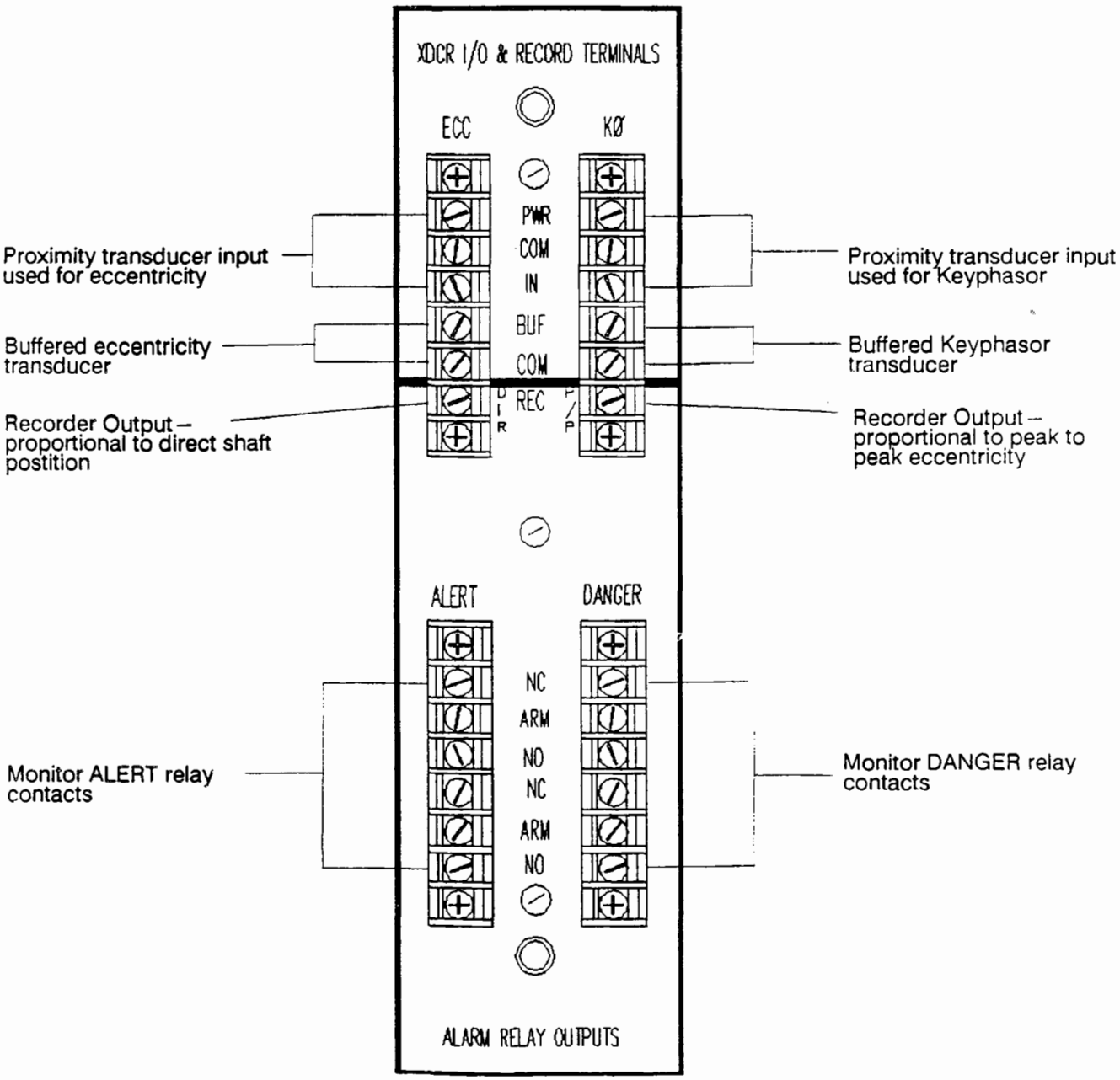
Peak to Peak Channel BYPASS LED

Read monitor ALERT alarm setpoints

Read gap voltage on left scale, Keyphasor threshold voltage on right scale

BNC connector for buffered Keyphasor transducer output

7. Signal Input Relay Module Features



8. Monitor Zero Adjustment

Use this procedure adjust the Direct scale to zero.

NOTE: For greatest accuracy, perform this procedure when the shaft is at rest. If the shaft is rotating faster than 1 rpm, the peak to peak envelope will appear as a bar on the meter. The bar will move up and down the scale as the shaft rotates. Refer to section 10 of the Operation Manual.

1. With the probe installed on the machine, measure the gap voltage. You can measure the gap voltage at the front panel ECC connector. The gap voltage must be within the limits given in Table 5-1.

2. Open the front panel.

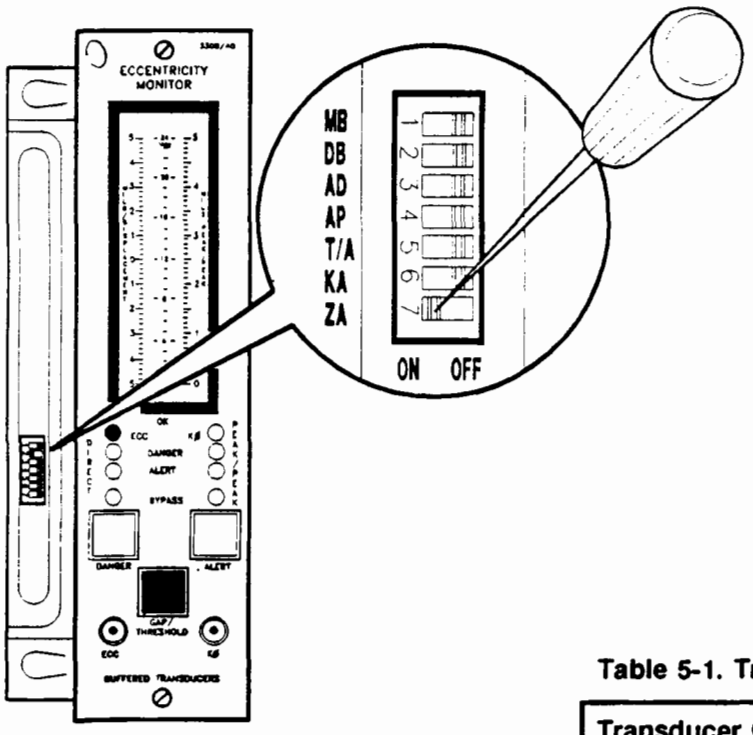
3. Set switch 7 (ZA) to the left (ON). The DIRECT display begins flashing.

4. To adjust the monitor scale, press and hold the GAP/THRESHOLD switch while you press ↑ or ↓ on the System Monitor.

Center the DIRECT display at zero. If the shaft is rotating faster than 1 rpm, press ↑ or ↓ on the System Monitor to center the peak to peak envelope bar at zero.

6. Set switch 7 (ZA) to the right (OFF). The DIRECT display stops flashing.

7. Close the front panel.



CAUTION

Proper Zero Adjustment is critical for the measurement of the Peak to Peak Eccentricity. The initial probe gap must be within the limits specified in Table 5-1, and the Monitor must be zeroed per this procedure. Failure to properly zero the monitor may cause the direct reading to go off scale. If this happens the monitor will go into bypass and display Error Code 15 (See Section 14 of Eccentricity Monitor Operation Manual 82344-01). Error code 15 indicates that the monitor is saturated and requires the following corrective action:

1. Follow the Monitor Zero Adjust Procedure. After adjusting the Monitor Zero, the stored error code 15 must be cleared by initiating Monitor Selftest (See Section 14 of Eccentricity Monitor Operation Manual 82344-01).

2. Vertical average shaft position movements are common as machines increase RPM. This vertical movement may drive the direct channel into saturation and generate error code 15. This may be corrected by orienting the Eccentricity Probe in the horizontal plane, by selecting a larger range for the monitor, or by starting with a initial direct zero above or below zero to allow for this shaft position shift.

Table 5-1. Transducer Gap Voltage Limits

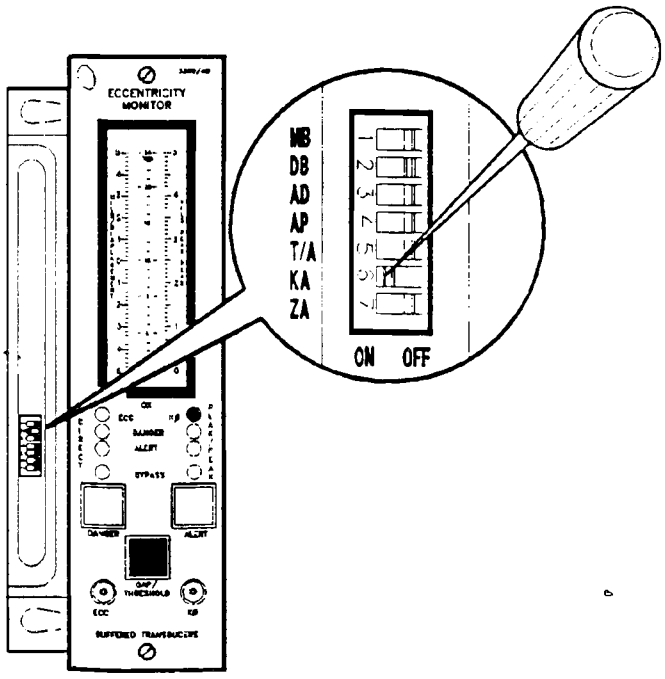
Transducer Option	Voltage Limits
7200 5-8mm Probes	
30-0-30 mil Range	-8.1 to 10.9 Vdc
All Other Ranges	-6.7 to -12.3 Vdc
7200 11mm Probe	
All ranges	-8.8 to -14.4 Vdc
7200 14mm Probe	
All Ranges	-7.2 to -12.8 Vdc

9. Keyphasor Threshold Adjustment

Use this procedure to adjust the Keyphasor threshold voltage.

NOTE: Before adjusting the Keyphasor threshold, set this option to Manual. (See Section 4. Monitor Options.) The shaft must be rotating.

1. Open the front panel.
2. Set switch 6 (KA) to the left (ON). The left bar graph displays the eccentricity transducer gap voltage. The right bargraph, which begins flashing, displays the Keyphasor threshold voltage
3. Press and hold the GAP/THRESHOLD switch. Press ↑ or ↓ on the System Monitor until the KØ OK LED goes on..
4. Press and hold the GAP/THRESHOLD switch. Press ↑ on the System Monitor until the KØ OK LED goes off. Note the bargraph level.
5. Press and hold the GAP/THRESHOLD switch. Press ↓ on the System Monitor until the KØ OK LED comes on, then goes off again. Note the bargraph level.
6. Press ↑ to adjust the bargraph to the midpoint of the two levels. The KØ OK LED will be on.
7. Set switch 6 (KA) to the right (OFF).
8. Close the front panel.

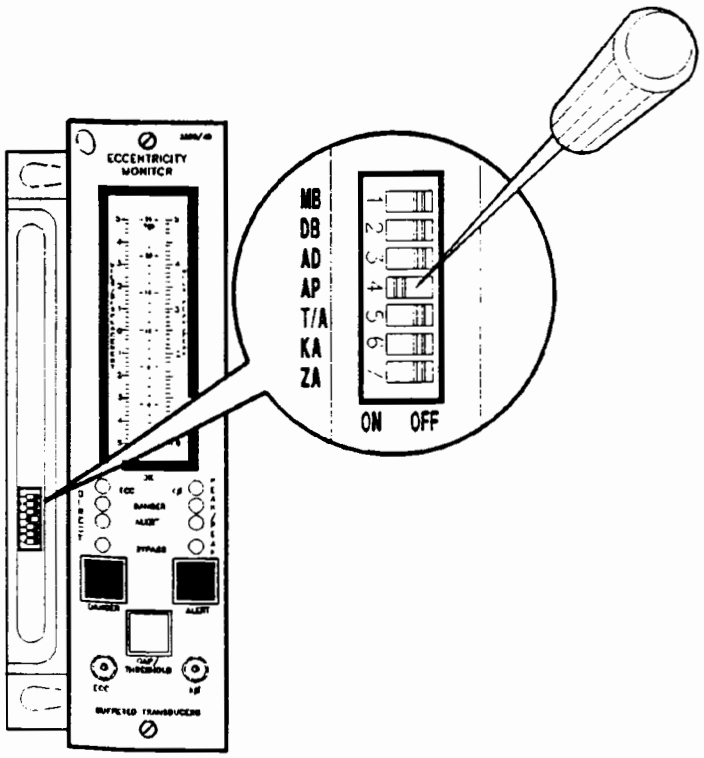


10. Alarm Setpoint Level Adjustment (Peak to Peak)

Use this procedure to adjust the peak to peak alarm setpoint level.

NOTE: The monitor will respond to the previous setpoint level until you perform step 4.

1. Open the front panel
2. Set switch 4 (AP) to the left (ON). The MILS PEAK/PEAK bargraph begins flashing.
3. To adjust the ALERT setpoint, press and hold the ALERT switch. To adjust the DANGER setpoint, press and hold the DANGER switch. Press ↑ or ↓ on the System Monitor to adjust the setpoints to the desired level.
4. Set switch 4 (AP) to the right (OFF).
5. Close the front panel.

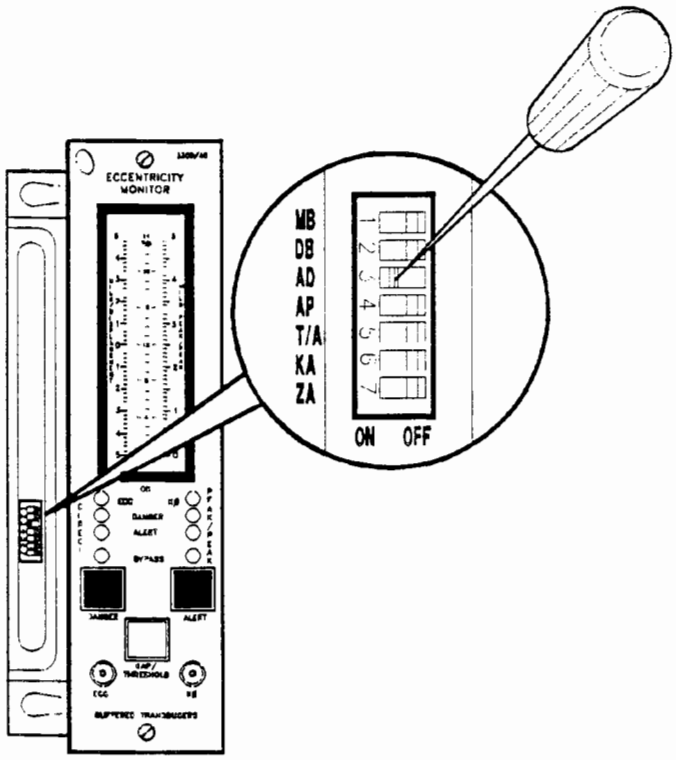


11. Alarm Setpoint Level Adjustment (Direct)

Use this procedure to adjust the direct alarm setpoint level.

NOTE: DANGER and the ALERT have TOWARD and AWAY setpoint levels. The monitor will respond to the previous setpoint level until you perform step 5.

1. Open the front panel.
2. Set switch 3 (AD) to the left (ON). The DIRECT bargraph begins flashing.
3. To adjust the ALERT setpoint, press and hold the ALERT switch. To adjust the DANGER setpoint, press and hold the DANGER switch.
4. To adjust the *TOWARD* setpoint level, set switch 5 (T/A) to the left (T). To adjust the *AWAY* setpoint level, set switch 5 to the right (A).
5. Press ↑ or ↓ on the System Monitor to adjust the setpoint to the desired level.
6. Set switch 3 (AD) to the right (OFF).
7. Close the front panel.



12. Monitor Bypass

CAUTION

Machine protection will be lost while monitor bypass is on.

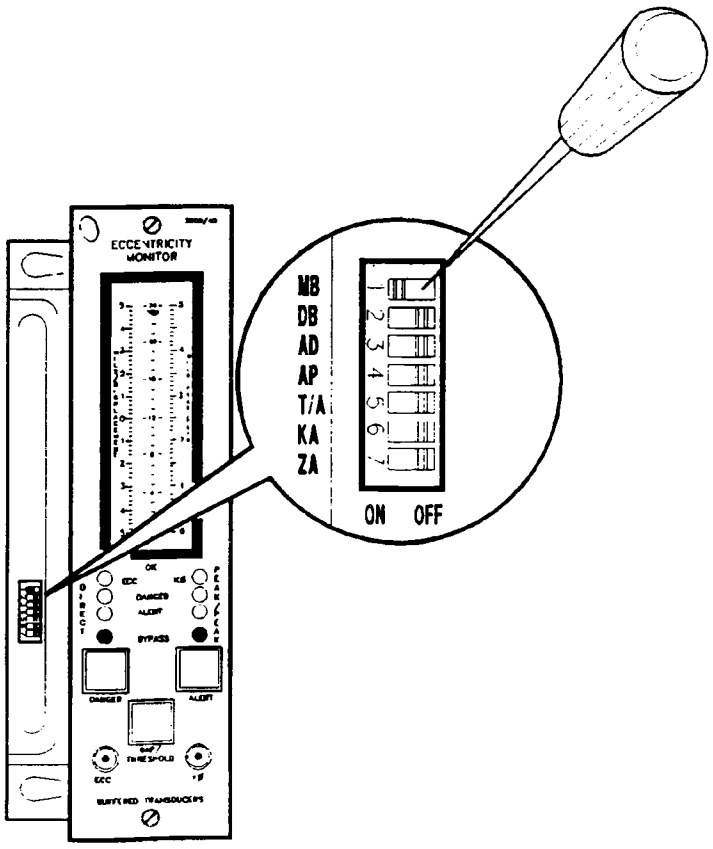
Monitor Bypass puts the monitor out of service. With Monitor Bypass on, the SYSTEM OK relay ignores NOT-OK conditions in the monitor.

To Turn Monitor Bypass On

1. Open the front panel.
2. Set switch 1 (MB) to the left (ON). Monitor Bypass is on. The BYPASS LEDs go on. The OK LEDS go off. The bar graphs go to 0. All channel alarms clear.

To Turn Monitor Bypass Off

1. Set Switch 1 (MB) to the right (OFF). Monitor Bypass is off. The BYPASS LEDs go off.
2. Close the front panel.



13. Danger Bypass

CAUTION

Machine protection will be lost while danger bypass is on.

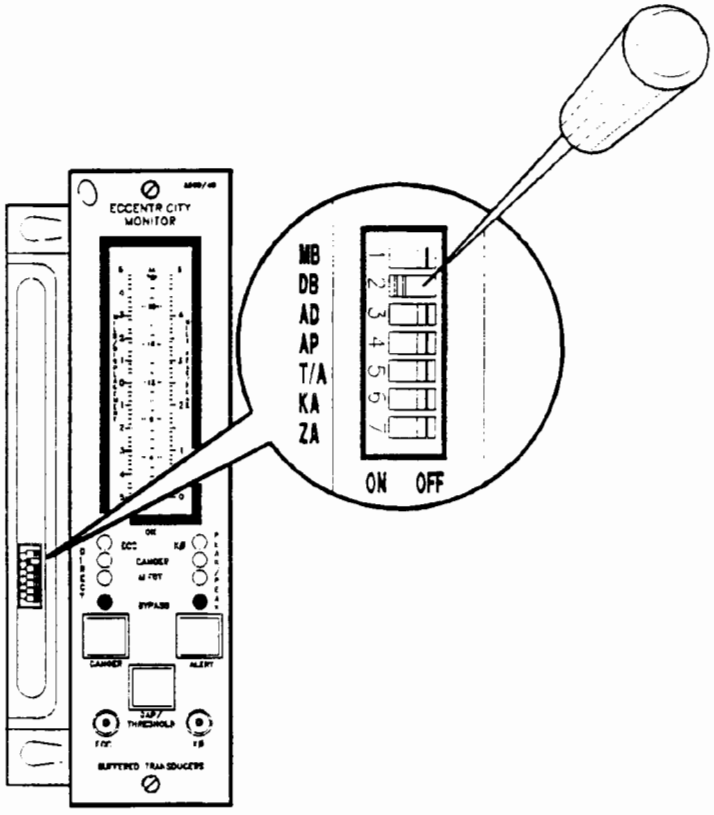
To enable Danger Bypass, install jumper W7 on the Main Board. If you select Danger Bypass, the Danger relay contacts will not activate.

To Turn Danger Bypass On

1. Open the front panel.
2. Set switch 2 (DB) to the left (ON). Both channel BYPASS LEDs come on. If a signal exceeds the danger setpoint, the DANGER alarm LEDs on the front panel will come on. However, the DANGER relays (on the Signal Input Relay Module) will not activate.

To Turn Danger Bypass Off

1. Set switch 2 (DB) to the right (OFF). Both channel BYPASS LEDs go off.
2. Close the front panel.



14. Test Direct Alarms

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

CAUTION

Steps in this procedure will exceed alarm set-points, activate alarms, and activate alarm relay contacts.

NOTE: See Section 13, Danger Bypass to disable the Danger relay contacts.

1. Disconnect COM and IN wiring from ECC terminals on Signal Input Relay Module.

2. Apply negative DC voltage to ECC IN terminals (reference to COM terminals). Adjust the voltage until the DIRECT channel reads 0. (See 6. Monitor Zero Adjust.)

3. Press ALERT. Note the *TOWARD* and *AWAY* setpoint levels.

4. Press DANGER. Note the *TOWARD* and *AWAY* setpoint levels.

5. Wait until DIRECT OK LED comes on. The circuits may have a 60-second delay.

6. Adjust the negative voltage until the meter exceeds the direct ALERT *TOWARD* setpoint.

7. Verify that the direct ALERT LED comes on after the programmed time delay.

NOTE: A flashing alarm LED indicates the first alarm since the last reset. To stop the flashing, press RESET *on the System Monitor.*

NOTE: The Danger Bypass option will inhibit danger relay function.

8. Verify that the ALERT relay contacts (on the Signal Input Relay Module) change state when the ALERT LED comes on.

9. Adjust the negative voltage until the bar graph is at least two segments less than the setpoint. If you selected the non-latching alarm option, the alarms should reset. If you selected the latching alarm option, press RESET on the System Monitor to clear the alarms.

10. Repeat steps 6, 7, 8, and 9 for the direct ALERT *AWAY*, direct DANGER *TOWARD*, and direct DANGER *AWAY* setpoints.

15. Test Peak to Peak Alarms

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

CAUTION

Steps in this procedure will exceed alarm set-points, activate alarms, and activate alarm relay contacts.

NOTE: See Section 13, Danger Bypass to disable the Danger relay contacts.

1. Disconnect COM and IN wiring from ECC and KØ terminals on Signal Input Relay Module.

2. Apply a 1 Hz sine wave with a -10 Vdc bias to ECC IN terminals.

3. Apply a 1 Hz Keyphasor signal using the circuit in Figure 15-1. (This voltage provides the timing signal for the peak to peak detectors.)

4. Select the External Keyphasor option. (See 4. Monitor Options.)

NOTE: You can also select the Simulated Keyphasor option. With simulated Keyphasor, the meter updates the peak to peak channel every minute. The display lags behind the measurement by one minute.

5. Press ALERT. Note the *setpoint level.*

6. Press DANGER. Note the setpoint level.

7. Be sure that both OK LEDs are on. The circuits may have a 60-second delay.

8. Increase the signal amplitude until the meter exceeds the peak to peak ALERT setpoint.

9. Verify that the peak to peak ALERT LED comes on after the programmed time delay.

10. Verify that the ALERT relay contacts (on the Signal Input Relay Module) change state when the ALARM LED comes on.

NOTE: The Danger Bypass option will inhibit danger relay function.

11. Adjust the signal amplitude until the bar graph is at least two segments below the setpoint. If you selected the non-latching alarm option, the alarms should reset. If you selected the latching alarm option, press RESET on the System Monitor to clear the alarms.

12. Repeat steps 6 through 12 for the peak to peak DANGER setpoints.

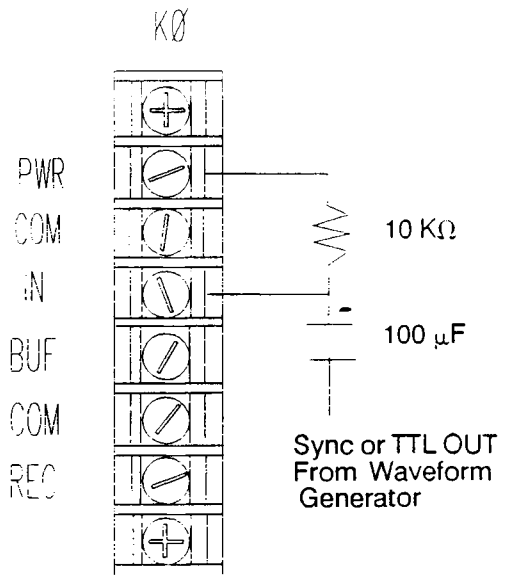


Figure 15-1. Connection for Simulated External Keyphasor Input

16. Calibrate Channel

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

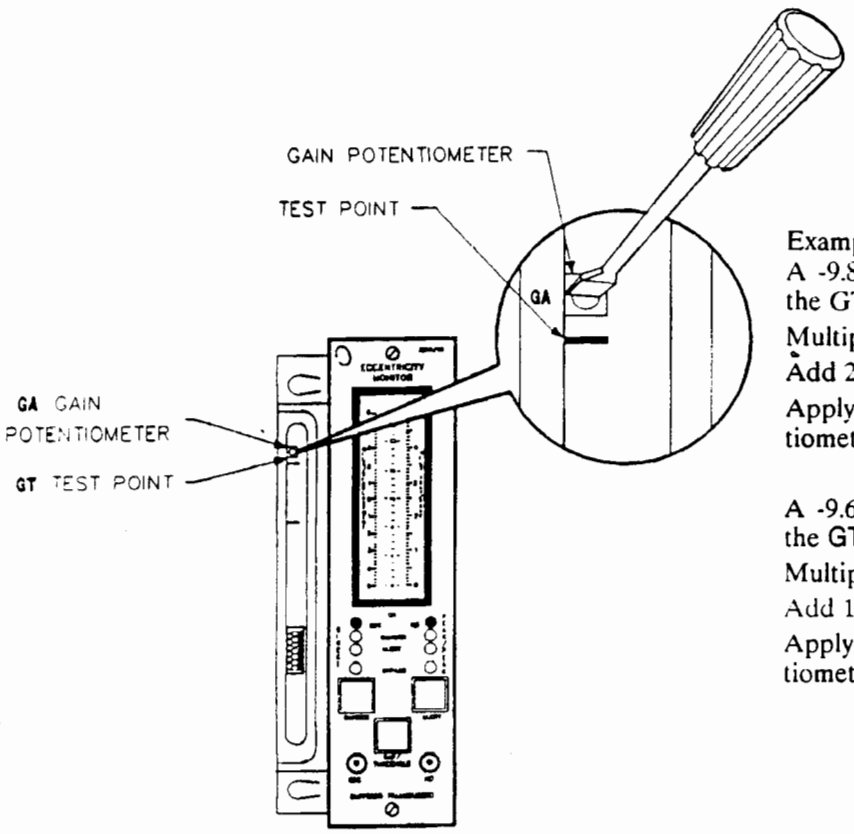
CAUTION

Steps in this procedure will exceed alarm set-points, activate alarms, and activate alarm relay contacts.

Note: See Section 13, Danger Bypass to disable the Danger relay contacts.

1. Disconnect the COM and IN wiring from the ECC terminals on the Signal Input relay Module.
2. Open the front panel.
3. Place a DC volt meter between the GT test point and common (the outer shell of the BNC connector on the front panel).
4. Apply negative voltage to the ECC IN terminals (reference to COM terminals) to cause the GT test point meter to read + 2.50 volts. Note this voltage.
5. Multiply the full scale range by 200 mV/mil (or 7.9 mV per μm). Add this number to the negative voltage at the ECC IN terminals. See examples below.
6. Apply this new voltage to ECC IN terminals.
7. Adjust the GA potentiometer until the voltage at the GT test point is +5.00 volts ±0.01 volt.

Note: If the voltage at the GT test point becomes greater than 5.05V at any time, as a result of adjustment of the GA potentiometer or an overrange voltage cut the ECC IN terminals, error 15 may occur.Before cleaning the error ensure that the voltage at the ECC IN terminals is set to a valve such that the voltage at the GT test point is less than 4.92V. If this is not done, error 15 will recur immediately.



Examples:

A -9.83 Vdc input causes a +2.50 Vdc output at the GT test point. The full scale range is 10 mils.
Multiply 10 mils times 200 mV/mil to get 2 Vdc.
Add 2 Vdc to -9.83 Vdc to get -7.83 Vdc.
Apply -7.83 Vdc to ECC IN. Adjust the GA potentiometer to make the meter read +5.00 Vdc.

A -9.67 Vdc input causes a +2.50 Vdc output at the GT test point. The full scale range is 200 μm.
Multiply 200 μm times 7.9 mV/μm. to get 1.6 Vdc.
Add 1.6 Vdc to -9.67 Vdc to get -8.07 Vdc.
Apply -8.07 Vdc to ECC IN. Adjust the GA potentiometer to make the meter read +5.00 Vdc.

17. OK Limits

⚠ WARNING

High voltage present could cause shock burns or death

Do not touch exposed wires or terminals

CAUTION

Steps in this procedure will exceed alarm set-points, activate alarms, and activate alarm relay contacts.

Test Eccentricity OK Function

This procedure verifies that the eccentricity probe gap voltage is within normal operating limits. If a probe is not within limits, it is NOT OK.

1. Disconnect the field wiring from the ECC and COM terminals on the Signal Input Relay Module.

2. Connect a negative voltage source and a volt meter to the ECC and COM terminals.

3. Adjust the voltage to -10.00 Vdc.

4. Be sure the ECC OK LED comes on. If the Timed OK Monitor Defeat option is enabled, wait 60 seconds for the ECC OK LED to come on. (See 4. Monitor Options.)

5. Press the Reset switch on the System Monitor.

6. Slowly increase the negative input voltage until the ECC OK LED goes off. Note the voltage.

7. Decrease the voltage slightly, and wait 60 seconds until the ECC OK LED comes on.

8. Slowly decrease the voltage until the ECC OK LED goes off. Note the voltage.

Table 14-1. Probe Gap Voltage Limits

Transducer Option	Voltage Limits
7200 5 - 8 mm Probes	
Lower OK Limit	-1.20 to -2.10 Vdc
Upper OK Limit	-17.05 to -18.28 Vdc
7200 11 mm Probe	
Lower OK Limit	-2.86 to -3.87 Vdc
Upper OK Limit	-19.30 to -20.35 Vdc
7200 14 mm Probe	
Lower OK Limit	-1.35 to -2.30 Vdc
Upper OK Limit	-17.67 to -18.75 Vdc

9. Compare the voltage readings with the values in table 14-1.

NOTE: The SYSTEM OK *relay (located behind the System Monitor) will change state with the* OK *LED if all other* OK *LEDs in the rack are on. If any* OK *LEDs are off, the* SYSTEM OK *relay will be deenergized until the* NOT-OK *monitors are bypassed.*

Test Keyphasor OK

This procedure verifies that the Keyphasor signal pulses are from 1 to 600 rpm, and that the Keyphasor pulses occur normally. If a signal has improper hysteresis or Keyphasor threshold voltages, it is NOT-OK.

1. Disconnect the KØ and COM terminals from the Signal Input Relay Module.

2. Be sure that the Automatic Threshold option is enabled. (See 4. Monitor Options.)

3. Apply a square wave swinging from 0 to -15 volts into the KØ terminal.

4. The Keyphasor probe is OK if the frequency of the square wave is between 1 rpm (0.0167 Hz) and 600 rpm (10 Hz).

NOTE: Rapid changing of the input (greater than 50% between pulses) will cause the Keyphasor signal to become NOT OK. At low frequencies, the response time can lag by 60 seconds. Wait for the lag as you approach 0.0167 Hz. The System OK relay is not driven by the Keyphasor NOT OK.

18. Field Wiring Diagrams

1. Wiring Recommendations

Signal module to Proximitor modules: 18-AWG to 22-AWG solid or stranded 3-wire shielded with insulating sheath.

Signal module to Recorder/Readout: 18-AWG to 22-AWG solid or stranded 2-wire shielded with insulating sheath.

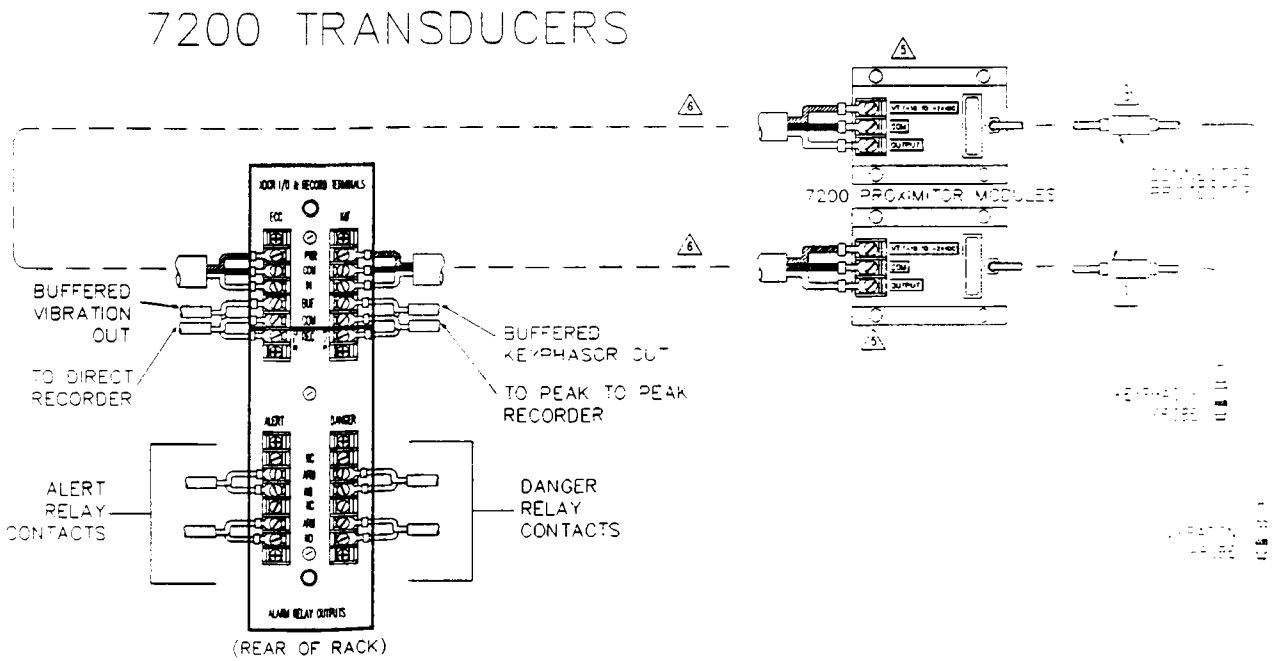
2. Shields terminated to Signal Module Common.

3. To electrically isolate and protect coaxial connections, use connector protector kit PN 40113-02.

4. To minimize ground loop noise problems, a single-point earth ground (GND) to system common (COM) is recommended.

5. Proximitor case must be electrically isolated from earth ground. Electrical isolation: 500 Vac (RMS) minimum isolation kit PN 19094-01 may be used to satisfy the isolation requirement.

6. Maximum cable length between signal input relay module and Proximitor module must not exceed 1,000 feet (300 metres).



1. Wiring Recommendations:

Signal Module to Barrier – Barrier to Proximitor transducer: 14-AWG to 18-AWG solid or stranded, 3-wire shielded with insulating sheath.

Signal Module to Recorder/Readout: 18-AWG solid or stranded 2-wire shielded with insulating sheath.

2. Shields are joined as shown terminating at Barrier Ground. Shields should be insulated.

3. Use MTL Safety Barrier per DWG BA22000, Note 17.

4. Barriers are mounted on Barrier Rail. Barrier Rail is the system ground and is used to terminate the potential equalization bus. Total earth loop impedance must not exceed 1 ohm.

5. Proximitor case must be electrically isolated from earth ground. Electrical isolation: 500 Vac (RMS) min. Isolation Kit PN 19094-01 may be used to satisfy the isolation requirement.

6. To electrically isolate and protect coaxial connections, use connector protector kit PN 40113-02.

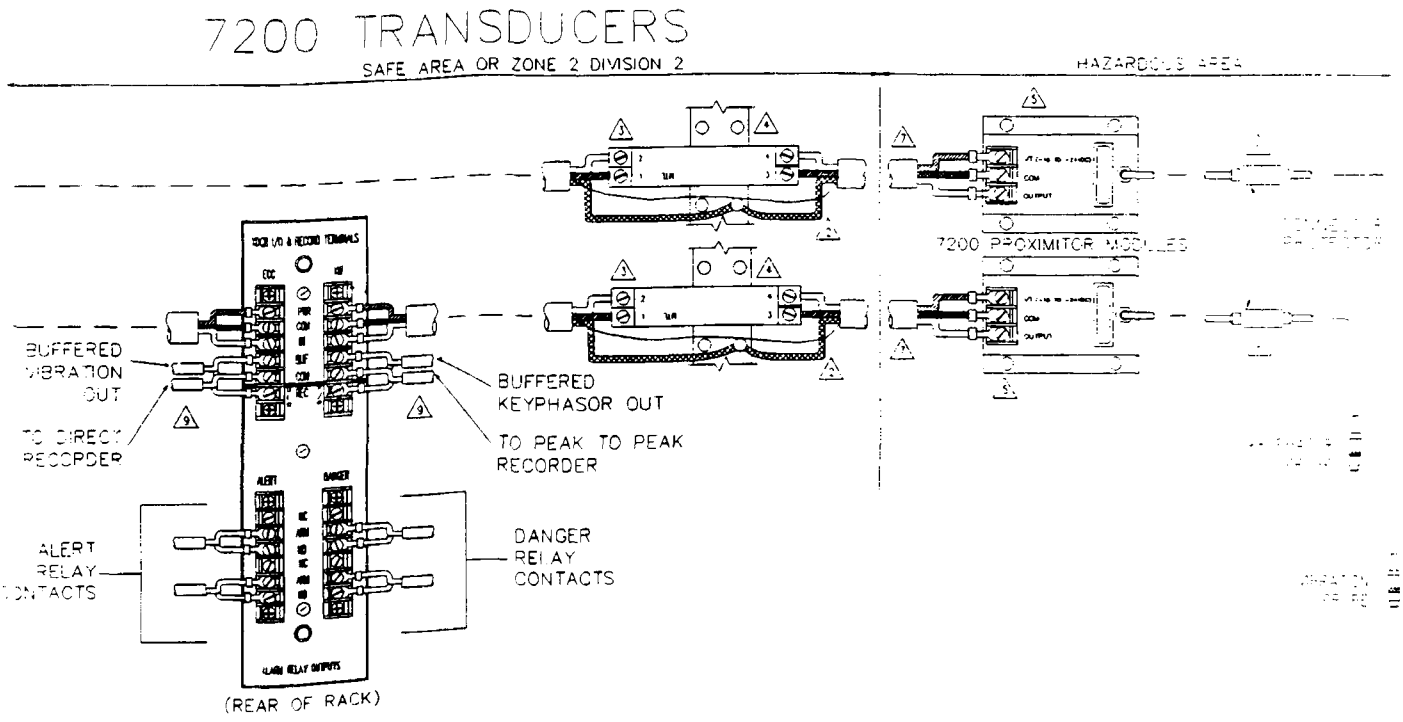
7. Maximum cable length between barrier and Proximitor transducer must not exceed 1,000 feet (300 metres).

8. To minimize ground loop noise problems, a single-point earth ground (GND) to system common (COM) connection recommended.

9. Recorder shields terminate at rack signal common.

10. Barriers located in division 2 or zone 2 hazardous area must be installed in NEMA 4, IP 54, or approved protective housing.

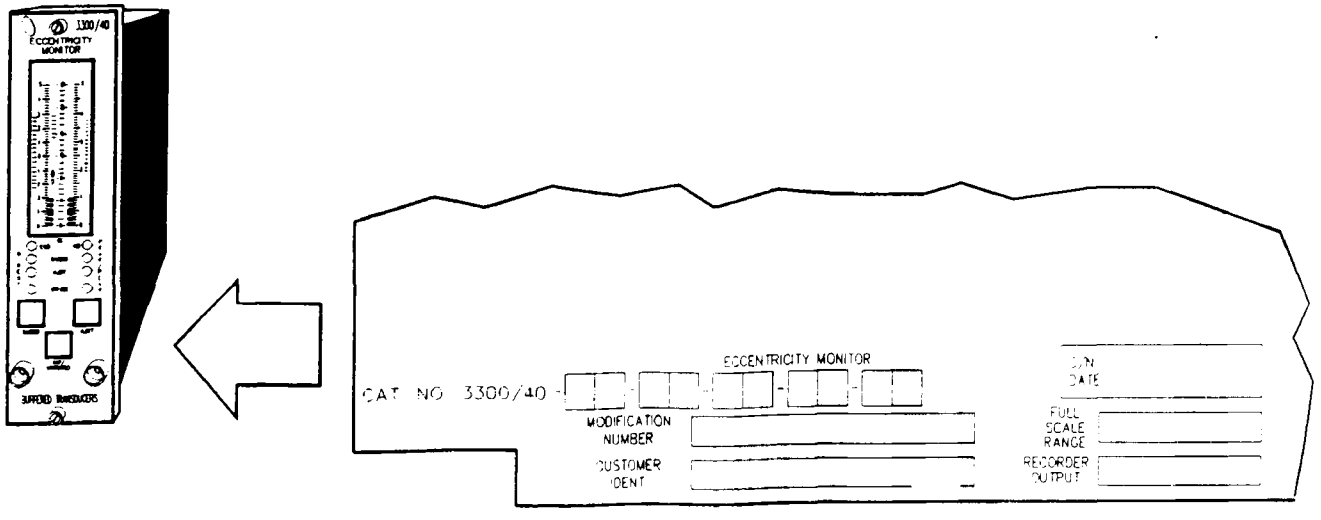
11. Monitors must be re-calibrated with barriers in the lines.



19. Recommended Spare Parts

To order replacement parts, specify the complete part number according to this table, as indicated on the identification label. If the monitor has been modified, specify the modification number on the parts order. The customer must set programmable options. If in doubt about the part number, call your Bently Nevada Corporation representative before ordering the part.

QTY PER MON	DESCRIPTION	PART NUMBER	
	ECCENTRICITY MONITOR	3300/40 - [ ][ ]-[ ][ ]-[ ][ ]-[ ][ ]-[ ][ ]	
1	FRONT PANEL PWA ASSEMBLY	82924-01	
1	MONITOR CIRCUIT ASSEMBLY	81786-01	
1	SIGNAL INPUT RELAY MODULE		
	NO RELAY	82925-01	0 0
	EPOXY SEALED RELAY	82926-01	0 1
	HERMETICALLY SEALED RELAY	82927-01	0 2
	QUAD EPOXY SEALED RELAYS	82728-01	0 3



20. Specifications

Input

Signal Input

Two channels with proximity probe signals, one for vibration and one for Keyphasor input

Signal Scale Factor

200mV/mil (8 V/mm) or 100 mV/mil (4 V/mm), jumper selectable

Signal Conditioning

Monitor Range

Full scale meter range selected per Option Table

Frequengy Range

Peak to Peak: 1 to 600 rpm (0 to 10 Hz)
Direct: 0 to 600 rpm (0.0167 to 10 Hz)

Accuracy

±0.33% of full scale error typical at 77°F (25°C)
±1% of full scale error maximum at 77°F (25°C)

Alarms

Alarm Setpoints

Alert and Danger alarm setpoints adjustable from 0 to 100% of full scale

Alarm Delay

Alarm delay times are user-programmable per options

Displays

Meter

LCD bargraph, dual scale with outside scales marked per monitor full scale range; center scale marked for probe gap
0 to -24 Vdc

LEDs

Green LEDs annunciate vibration and Keyphasor transducer OK conditions
Red LEDs annunciate DANGER, ALERT, and BYPASS conditions.

Controls

Front Panel

Three front panel switches: two for reading ALERT and DANGER setpoint levels, and one for reading GAP/THRESHOLD levels

Internal

Switches on circuit board for Danger Bypass, and Monitor Bypass, Direct setpoint adjust, Peak to Peak setpoint adjust, Toward/Away adjust, Keyphasor threshold adjust, and Zero adjust

Output

Recorder

Output proportional to selected full scale monitor range and protected against continuous short circuit to ground:
+4 to +20mA, 12 V compliance
+1 to +5 Vdc, 100-ohm output impedance
0 to -10 Vdc, 100-ohm output impedance

Output (Continued next page)

20. Specifications [Cont.]

Output (Continued)

Transducer Power

-24 Vdc or -18 Vdc determined by transducer option selected in power supply, short circuit protected

Alarms & OK

Relay drives for alarms (ALERT and DANGER) and monitor or transducer OK

Buffered Output

Output terminals on front and rear panels for ECC and Keyphasor transducers.

Relay Contact Ratings

Dual Relays:
5 A @120 Vac 50/60 Hz
5 A 28 Vdc
Quad Relays:
0.6 A @120 Vac 50/60 Hz
2 A 30 Vdc

Environmental

Temperature

Operating: +32°F to +149°F (0°C to +65°C)
Storage: -40°F to +185°F (-40°C to +85°C)

Humidity

0 to 95%, noncondensing

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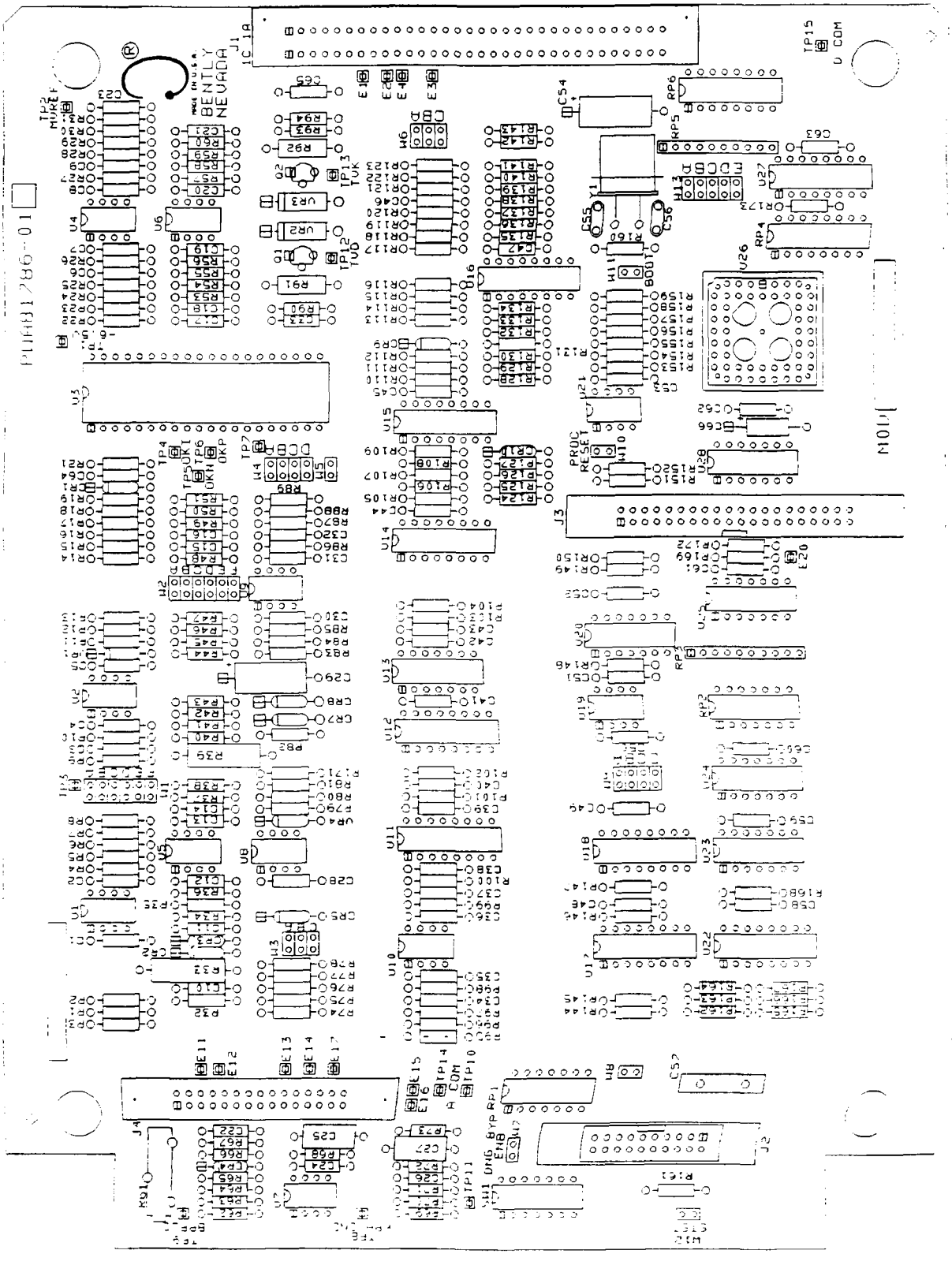
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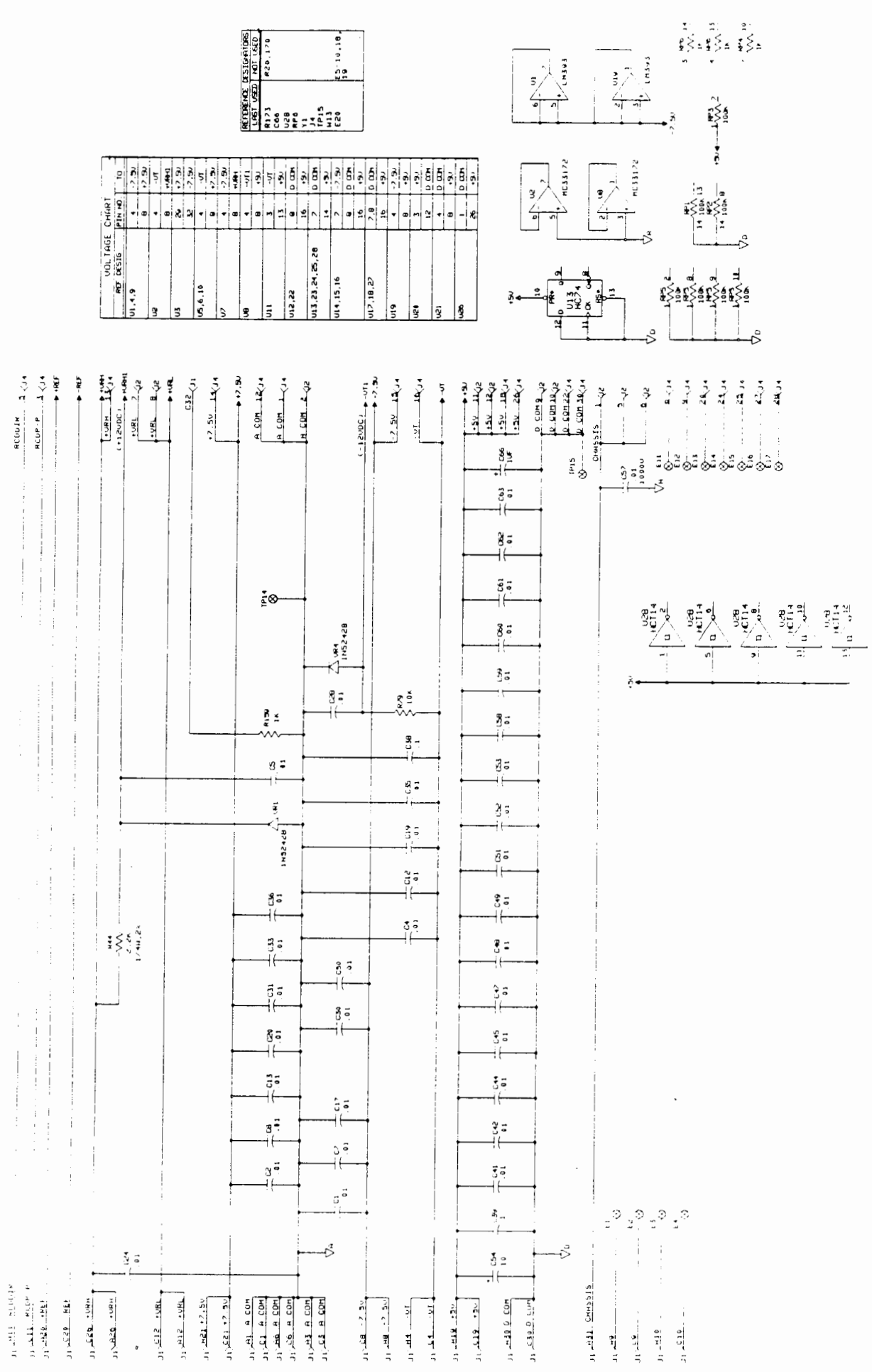
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Schematics and PWA Drawings

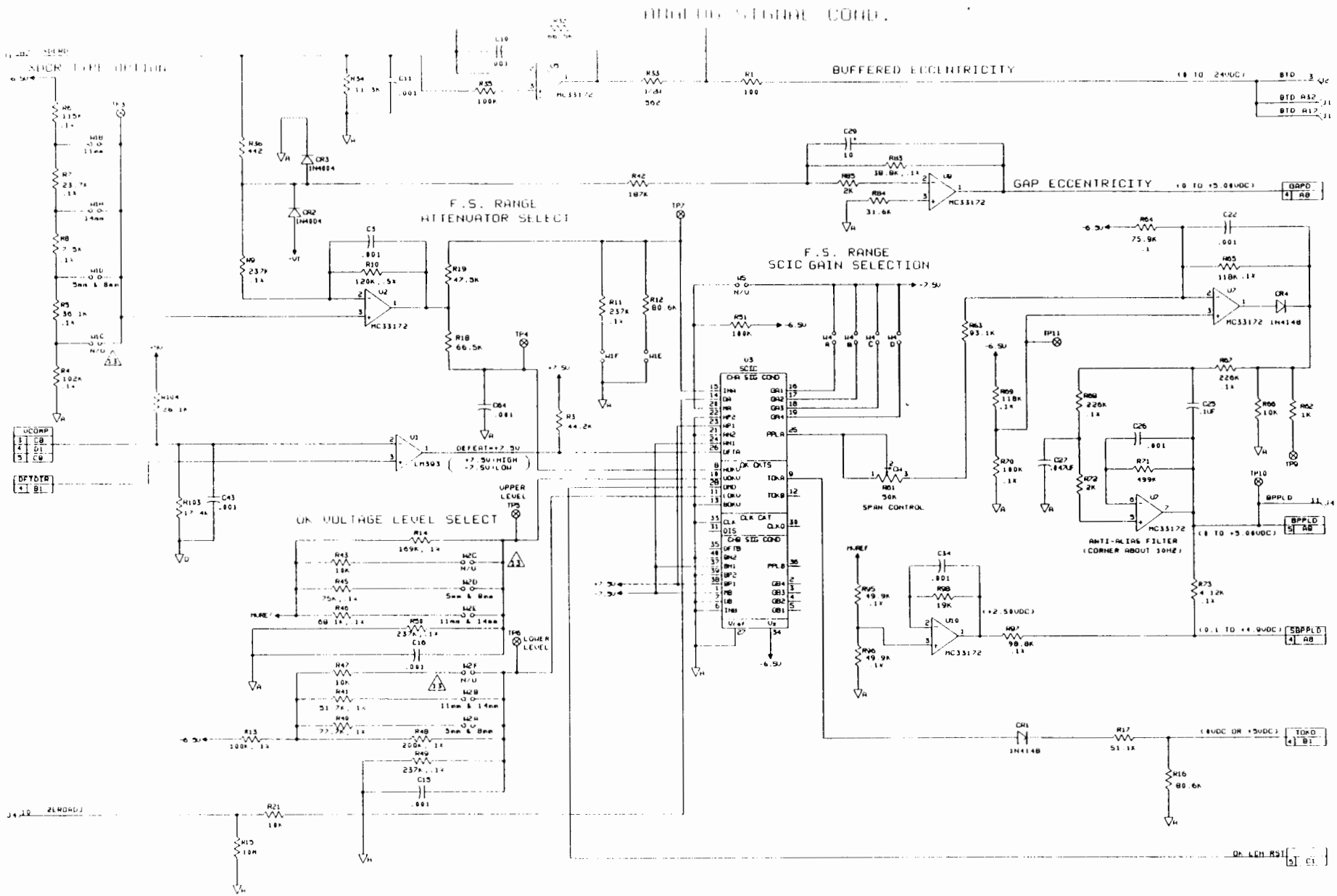
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SCHEMATIC DIAGRAM EIPP PIGGYBACK	82252	SHTS 3 OF 3
SCHEMATIC DIAGRAM SIRM	78463	SHTS 2 OF 2
SCHEMATIC DIAGRAM QUAD RELAY	83730	SHTS 2 OF 2
SCHEMATIC DIAGRAM FRONT PANEL	78413	SHTS 1 OF 1



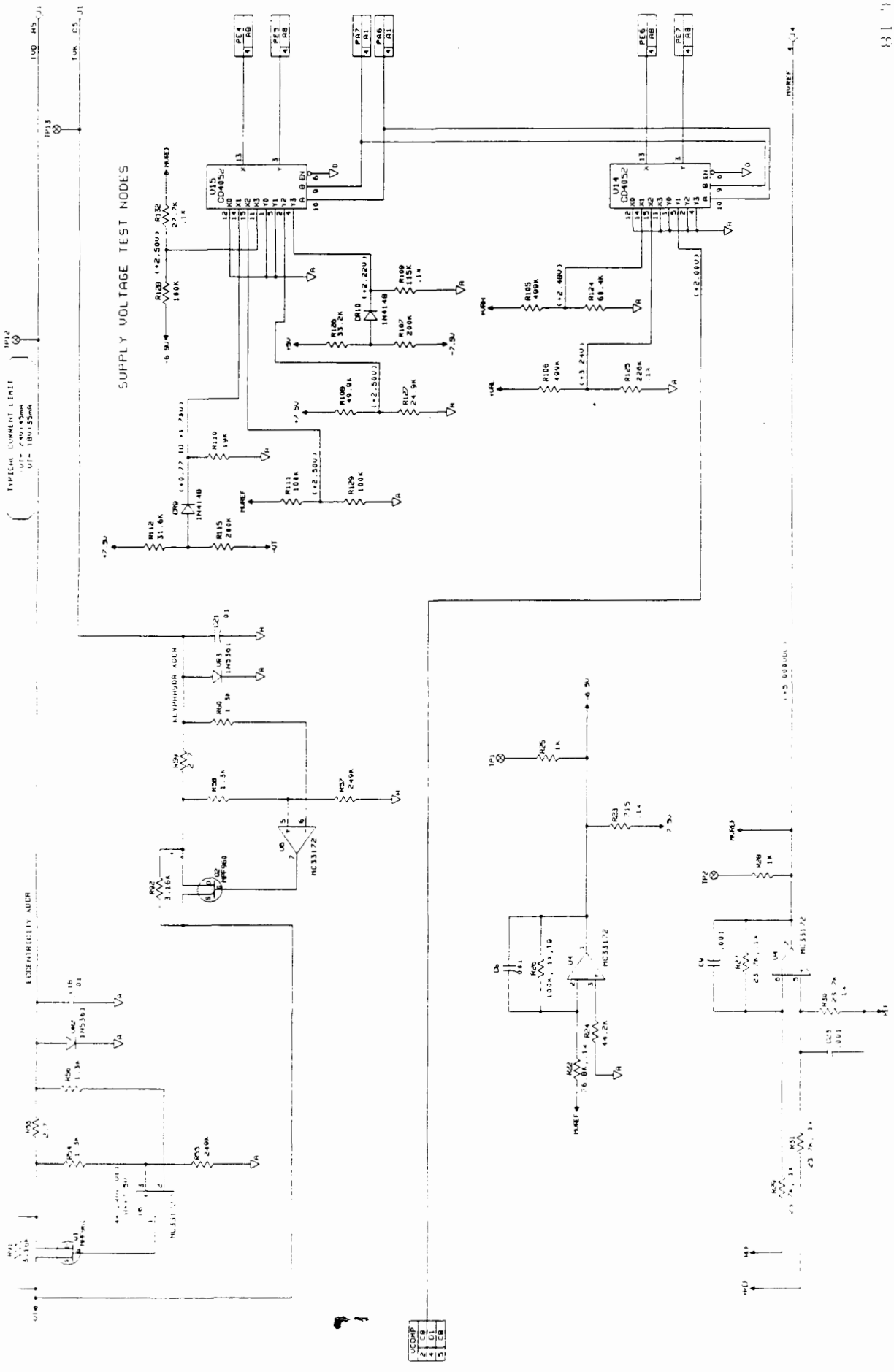
PWA EIPP MONITOR 81786 SH 1 OF 1



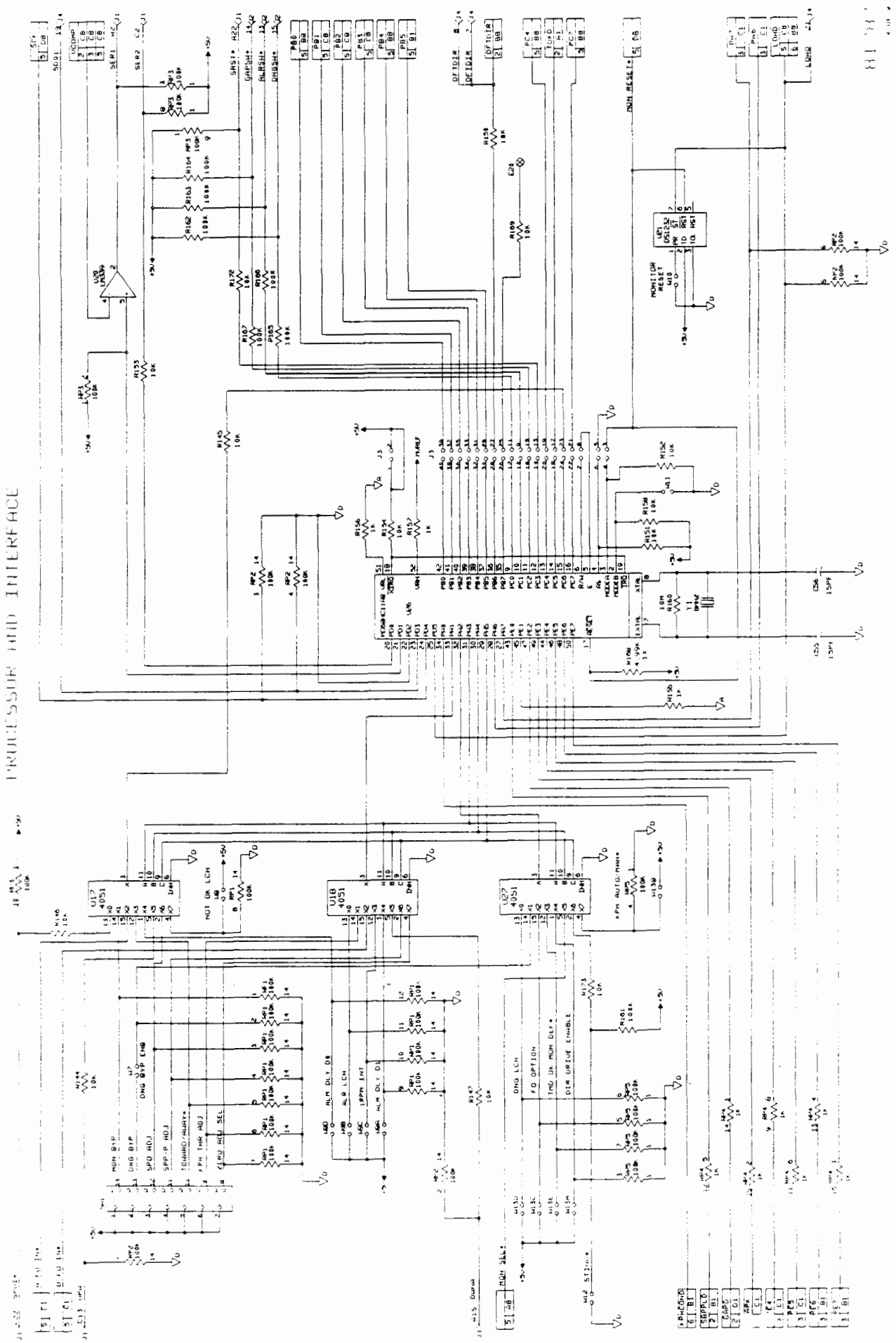
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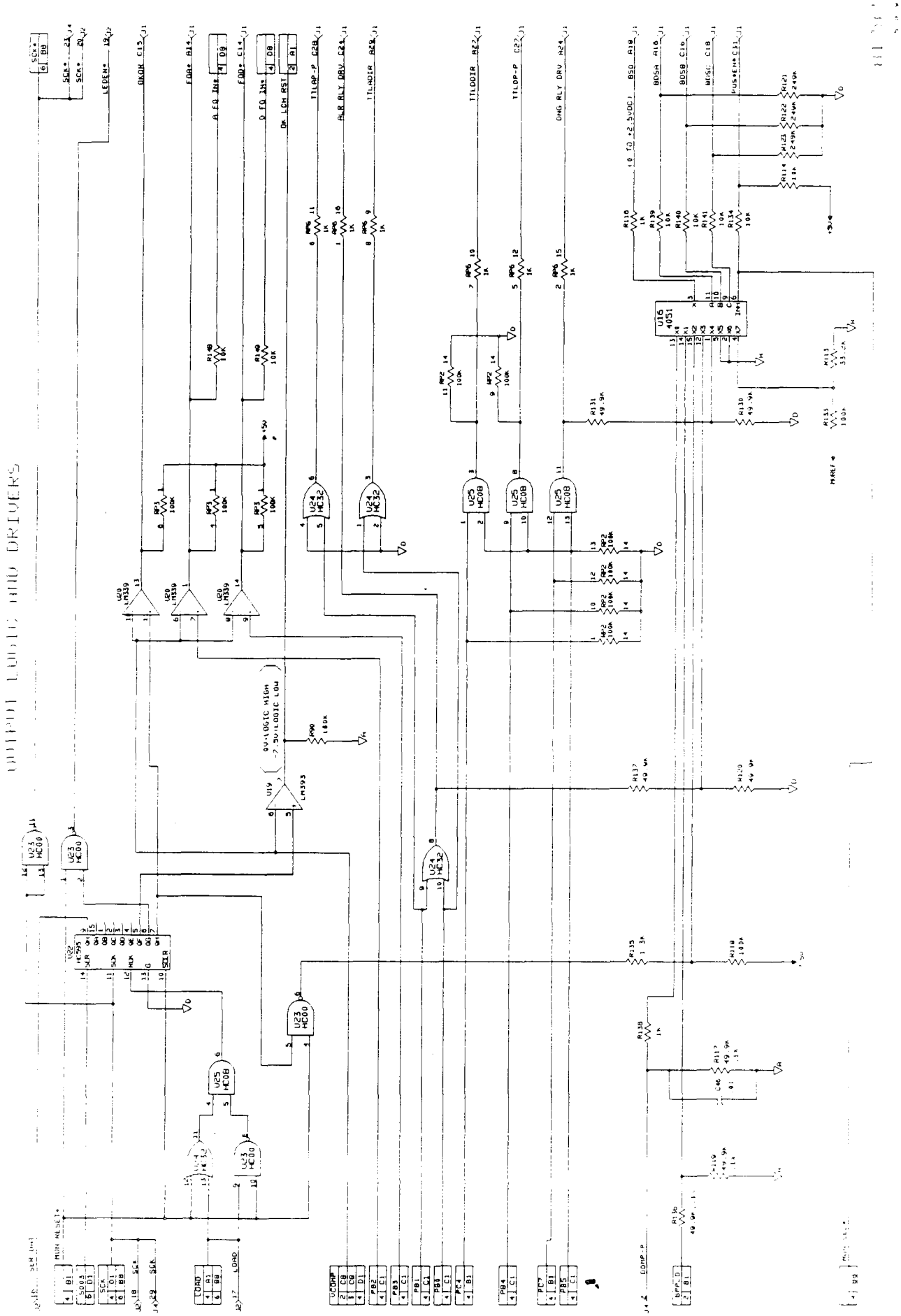
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SCHEMATIC DIAGRAM EIPP MONITOR 81787 SH 3 OF 9



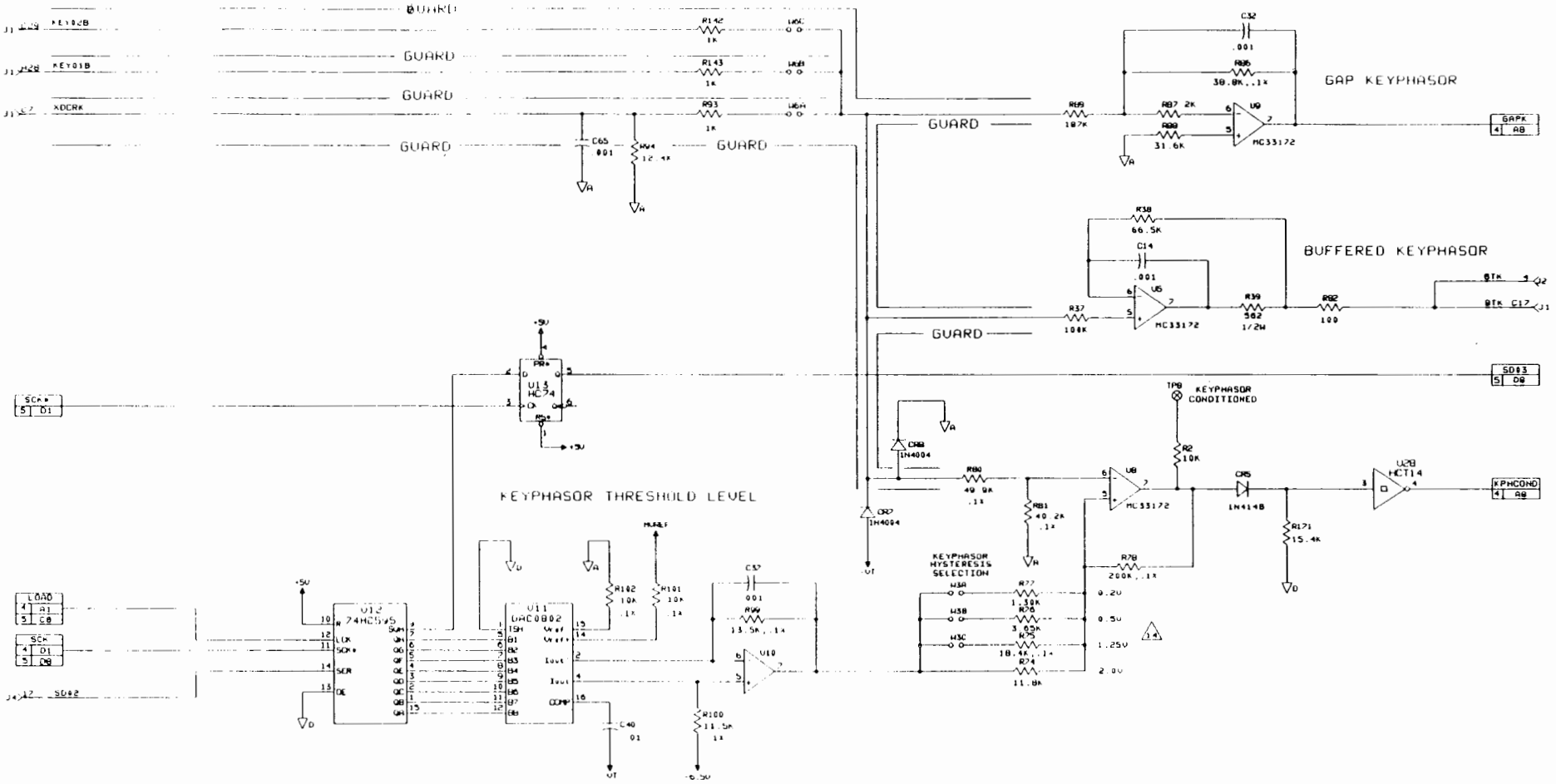
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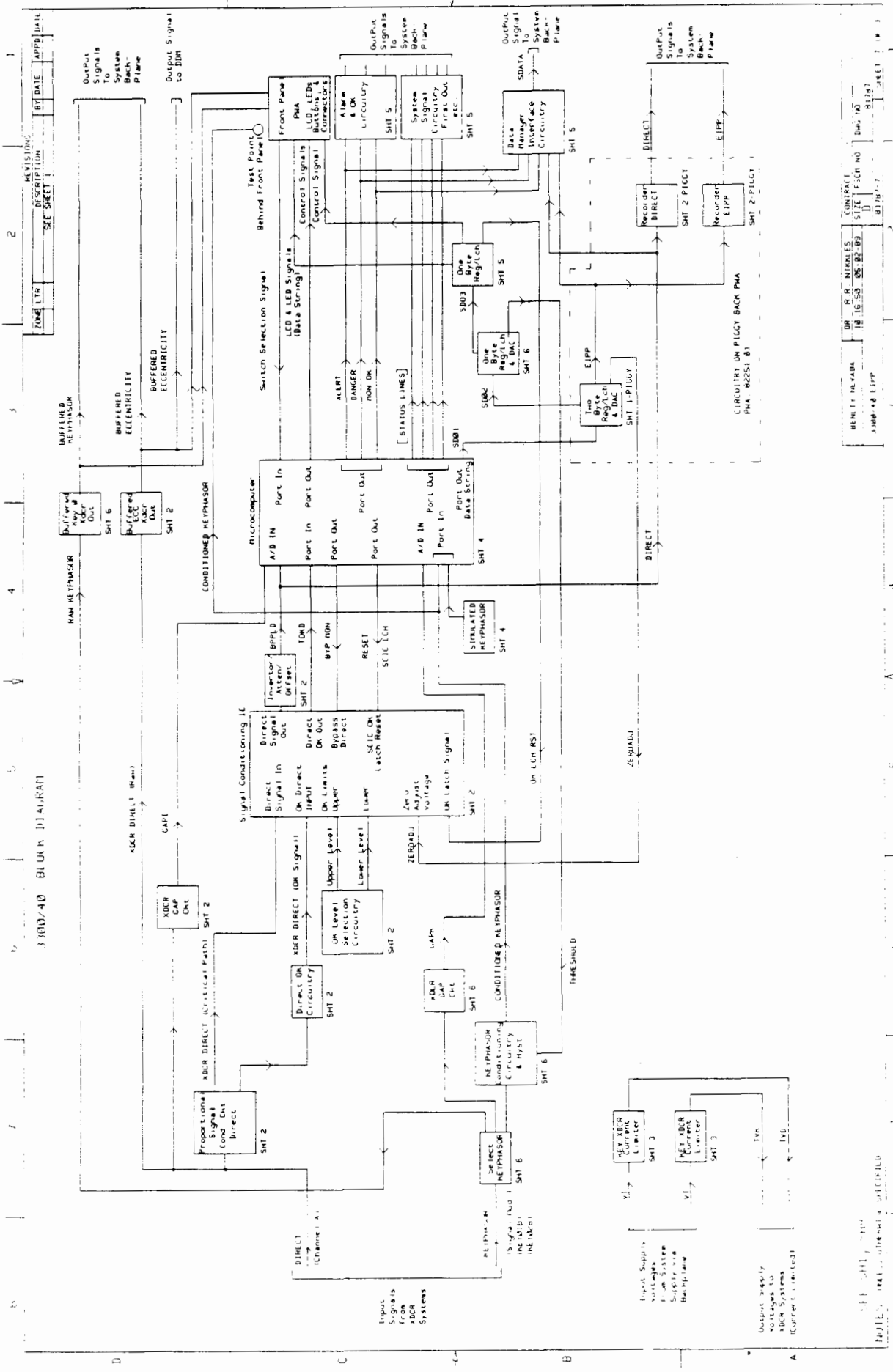


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KEYPHASOR CIRCUITRY

KEYPHASOR INPUT SOURCE SELECTION





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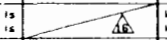
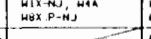
PROGRAMMABLE OPTIONS

3300/40 ECCENTRICITY PEAK TO PEAK

3300 40

REVISIONS						
ZONE	LTR	DESCRIPTION	BY	DATE	APPD	DATE
		SEE SHEET 1				

FULL SCALE RANGE

OPT	RANGE	JUMPER 5mm & 8mm 200mV/mil	JUMPER 11mm & 14mm 100mV/mil
01	5 0-5 mils 0-5 mils	W1X-NJ, W4A, W4C W8X P-NJ	W1X-NJ, W4D W8B P, W8C P
02	10 0-10 mils 0-10 mils	W1X-NJ, W4C W8X P-NJ	W1X-NJ, W4A, W4C W8B P, W8C P
03	20 0-20 mils 0-20 mils	W1X-NJ, W4A W8X P-NJ	W1X-NJ, W4C W8B P, W8C P
04	30 0-30 mils 0-30 mils	W1F, W4-NJ W8A P, W8D P	W1F, W4A, W4B W8A P, W8D P
05	50 0-50 mils 0-50 mils		W1X-NJ, W4X-NJ W8B P, W8C P
11	100 0-100 cm 0-100 cm	W1X-NJ, W4B, W4C W8X P-NJ	W1X-NJ, W4A, W4D W8B P, W8C P
12	200 0-200 cm 0-200 cm	W1F, W4A, W4C W8X P-NJ	W1X-NJ, W4B, W4C W8B P, W8C P
13	500 0-500 cm 0-500 cm	W1X-NJ, W4A W8X P-NJ	W1X-NJ, W4C W8B P, W8C P
14	1000 0-1000 cm 0-1000 cm		W1X-NJ, W4A W8B P, W8C P

JUMPER FUNCTION

W1E, W1F ATTENUATOR SELECTION
W4A, W4B, W4C, W4D SCIC GAIN SELECTION
W8A P, W8B P, W8C P ZEROING ADJUSTMENT RANGE
W8D P ZEROING ADJUSTMENT RANGE

TRANSDUCER OPTION

OPT	RANGE	JUMPER
01	7200 - 5mm & 8mm PROX	W1D, W2A, W2D
02	7200 - 11mm PROX	W1B, W2B, W2E
03	7200 - 14mm PROX	W1A, W2B, W2E

JUMPER FUNCTION:

W1A, W1B, W1I TRANSDUCER SELECTION
W2A, W2B, W2C, W2I OK LIMITS SELECTION
W2E, W2F OK LIMITS SELECTION

ALARM RELAY OPTIONS

00	NONE
01	SAMP, EPOXY SEALED RELAY
02	SAMP, HERMETIC SEALED RELAY

APPROVALS OPTION

00	NONE
01	CSA
02	BASEEFA
03	FACTORY MUTUAL

BARRIER OPTIONS

00	NONE	ALL TRANSDUCER
01	WITH BARRIER	5mm & 8mm ONLY

	FIRST OUT		DIRECT ALARM DRIVE		NOT-OK MODE		ALERT MODE		DANGER MODE		DANGER BYPASS		TIMED OK MONITOR DEFEAT	
SHIPPED AS	ENABLED.		ENABLED		NON-LATCHING		LATCHING MODE		LATCHING MODE		DISABLED		ENABLED	
	ENABLED	W13C	ENABLED	W13A	LATCHING	W8	LATCHING MODE	W9B	LATCHING MODE	W13D	ENABLED	W7	ENABLED	NJ
	DISABLED	NJ	DISABLED	NJ	NON-LATCHING	NJ	NON-LATCHING MODE	NJ	NON LATCHING MODE	NJ	DISABLED	NJ	DISABLED	W13E

	RECORDER OUTPUTS		RECORDER CLAMPING OPT		ALARM DELAY		KEYPHASOR SOURCE		KEYPHASOR HYSTERESIS		KEYPHASOR THRESHOLD	
SHIPPED AS	+4 TO +20 mA		NON-CLAMPED		3 SEC.		EXTERNAL K8		0.5 V		MANUAL	
	+4 TO +20 mA	W1 B,C,E,F W2 C F W3 A,B F W4 A,B F W5 C F W6 B,C,E F W7 C,D F	CLAMP DIR CLAMP F-F	W2D F W5D F	0.1 SEC 1 SEC 3 SEC. 6 SEC.	NJ W9D W9A W9A, W9D	EXTERNAL K8 (SIGNAL MOD.) INTERNAL K01 (NET0101) INTERNAL K02 (NET0201) SIMULATED	W6A W6B W6C W9C	0.2 V 0.5 V 1.25V 2.0 V	W3A W3B W3C NJ	AUTOMATIC MANUAL	W13B NJ
			NON CLAMPED	NJ								
	0 TO -10 Vdc	W1 A,D F W2 A F W3 D F W4 D F W5 A F W6 A,D F W7 A,B F										
	+1 TO +5 Vdc	W1 A,D F W2 B F W3 C F W4 C F W5 B F W6 A,D F W7 C,D F										

19 REF SCHEMATIC 81556 FOR PIGGY BD

18 REF SCHEMATIC 81580 FOR SHEETS 7, 8, AND 9

12 NOTATION USED WITH THE JUMPER

EXAMPLES W8A N-T MEANS W8 - JUMPER GROUP W8
X -- ALL JUMPERS IN OPTION FAMILY
NJ -- NO JUMPER INSTALLED

W1 A,D F MEANS W1 JUMPER GROUP W1
A,D JUMPERS A AND D IN OPTION FAMILY
F - JUMPERS ARE ON PIGGYBACK

IF THERE IS NO F AT THE END OF THE JUMPER NUMBER THEN THE JUMPER WILL BE ON THE MAIN BOARD

13 THE ILLEGAL OPTIONS HAVE BEEN CROSSED OUT

15 EACH OPTION GROUP HAS A GROUP OF JUMPERS WHICH ARE USED TO CONFIGURE THAT OPTION. FIRST REMOVE ALL THE JUMPER FOR THAT OPTION, THEN INSTALL THE CORRECT JUMPERS

ADDITION NOTE : AS SHEET 1

NOTES: UNLESS OTHERWISE SPECIFIED

BENTLY NEVADA	DR R R NIKKELS 10 16 02 05 02-03	CONTRACT		
3300 40 EIPP		SIZE D	FSCM NO 81787-8	DWG NO 81787 SHEET 8 OF 9

SCHEMATIC DIAGRAM EIPP MONITOR 81787 SH 9 OF 9

3300/40 SIGNAL NAMES

REVISIONS						
ZONE	LTR	DESCRIPTION	BY	DATE	APPD	DATE
		SEE SHEET 1				

ABBREVIATIONS OF THE SIGNALS USED IN THE SCHEMATIC

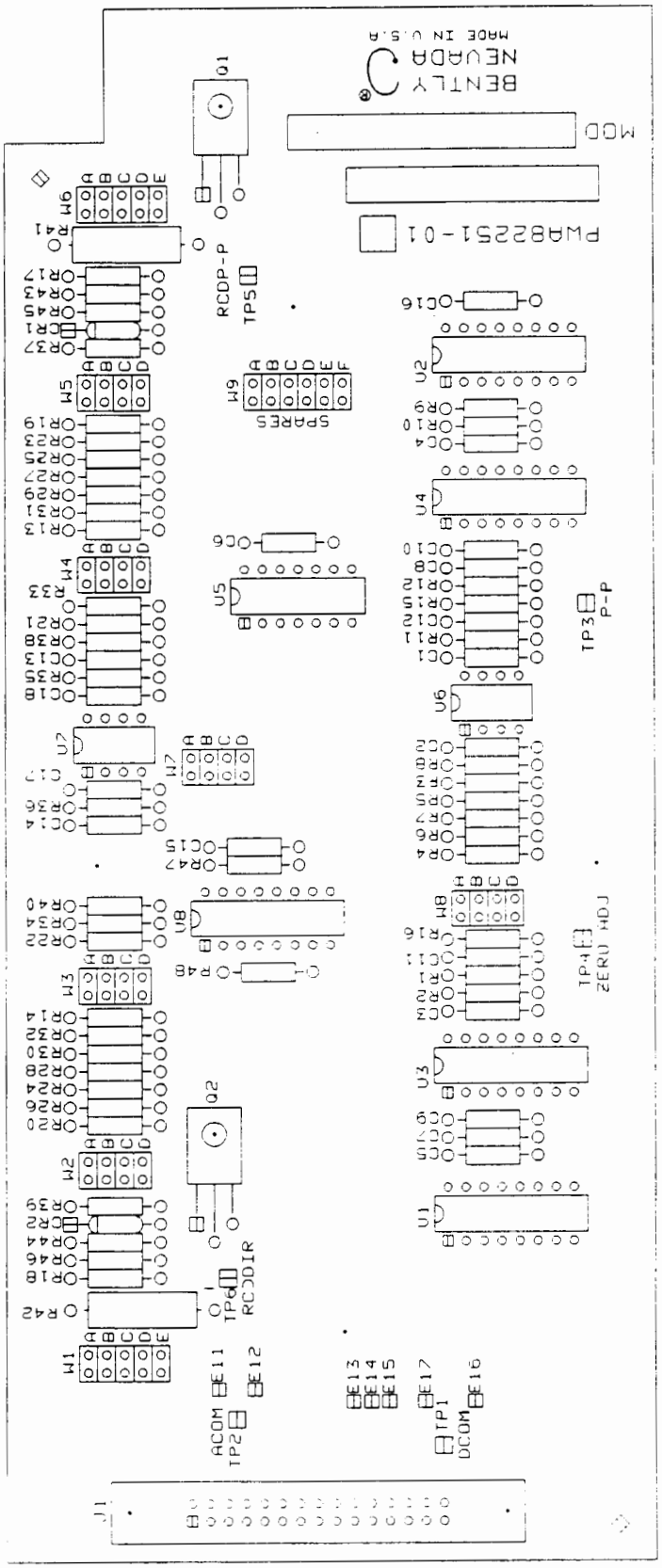
SIGNALS ON THE SCHEMATIC	COMPLETE SIGNAL NAME
A COM or A	Analog Common
ALM DLY D0	Alarm Delay Digit 0
ALM DLY D1	Alarm Delay Digit 1
ALR LCH	Alert Latching
ALR RLY DRV	Alert Relay Drive
A FO IN=	Alert First Out Input
ALRSW=	Alert Switch
BSD	Buffered Serial Data -- DDM
BDSA	Buffered DDM Static Data Select Line A
BDSB	Buffered DDM Static Data Select Line B
BDSC	Buffered DDM Static Data Select Line C
BPPLD	Buffered Proportional Direct -- Eccentricity Input
BTD	Buffered Transducer Signal -- Eccentricity
BTK	Buffered Transducer Signal -- Keyphasor
CHASSIS	Chassis Common
D COM or D	Digital Common
DDMP-P	DDM Reconstructed Analog Peak to Peak Signal
DFTDIR	Defeat Direct Signal
DIRECT DRIVE ENBLE	Direct Drive Enable Command
DNG BYP	Danger Bypass
DNG BYP ENB	Danger Bypass Enable
DNG LCH	Danger Latching
DNGSW=	Danger Switch
DNG RLY DRV	Danger Relay Drive
DWNA	DOWN Arrow
D FO IN=	Danger First Out Input
FOA=	Alert First Out Drive
FOD=	Danger First Out Drive
FO OPTION	First Out Option
GAPD	Transducer Gap Signal -- Direct (Eccentricity)
GAPK	Transducer Gap Signal -- Keyphasor
GAPSW=	Gap Switch
KPH AUTO/MAN=	Automatic or Manual Keyphasor Threshold Selection
KPHCOND	Conditioned Keyphasor
KPH THR ADJ	Keyphasor Threshold Adjustment Select
KEY01B	Buffered Keyphasor Input -- One (from System Monitor)
KEY02B	Buffered Keyphasor Input -- Two (from System Monitor)
LOAD	Shift Register Latches Load Command
LEDEN=	LED Drive Enable
MON BYP	Monitor Bypass
MON RESET=	Monitor Reset
MON SEL=	Monitor Select
MVREF	+5 Volts Voltage Reference
NOT OK LCH	Not OK Transducer Latch Command
OK LCH RST	SCIC OK Latch Reset Command
OKOR	Monitor OK Bus Drive
PA_	Port A_
PB_	Port B_
PC_	Port C_
PD_	Port D_
PE_	Port E_

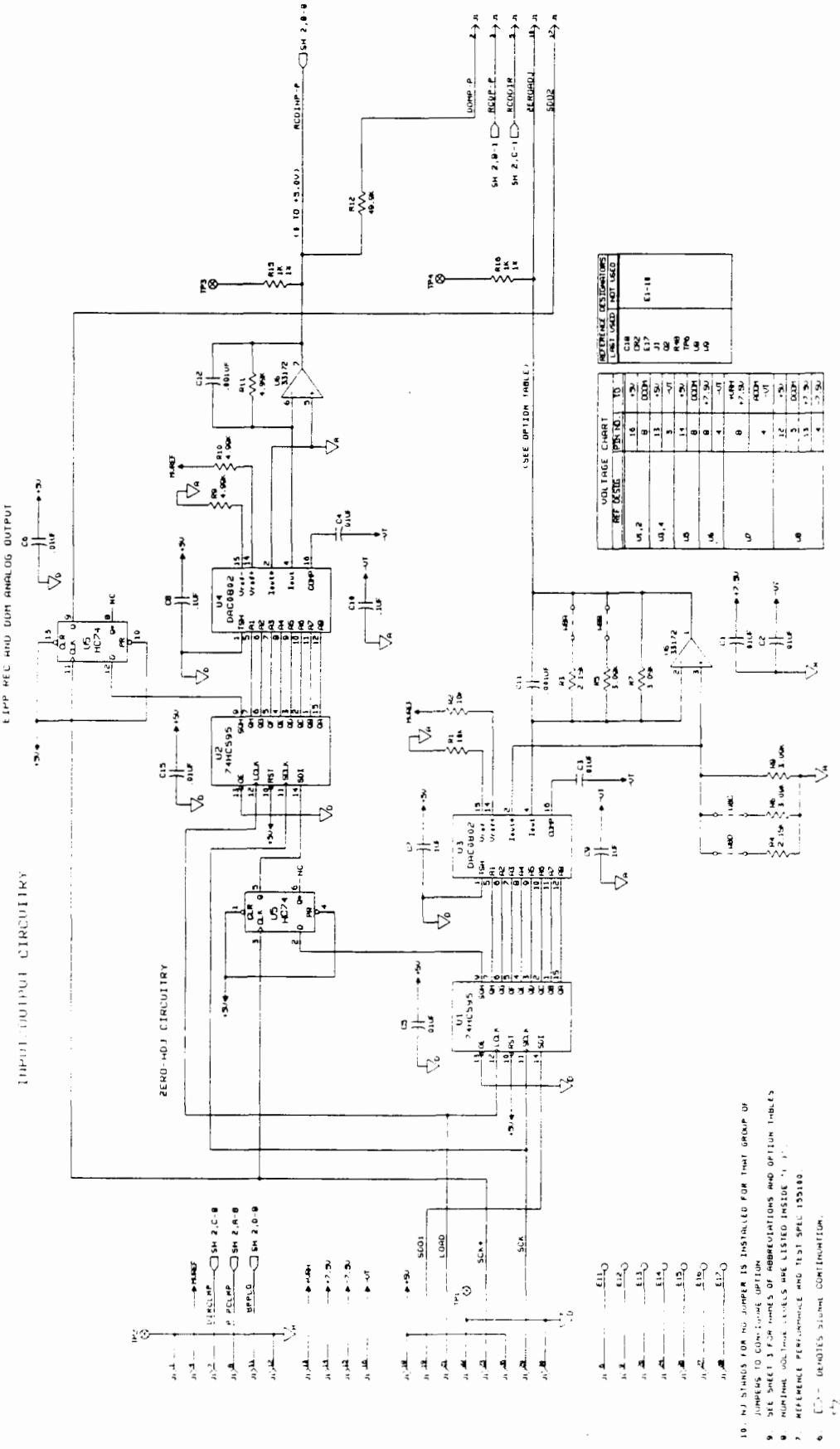
SIGNALS ON SCHEMATIC	COMPLETE SIGNAL NAME
POSNEN=	Rack Slot Position Enable
RCDDIR	Recorder Output -- Direct
RCDP-P	Recorder Output -- Peak to Peak
STINV=	Self-Test Invoke
SBPPLD	Scaled Buffered Proportional Direct Signal
SPARE	Unused Parts and/or Lines
SPD ADJ	Set-Point Direct Adjustment
SPP-P ADJ	Set-Point Peak to Peak Adjustment
SCK	Serial Clock
SCK=	Inverted Serial Clock
SD01	Serial Data String at first location
SD02	Serial Data String at second location
SD03	Serial Data string at third location
SER DAT	Serial Data String sent to front panel
SER1	Serial Communications Transmit
SER2	Serial Communications Receive
SPUI=	System Power Up Inhibit
SRST=	System Reset
TMR OK MON DEF=	Time OK monitor Defeat
TOKD	Transducer OK Direct Signal -- Eccentricity
TOWARDS/AWAY=	Towards and Away Set-Point Selection
TTLADIR	TTL Alert Drive -- Direct
TTLAP-P	TTL Alert Drive -- Peak to Peak
TTLDDIR	TTL Danger Drive -- Direct
TTLDP-P	TTL Danger Drive -- Peak to Peak
TVD	Transducer Power Current Limited -- Eccentricity (Direct)
TVK	Transducer Power Current Limited -- Keyphasor
VCOMP	Comparator Threshold Voltage (+2 Volts)
UPA	UP Arrow
XDCND	Transducer Signal Direct -- Eccentricity
XDCNK	Transducer Signal -- Keyphasor
ZERO ADJ SEL	Zero Adjustment Select Command
ZERVADJ	Zero Adjust Voltage
1RPM INT	1 RPM Simulated Keyphasor Command
+5V	+5 Volts Digital Supply
+7.5V	+7.5 Volts Analog Supply
+VRH	High Rough Supply Voltage
+VRH1	+12 Volt Op Amp Supply
+VRL	Low Rough Supply Voltage
+REF	+5 Volts Reference from System Supply
-REF	Common for +REF
+VI	Transducer/Analog Supply
-VI1	-12 Volt Op Amp Supply
-6.6V	-6.6 Volts Reference
-7.5V	-7.5 Volts Analog Supply

SEE SHT, SIMS

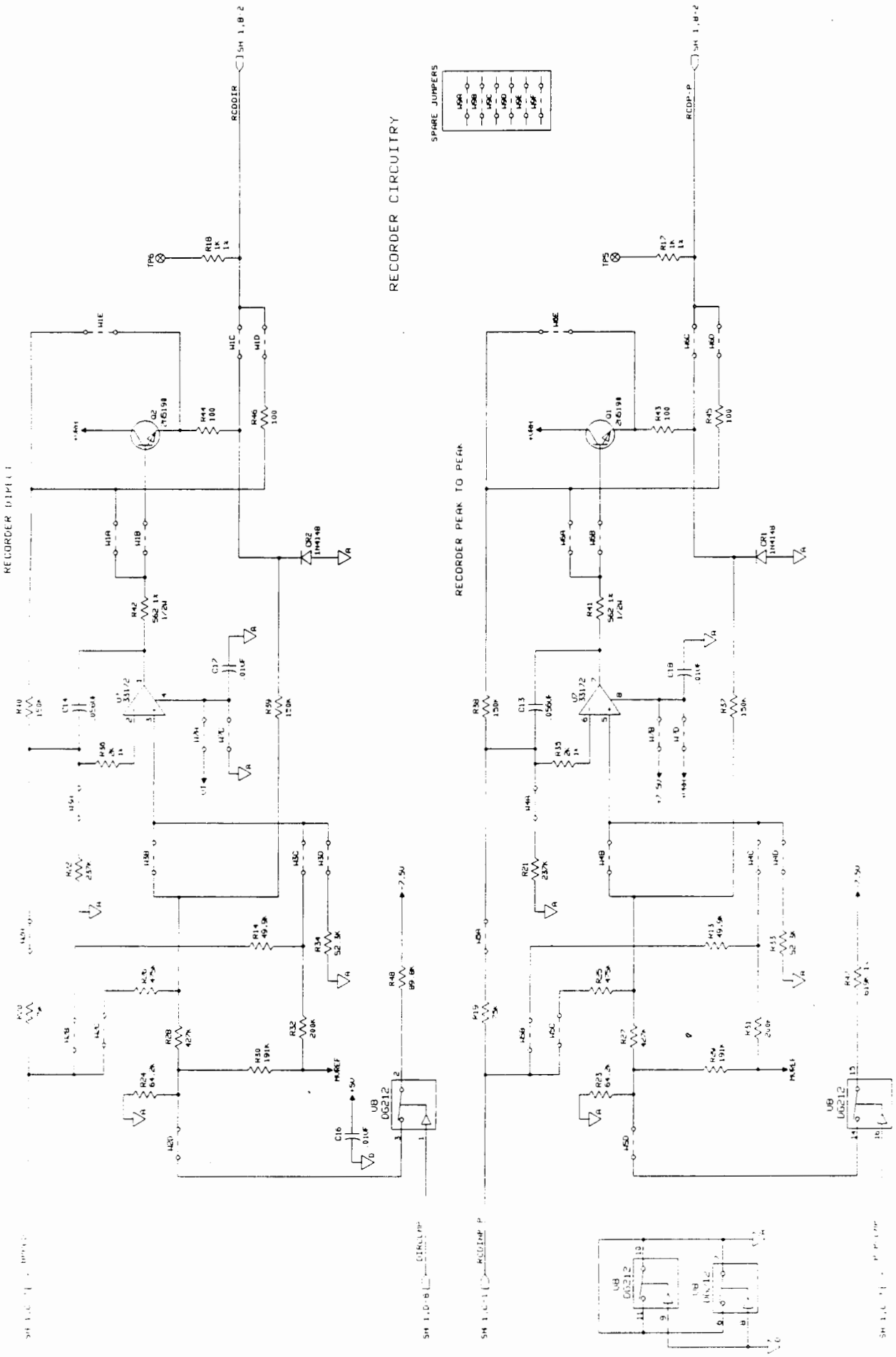
NOTES: UNLESS OTHERWISE SPECIFIED

BENTLY NEVADA	DR R.R. NIKKELS 10.18.06 05-02-89	CONTRACT -			
3300/40 EIPP		SIZE D	FSCM NO. -	DWG NO. 81787	
		81787-9		SHEET 9 OF 9	


BENTLY
NEVADA
MADE IN U.S.A.
PWA82251-01
MOD
Q1
RCDP-P
TP5
Q2
RCDIR
TP6
TP1
DCOM
TP2
ACOM
TP3
P-P
TP4
ZERO ADJ
SPARES
J1



SCHEMATIC DIAGRAM EIPP PIGGYBACK 82252 SH 1 OF 3



SCHEMATIC DIAGRAM EIPP PIGGYBACK 82252 SH 2 OF 3

SCHEMATIC DIAGRAM EIPP PIGGYBACK 82252 SH 3 OF 3

REVISIONS						
ZONE	LTR	DESCRIPTION	BY	DATE	APPD	DATE
		SEE SHEET 1				

ABBREVIATIONS OF THE SIGNAL USED IN THE SCHEMATICS

SIGNAL ON SCHEMATIC	COMPLETE SIGNAL NAME
ACOM	Analog Common
BPPLD	Buffered Proportional Direct
CHASSIS	Chassis
DCOM	Digital Common
DIRCLMP	Direct Clamping Signal
DDMP-P	DDM Peak to Peak Signal
E-#	E-pad Numbers
LOAD	Shift Register Latch's Load Command
MVREF	+5 volts Voltage Reference (Generated on Main PWA)
P-PCLMP	Peak to Peak Clamping Signal
RCDDIR	Recorder Direct Signal Output
RCDP-P	Recorder Peak to Peak Signal Output
SCK	Serial Clock
SCK*	Inverted Serial Clock
SD01	Serial Data String Input (from Main PWA)
SD02	Serial Data String Output (to Main PWA)
ZERODAC	Zero Adjustable Voltage
+5V	+5 Volts Digital Supply
+7.5V	+7.5 Volts Analog Supply
+VRH	High Rough Supply Voltage
-7.5V	-7.5 Volts Analog Supply
+VT	Transducer/Analog Supply

PROGRAMMABLE OPTION

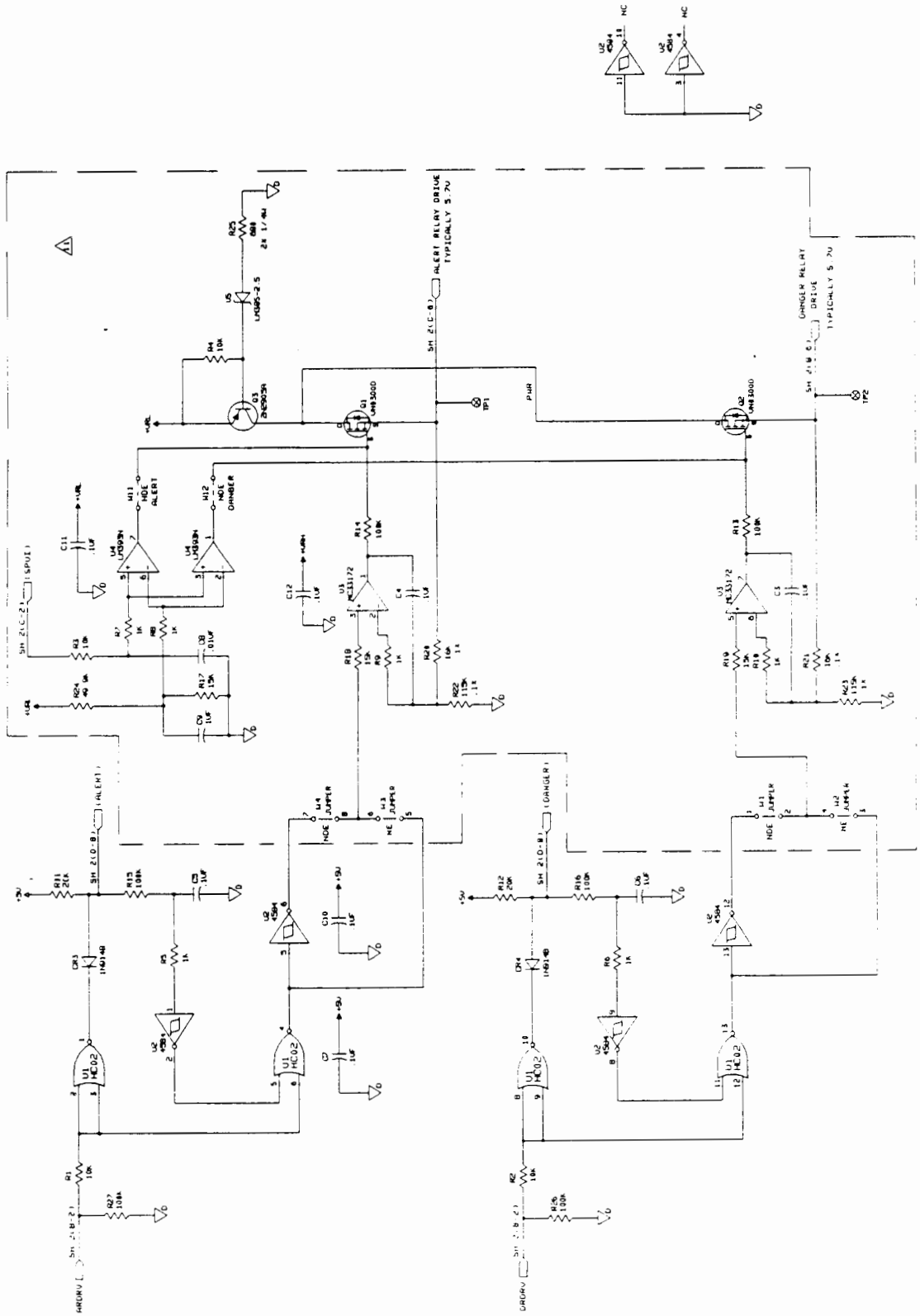
SHIPPED AS:	RECORDER OUTPUT		RECORDER CLAMPING OPTION		ZERO ADJUSTMENT RANGE	
	4 TO 20 mA		NON-CLAMPED		SEE TRANSDUCER FULL SCALE RANGE	
	4 to 20 mA	W1 B,C,E W2 C W3 A,B W4 A,B W5 C W6 B,C,E W7 C,D	4 to 20 mA ONLY		+/- 0.63V	W8 A,D
			CLAMPED:	W2 D: DIR W5 D P/P	+/- 0.77V	W8 B,C
			NON-CLAMPED:	NU	+/- 1.55V	NU
	0 to -10 V	W1 A,D W2 A W3 D W4 D W5 A W6 A,D W7 A,B				
	1 to 5 V	W1 A,D W2 B W3 C W4 C W5 B W6 A,D W7 C,D				

12 REF SCHEMATIC 81547 FOR SHEET 3

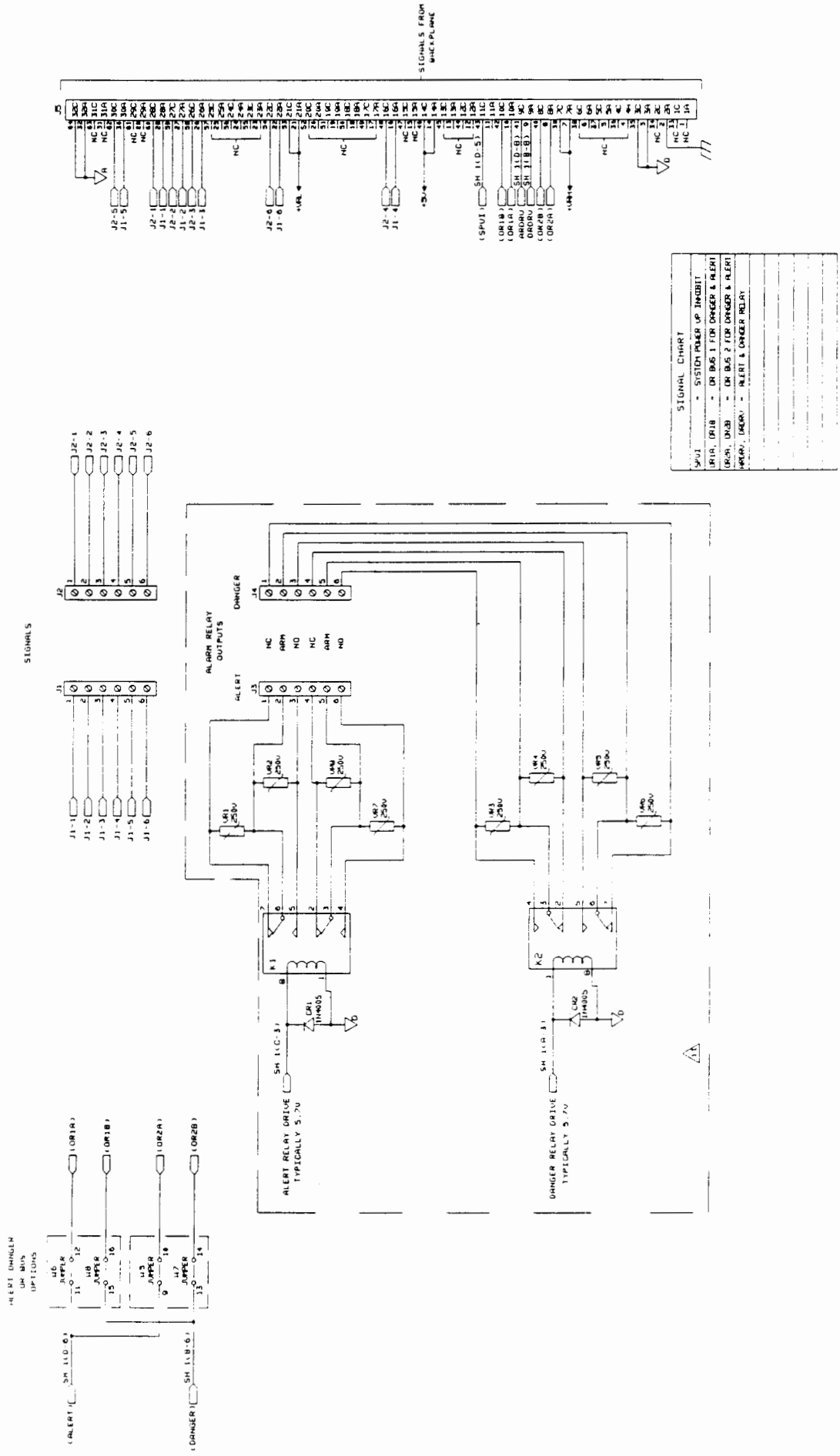
11 AN "*" AT THE END OF THE ABBREVIATION MEANS THAT THE SIGNAL IS NEGATIVE LOGIC

NOTES: UNLESS OTHERWISE SPECIFIED

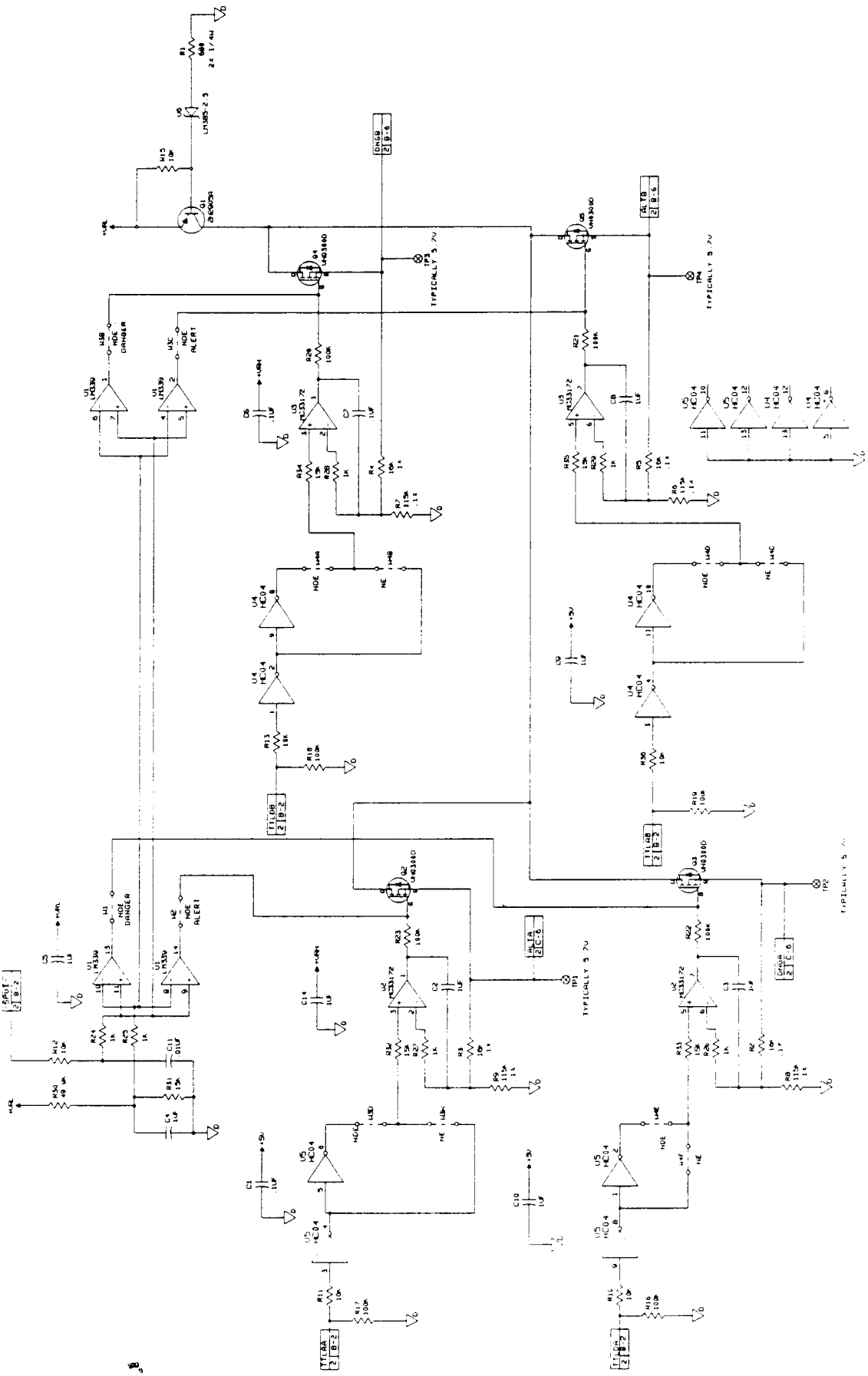
BENTLY NEVADA	DR R.R. NIKKELS	CONTRACT	
	10.14.01 05-02-89	SIZE D	FSCM NO 82252 D
EIPP PIGGY			DWG NO 82252
			SHEET 3 OF 3



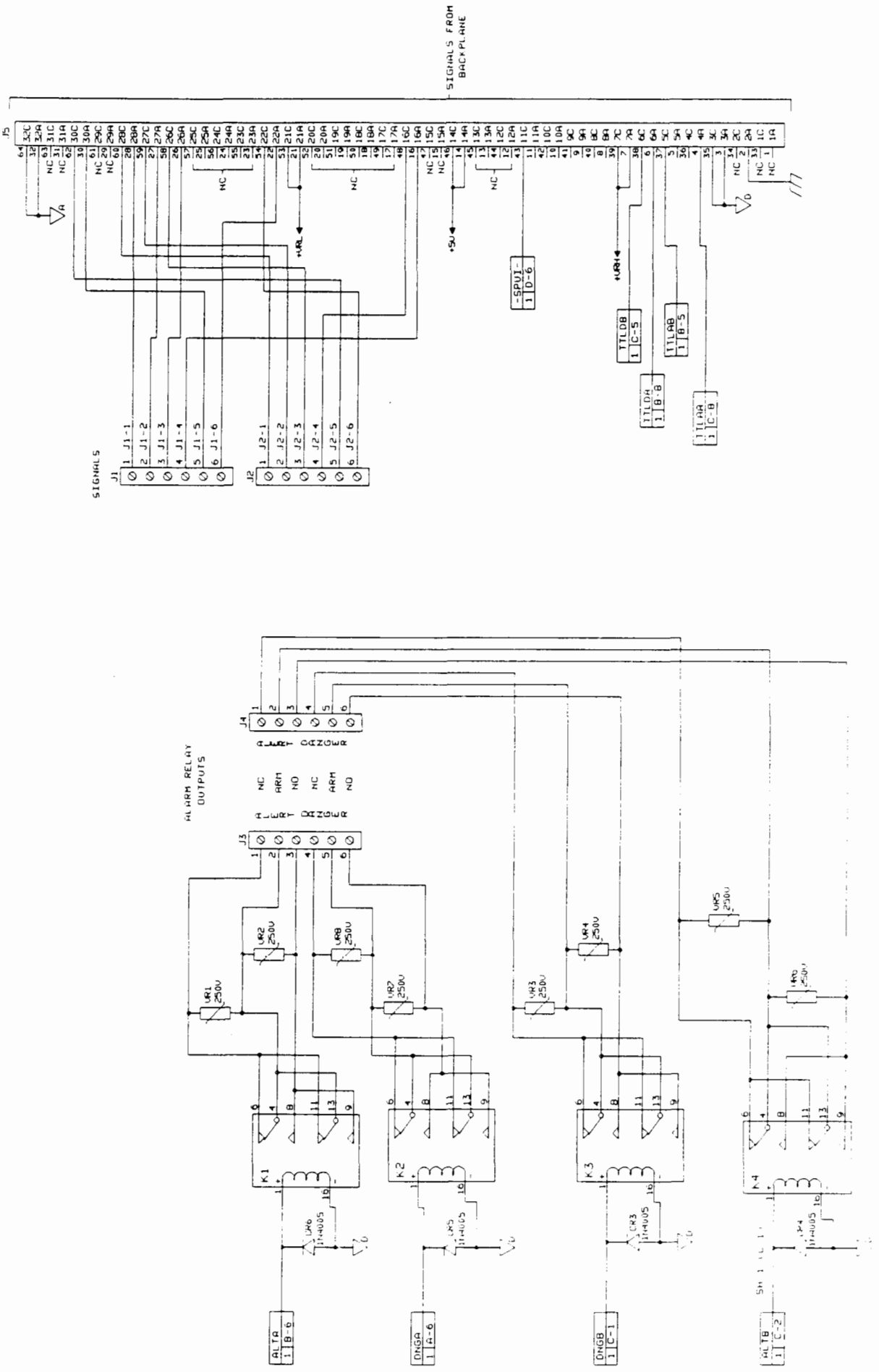
SCHEMATIC DIAGRAM SIRM 78463 SH 1 OF 2



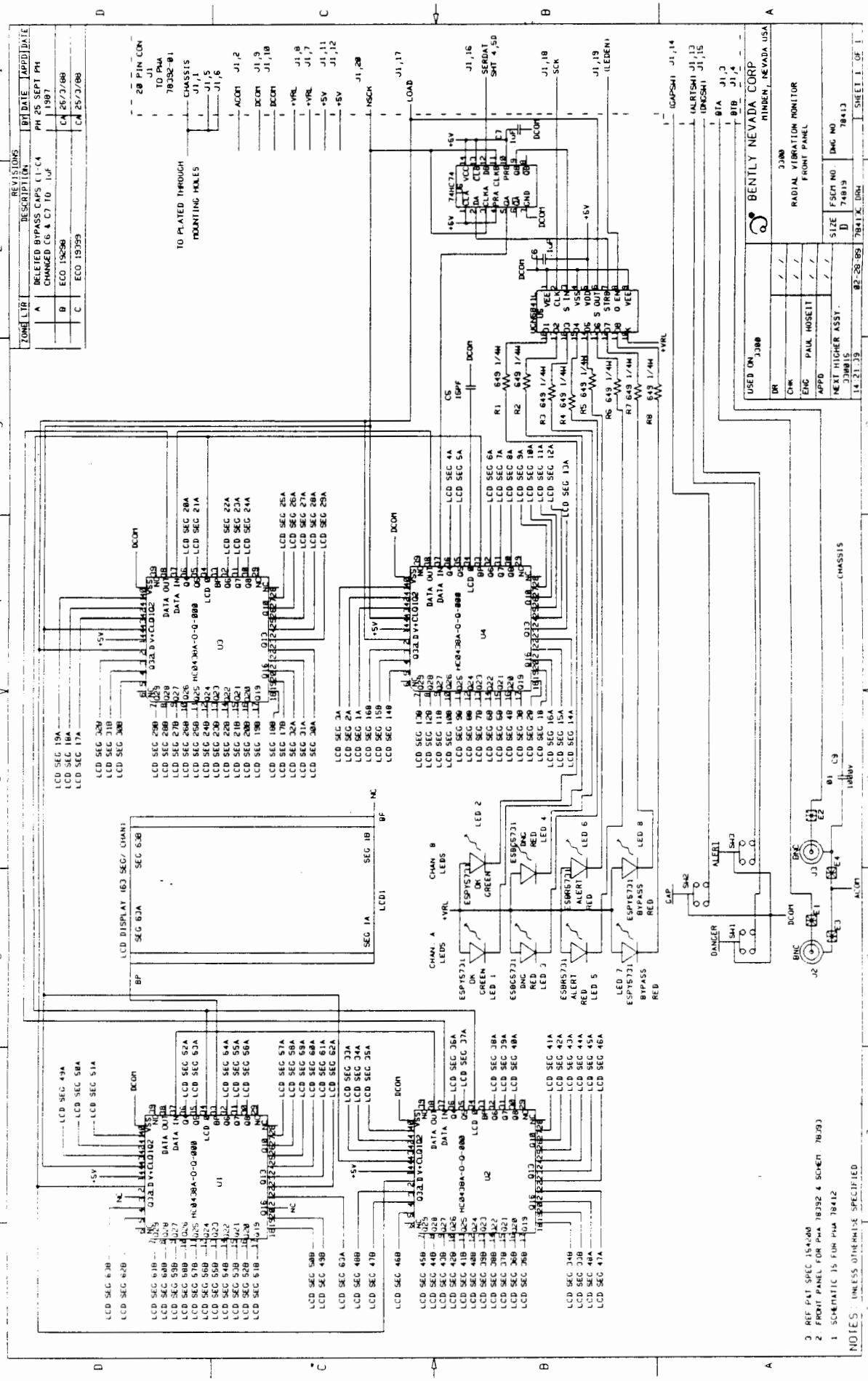
SCHEMATIC DIAGRAM SIRM 78463 SH 2 OF 2



SCHEMATIC DIAGRAM QUAD RELAY 83730 SH 1 OF 2



SCHEMATIC DIAGRAM QUAD RELAY 83730 SH 2 OF 2



SCHEMATIC DIAGRAM FRONT PANEL 78413 SH 1 OF 1

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