I INTRODUCTION

The IRD Model 880 Spectrum Analyzer/Dynamic Balancer is a portable instrument designed for industrial use in detecting and resolving machinery vibration problems. Using the Model 880, an operator can perform many analysis techniques that are essential to obtain comprehensive vibration data. Also, precision in-place balancing can be performed using the Single Plane or Two Plane method.

The 880 instrument provides a number of features which simplify vibration analysis. The built-in printer/plotter generates complete vibration spectrum signatures from 600 to 600,000 CPM (10 Hz to 10,000 Hz) or from 60 to 60K CPM (1 Hz to 1,000 Hz). A 90-foot roll of plot paper will provide approximately 90 Broad or 60 Sharp spectrum plots. This instrument is fully microprocessor controlled, and automatically prints the setup settings used, respectively, on all plots that are generated. The plots are fully annotated with engineering units, filter bandwidth, and the full-scale amplitude and frequency scale values used. The overall (filter out) signal amplitude is sampled during the header line printing. This amplitude, along with the minimum and maximum vibration amplitude variation, are then printed. (In the TIME mode, at the completion of a plot, the minimum, average, and maximum amplitudes measured during the plot are printed.)

A unique form of vibration analysis can be performed by using the Diagnostics function. In this function, the first 16 peaks having amplitudes above 15% of the full-scale value are logged and are printed in tabular form following the spectrum plot (see explanation in Chapter 4). If RPM is displayed on the LCD, the Diagnostics printout will list selected RPM multiples and sub-multiples plus corresponding diagnostic causes of the vibrations. By analysis of the tabular information provided, and relating to corresponding diagnostic causes shown in the printout, the sources of the vibrations can be readily identified.

In addition to frequency signature analysis, the 880 instrument is capable of two other modes of operation. The first is the plotting of the overall amplitude vs. time. This can be extremely valuable during machine startup and coastdown to identify criticals, natural frequencies, resonances, and beats. The second capability involves plotting SPIKE ENERGY™ signal amplitude vs. time, which provides a hard copy record of the mechanical condition of rolling element bearings and gears. The special SPIKE ENERGY signal circuits detect ultrasonic energy bursts caused by microscopic defects in bearings and gears, and provide the operator with advanced warning of deterioration in these machine components.

To aid in balancing, the Model 880 includes function pushbuttons for generating Single Plane and Two Plane balancing formats on the built-in plotter/printer. These formats consist of a series of prompting messages which lead the operator through the proper balancing procedures in a step-by-step fashion. The formats also include item numbers along the edge of the printout which correspond to data entry points in calculator programs. The balancing information recorded on this printout should then be entered into the proper program for performing the balancing calculations.

The Model 880 uses analog Amplitude and Frequency meters to aid in interpreting vibration characteristics. Also, a digital LCD provides a high-accuracy readout of the frequency to which the filter is tuned, the vibration frequency, and the vibration amplitude. The switch settings, operating mode, and other types of indications are displayed on the LCD along with the numerical reading.

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Other features of the Model 880 instrument include:

- A built-in sealed lead acid battery pack and internal charger.
- A built-in storage compartment for the Strobe Light and other accessories.
- Switch selectable English or Metric operation.
- Averaging in SPIKE ENERGY (g's SE) units.

The Model 880 is an excellent instrument for predictive maintenance programs in which periodic signature checks are desirable for critical machines. These signature checks, rather than overall (i.e., Filter Out) checks, enable a closer watch to be maintained and more advanced warning given of any change in the machine condition. The Model 880 is also useful for establishing "baseline" signatures, or for post-repair checks to verify that proper machine operation has been restored.

NOTE: This manual is updated to the configurations of the Model 880 instruments with Serial Number Prefix Letter U. See Appendix E for backdating information for the 880 instruments with Serial Number Prefix Letters ranging from A through T.

II DESCRIPTION

2.1 GENERAL

This chapter provides detailed descriptions of the instrument controls, indicators, and connectors. The descriptions for these items are listed in the following sections: Front Panel Indicators and the Plotter/Printer, Front Panel Controls and Switches, and Side Panel Connectors, Switches and Fuses. The Optional and Standard Accessories for the Model 880 are also described in this chapter. Specifications for the Model 880 are listed in **Appendix A.**

The front panel layout of the 880 instrument is shown below in Figure 2-1.

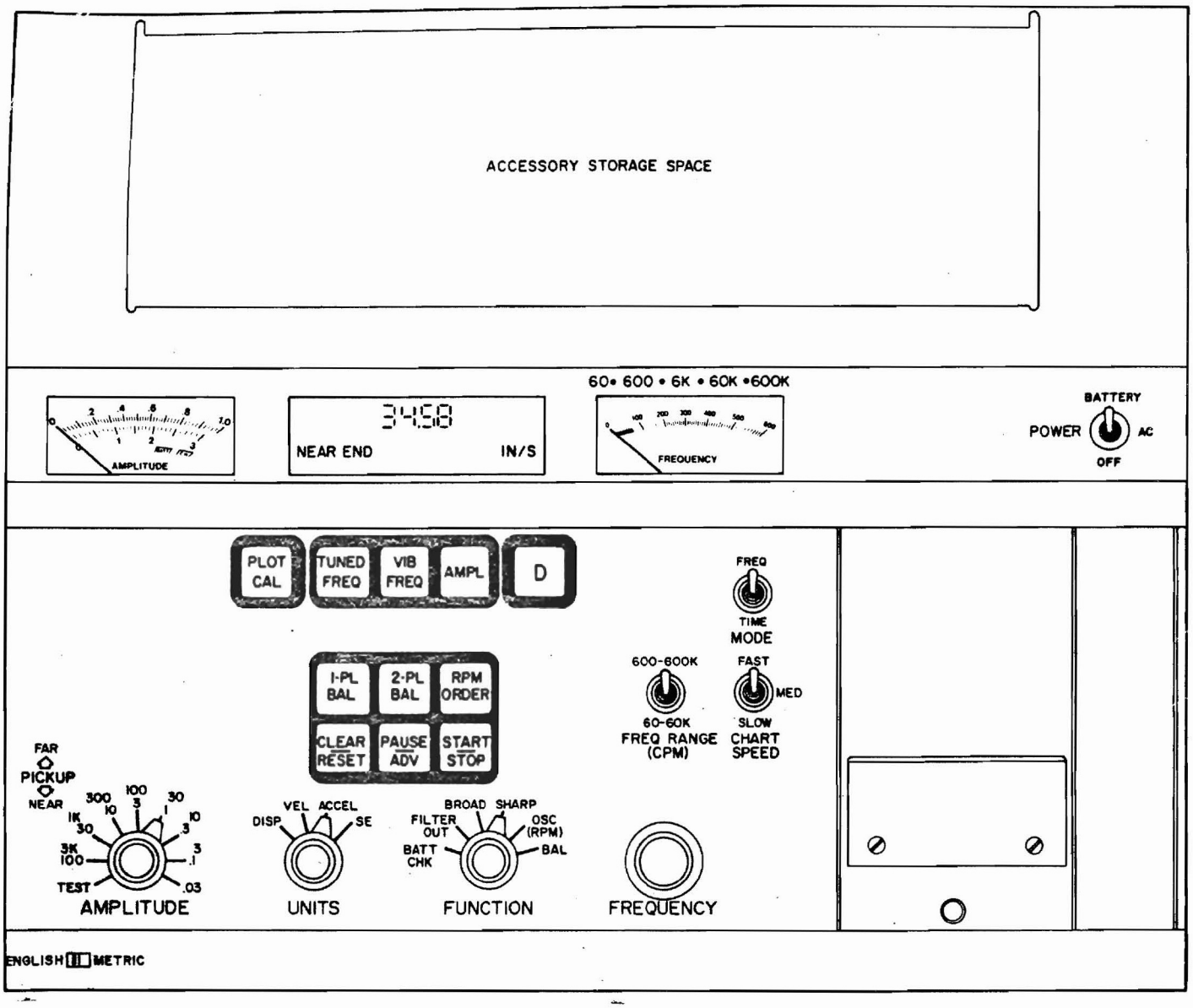
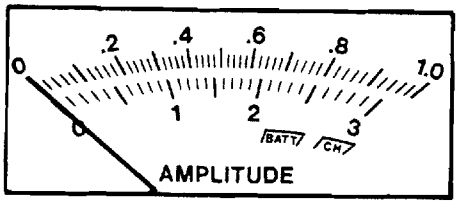


FIGURE 2-1 MODEL 880 FRONT PANEL DETAILS

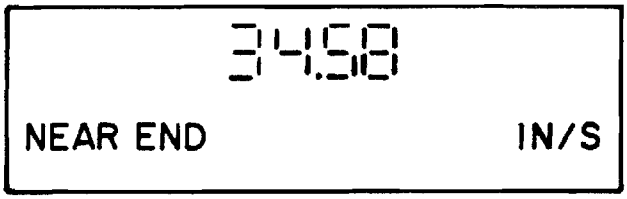
2.2 FRONT PANEL INDICATORS AND THE PRINTER/PLOTTER

AMPLITUDE METER



The **Amplitude** meter is used as an aid for interpreting vibration characteristics. Using this analog meter, beat frequency vibrations can be identified, and amplitude peaks can be quickly located. The meter displays the overall vibration signal strength in the FILTER OUT mode and the amplitude of filtered signals in the BROAD, SHARP or BALANCE modes. The amplitude is measured in displacement, velocity, acceleration, or SPIKE ENERGY units. The meter also provides an indication of the charging circuit operation and the battery charge level. In OSC function the meter indicates zero.

LCD DISPLAY
(Liquid Crystal Display)

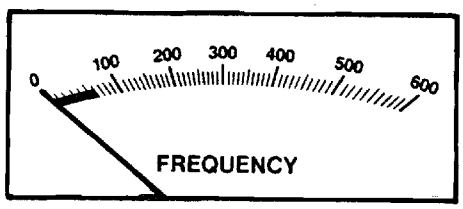


The **LCD** meter is an alpha-numeric display that reads out the precise frequency and amplitude values necessary for proper vibration analysis and balancing. The numeric display mode is controlled by the **TUNE FREQ, VIB FREQ,** or **AMPL** pushbuttons. The **LCD** also displays the following information:

- units of amplitude selected ("MILS", etc.)
- mode of measurement selected ("TUNE", etc.)
- low battery charge level warning ("LO BAT")
- vibration pickup selection ("NEAR END" or "FAR END")
- RPM data entry indication ("RPM")
- diagnostics mode operational ("d")

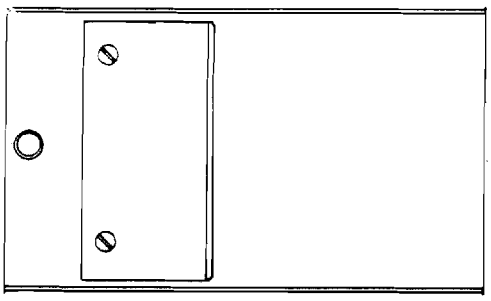
FREQUENCY METER AND RANGE INDICATORS

60• 600 • 6K • 60K •600K



The **Frequency** meter allows rapid filter tuning to a specific frequency and aids in analyzing vibration characteristics. Depending on the mode of operation, the meter indicates the dominant vibration (Filter Out) frequency or the frequency of any signals passed by the filter. In the OSC mode, the frequency that the filter is tuned to is indicated. Signal frequencies from 60 to 600,000 cycles per minute (CPM) may be measured, and the decade range over which the meter indicates is identified by a lit LED above the meter. The operation of the LED Range Indicators is controlled by the Frequency Tune control and the Frequency Range selector switch.

DIGITAL PLOTTER



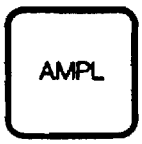
The built-in printer/plotter enables complete spectrum analysis to be provided automatically. Fully annotated frequency or time base plots are switch selected, and the time signature plots may be generated at three chart speeds. In addition, a Diagnostics printout and single or two plane balancing programs with prompting instructions can also be generated. The chart paper roll is accessible when the cover over the printer is removed.

2.3 FRONT PANEL CONTROLS AND SWITCHES

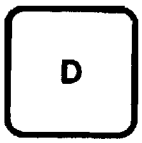
The **PLOT CAL** (or EVENT MARKER) pushbutton is used in Filter Out plotting in Displacement, Velocity, Acceleration, or SPIKE ENERGY to mark the plot at important points of interest. A short line is printed at the left edge of the plot each time this switch is pressed.

The **TUNED FREQ** pushbutton is pressed to display the frequency to which the filter is tuned on the LCD.

Depressing the **VIB FREQ** pushbutton in the Filter Out mode causes the **LCD** to display the dominant vibration frequency for either the 60 to 60K CPM range or the 600 to 600K CPM range. In the BROAD, SHARP, or BALANCE modes, the actual frequency of the signal passing through the filter will be displayed. If OSC is selected, the frequency of oscillation is displayed.



Depressing the **AMPL** pushbutton causes the **LCD** to display the overall vibration amplitude in the Filter Out mode. In the BROAD, SHARP or BALANCE modes, the amplitude of the signal passing through the filter will be displayed. If OSC is selected, the LCD is extinguished.



Depressing the **D** (Diagnostics) pushbutton sets up the instrument to analyze the next frequency signature to be generated. A "**d**" indication is displayed on the LCD when the Diagnostics function is operational. When the frequency signature is plotted, a tabular diagnosis is then printed which lists the probable causes of the vibrations, along with the vibration amplitude at selected multiples of the shaft RPM. The Diagnostics feature utilizes an entered RPM value to perform the analysis. The **D** pushbutton must be reset each time a diagnostic printout is desired.

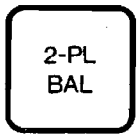
Depressing the **RPM ORDER** pushbutton causes the reading on the LCD to be entered into the instrument memory as the shaft RPM value. When this occurs, an "**RPM**" indication will be displayed on the LCD. Each frequency and time signature that is generated by the built-in plotter will then list the entered RPM value on the printout heading. In addition, the locations of the first ten orders (harmonics) of the RPM frequency will be indicated with tick marks on the frequency spectrum printouts.

The **START/STOP** pushbutton is used to control the operation of the built-in printer/plotter. Depressing the pushbutton twice in succession will cause the plotting to start from the frequency to which the filter is tuned. After the headers have been printed, depressing the pushbutton again will stop the plot. Each time the plot is then started, the built-in plotter will print new headers on the strip chart. The **START/STOP** pushbutton is also used to restart an interrupted plot from the pause mode.

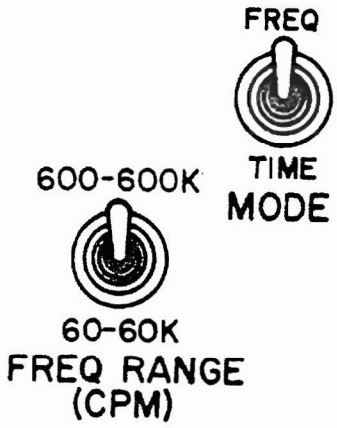
The **PAUSE/ADV** pushbutton controls the operation of the built-in plotter or external analog recorder. The paper advance mechanism is also activated with this pushbutton. Depressing the pushbutton once will cause the frequency signature, or time signature plots to pause. The plots are restarted by depressing the **START/STOP** pushbutton. The printer paper may be advanced anytime the plotter is not functioning by depressing the **PAUSE/ADV** pushbutton. The pushbutton may then be held as long as necessary to advance the paper.

The **CLEAR/RESET** pushbutton is used to terminate a one or two plane balancing program that is in progress. The balancing programs are then reset and will start from the beginning if the **1-PL** or **2-PL** pushbuttons are depressed. Depressing the **CLEAR/RESET** pushbutton also clears any RPM value stored in the instrument memory. When this occurs, the "**RPM**" indication on the LCD will extinguish. In addition, the pushbutton is used to clear the PLOT /CAL signal readings from the analog meters, and to cancel the Diagnostics printout.

The **1-PL BAL** pushbutton is used to generate a single-plane balancing format. The built-in plotter will print out prompting instructions which direct the operator through the proper series of steps for balancing a rotor. The format contains space for writing in the requested information, and at each step the printout pauses and must be restarted by depressing the **1-PL** pushbutton. The format includes important information at various stages to assist the operator in making the needed calculations. In addition, sequence numbers are printed along the chart paper to guide the operator in entering data into a calculator which is programmed to solve single-plane balancing equations.



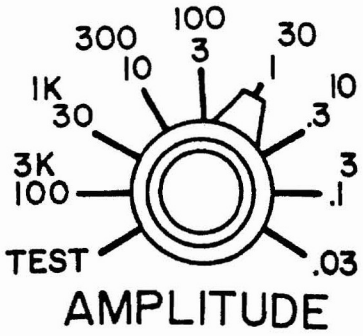
The **2-PL BAL** pushbutton is used to generate a two-plane balancing format. The format is printed out by the built-in plotter, and is similar to the **1-PL BAL** format. The printout provides prompting instructions and other information necessary to guide the operator through the two-plane balancing sequence.



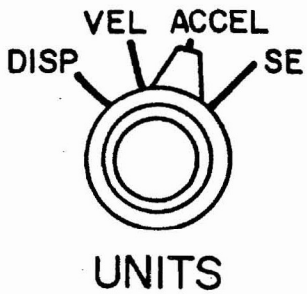
The **MODE** switch is used to select either a Frequency Plot or a Time Base plot.

The **FREQ RANGE** selector switch controls the frequency band over which the filter will tune. The low band extends from 60 to 60K CPM and the high band extends from 600 to 600K CPM. The selector switch also controls the range of the **VIB FREQ** reading on the LCD, and the range of frequencies that are plotted.

The **CHART SPEED** switch is used to control the printer/plotter print rate when the TIME mode is used.

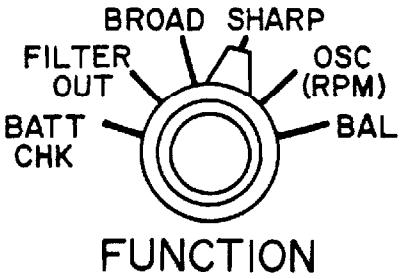


The **AMPLITUDE** selector is used to set up the full-scale amplitude range or to select the **TEST** mode. Eight overlapping ranges are provided. In English measure, full-scale values of .03 to 100 are selectable in units of mils pk-pk, inches per second pk, g's pk, or gSE. In metric measure, full-scale values of 1 to 3K are selectable in units of micrometers pk-pk, millimeters per second pk, g's pk, or gSE. The **red** numerals on the Amplitude control are to be used only when measuring in units of um and mm/s. For all other units (mils, in/s, g, gSE) the **black** numerals are used. The TEST position is used to test the operation of the instrument filter and other circuits. When the **POWER** switch is set to **BATTERY**, a 120 CPM or 1200 CPM internal test signal is generated. If the POWER switch is set to **AC**, the test signal has the same frequency as the AC input voltage, which is typically 3600 CPM (60 Hz) or 3000 CPM (50 Hz).



The **UNITS** selector is used to set up the input circuits for the type of pickup and units of measure. The units of measure for the mode used is indicated on the LCD display when the **AMPL** pushbutton is depressed. The units indicated on the display may be of English or metric measure, depending on the setup of the **ENGLISH/METRIC** switch. The pickups that may be used for the various units selected are described as follows:

UNITS	PICKUP TYPE	MEASURE
DISPLACEMENT	NCPU, 544, 560, 970	mils (micrometers metric)
VELOCITY	Model 544, 560, 970	in/sec (mm/sec metric)
ACCELERATION	Model 970	g's
SPIKE ENERGY	Model 970	gSE

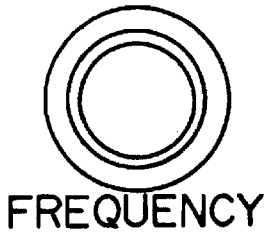


The **FUNCTION** selector is used to select the operation mode of the filter circuit and to check the condition of the internal battery. The FILTER OUT position is used to provide an unfiltered (overall) amplitude measurement of the vibration spectrum. The dominant vibration frequency and amplitude values are indicated on the analog meters and the LCD.

The BROAD, SHARP, and BAL positions are used to observe individual frequency components of the vibration signal. Each position provides filtering with a different degree of tuning selectivity. The BROAD mode bandwidth is 10% of the tuned frequency, and provides faster plotting. The SHARP mode bandwidth is 5% of the tuned frequency, and is used for detailed analysis of frequency peaks. The BAL mode bandwidth is 2.8% of the tuned frequency, and provides the tuning precision necessary for balancing.

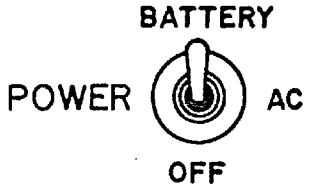
The OSC position is used to flash the strobe light at the frequency to which the filter is tuned. This mode is used for balancing, and for determining the correct RPM value needed to generate a Diagnostics printout. By properly adjusting the **FREQUENCY** tune control, the strobe light will freeze a rotating shaft when the flash rate is equal to the rotation speed of the shaft or other part.

The BATT CHK position is used to test the condition of the internal batteries. If the **POWER** switch is set to BATTERY, the Amplitude meter reading will indicate the condition of the battery.



The **FREQUENCY** tune control adjusts the filter tuning in all FUNCTION switch modes except BATT CK. The control is used to manually tune the instrument to a desired frequency peak or a balancing RPM value. The filter is tunable over four decade ranges. The upper three decades or the lower three decades are selected using the **FREQ RANGE** selector. The nominal frequency to which the filter is tuned is indicated on the LCD when the **TUNE FREQ** pushbutton is depressed. Also, the LED range indicators identify the decade range to which the filter is tuned.

The **ENGLISH/METRIC** switch is used for setting up the instrument to either English or metric units of measure. The appropriate units of amplitude for either setup will be indicated on the LCD display.



The **POWER** switch is a 3-position toggle switch used to connect battery or AC power to the instrument circuits. In the **AC** or **BATTERY** position, and with the AC power input cable connected to the instrument, a trickle charge current is supplied to the internal battery. The battery is thus kept at a high level of charge while the instrument is being operated. A depleted internal battery will receive full charge current when the POWER switch is set to **OFF** and the instrument is connected to AC power.

2.4 SIDE PANEL CONNECTORS, SWITCHES, AND FUSE

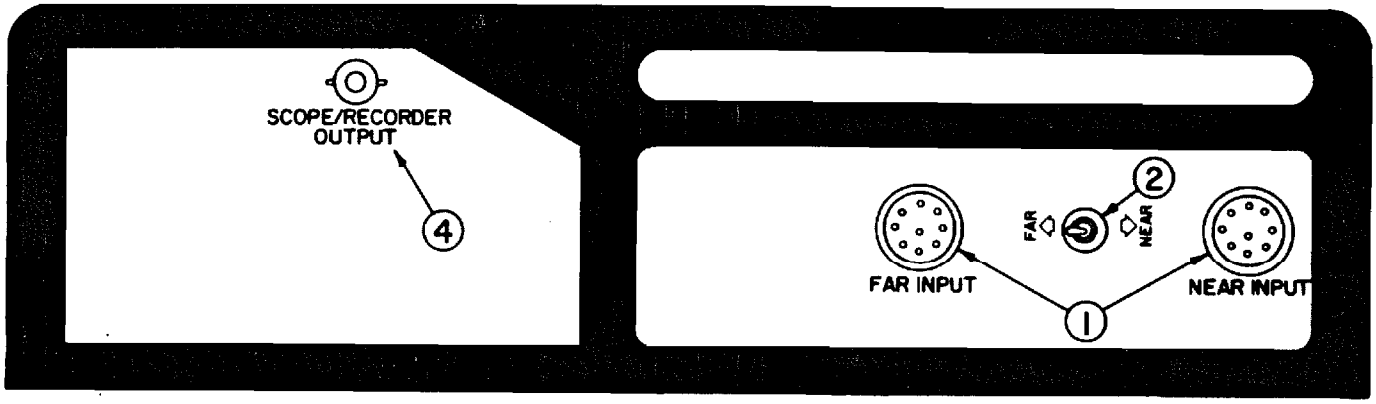


FIGURE 2-2 LEFT-HAND SIDE PANEL DETAILS

1) **VIBRATION INPUT CABLE CONNECTORS** (Fig. 2-2, Ref. 1)

Two VIBRATION PICKUP CONNECTORS are located on the left side panel, and are labeled FAR INPUT and NEAR INPUT. Each connector consists of a female twist-lock receptacle for installing the appropriate vibration pickup input cable.

2) **PICKUP SELECTOR** (Fig. 2-2, Ref. 2)

The PICKUP SELECTOR switch is located on the left-hand side panel between the VIBRATION PICKUP receptacles. The switch is used to connect the instrument input circuits to the selected vibration input receptacle (Near or Far).

3) **SCOPE/RECORDER OUTPUT CONNECTOR** (Fig. 2-2, Ref. 4)

The SCOPE/RECORDER output connector is located on the left-hand side panel. The BNC-type connector is used for the connection of an oscilloscope or a recorder/analyzer to the 880 instrument. Filtered or unfiltered output signals are provided, depending on the mode of the FUNCTION switch. Full-scale output voltage of 764 Mv RMS, with a source impedance of 150 ohms. The center pin of the BNC connector is the signal line, and the shell is grounded.

4) **AC INPUT SELECTOR SWITCHES** (Fig. 2-3, Ref. 2)

Two AC INPUT SELECTOR switches are located on the right-hand side panel. These switches must be set up to the positions corresponding to the value of the AC power input voltage connected to the instrument. Four input voltage ranges are provided, and the slide switch set-up positions for each range are shown on the panel.

CAUTION: Make certain that the AC INPUT SELECTOR switches are correctly positioned for the AC voltage range to be used before installing the AC Power Cable.

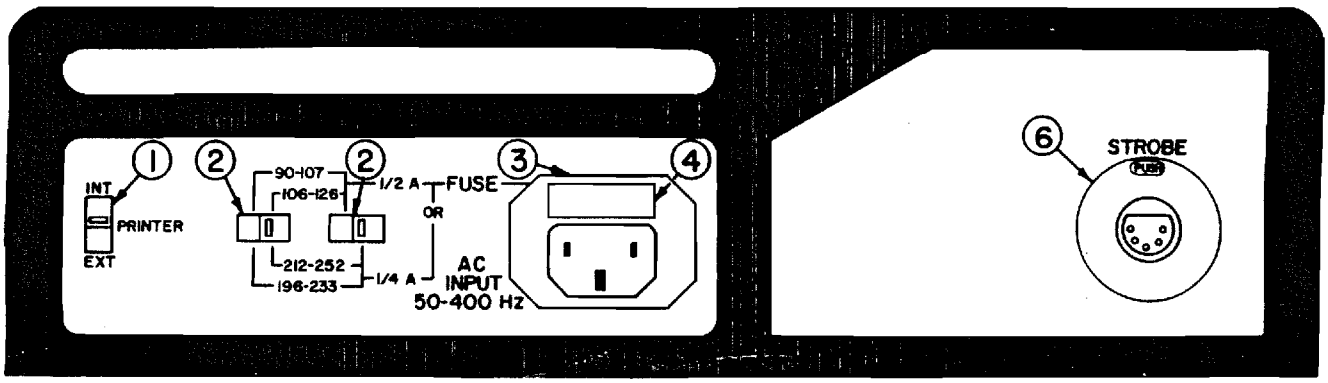


FIGURE 2-3 RIGHT-HAND SIDE PANEL DETAILS

5) **AC INPUT POWER RECEPTACLE** (Fig. 2-3, Ref. 3)

The AC INPUT POWER receptacle is an international standard 3-contact male connector (Belden No. 17252). The connector is rated for 15 amperes at 125 volts, or 6 amperes at 240 volts, and is designed for connection of 100, 120, 220, or 240 volts, 50 to 400 Hz single phase voltage using the AC Power Cable. Cable Part No. 19643 is supplied with instruments intended for connection to 90 to 132 volts AC.

6) **AC POWER FUSE** (Fig. 2-3, Ref. 4)

The AC Power Fuse is mounted in the fuse clip located above the INPUT POWER receptacle. This fuse protects the analyzer circuits from the AC power line voltage. A spare fuse is contained in the enclosed portion of the clip. A **1/2-ampere,** 3AG, Slo-Blo fuse, Part No. 28579 is used for 90 to 110 and 108 to 132 volts operation. A **1/4-ampere,** 3AG Slo-Blo fuse, Part No. 28578 is used for 198 to 242 and 216 to 264 volts operation.

CAUTION: Before installing the power cable, make sure that the line voltage and frequency are correct for the analyzer, and that the Input Selector Switches are set up as instructed in Section 3.2. Also, do not use a higher amperage fuse than specified, as serious damage to the instrument may result.

7) **STROBE LIGHT CONNECTOR** (Fig. 2-3, Ref. 6)

The STROBE LIGHT connector is located on the right-hand side panel, and is used for connecting the Model 571 Strobe input cable to the 880 instrument. The connector consists of a 5-pin spring-lock female receptacle. The strobe cable connector is disconnected from the instrument receptacle by pressing the "PUSH" tab and pulling the connector. **NOTE:** Only the Model 571 Strobe Light is to be used with the 880 instrument.

2.5 DESCRIPTION OF STANDARD ACCESSORIES

1) POWER INPUT CABLE (Fig. 2-4, Ref. 1)

The POWER INPUT CABLE is 10 feet (3.03 meters) in length, and connects the external AC power source to the Model 880. Analyzers designed for connection to 90 to 132 volts AC are supplied with cable P/N 19643. This 3-wire cable has an international standard female connector at one end, and a U.S.A. standard male connector at the other end.

2) ACCELEROMETER MODEL 970 (Fig. 2-4, Ref. 2)

The MODEL 970 ACCELEROMETER, P/N 19697, is a vibration transducer that is used to measure vibration acceleration, velocity, displacement, or SPIKE ENERGY units. This transducer provides an extended frequency range, and will withstand considerable physical shock (see **Appendix A** for Specifications). The Model 970 can be used in any position without a reduction of sensitivity or accuracy. It is sensitive only to the vibration along the long axis, and can be permanently mounted to a rotating machine using the 1/4-28 by 1/4 inch threaded hole, or held to any flat surface of the machine by a magnetic pickup holder, P/N 04332.

3) ACCELEROMETER PICKUP CABLE (Fig. 2-4, Ref. 3)

The ACCELEROMETER PICKUP CABLE, P/N 20431, is 12 feet (3.64 m) in length and connects the Model 970 input signal to the analyzer. This cable also connects a DC supply voltage from the instrument to the internal amplifier of the pickup. The twist-lock cable connector is installed at the **NEAR** or **FAR** twist-lock receptacle on the left side panel of the instrument. The threaded connector at the pickup end of the cable connects to the receptacle on the accelerometer.

If an extension of the cable is required, interconnect the standard cable and an optional extension cable to the accelerometer receptacle. Two lengths of optional extension cables are available: 25 feet P/N 21044, and 50 feet P/N 21048. Any combination of the three cables can be used to provide cable lengths of 12, 37, 62, 87 or 112 feet.

4) STRAIGHT PROBE (Fig. 2-4, Ref. 4)

The 9-inch STRAIGHT PROBE, P/N 01103, is used with the accelerometer for hand-held measurement in displacement, velocity, acceleration or SPIKE ENERGY units. The probe enables the measurements to be obtained at difficult places, and its use is standard for analyzing the SPIKE ENERGY signals. The probe fastens to the flat end of the accelerometer using the 1/4-28 by 1/4 inch threaded hole.

5) STROBE LIGHT (Fig. 2-4, Ref. 5)

The Model 571 STROBE LIGHT, P/N 28830, flashes once per RPM up to the frequency of 15,000 CPM, and then provides sub-multiple firing up to 600,000 CPM. The 2-position slide switch controls the power to the unit.

6) STROBE LIGHT CABLE (Fig. 2-4, Ref. 6)

The STROBE LIGHT CABLE supplied is 12 feet (3.7 meters) long, and is connected to the strobe light receptacle. Replacement cables, P/N 28836, are available from IRD MECHANALYSIS. Two cables can be connected in series to provide additional length.

7) PRINTER CHART PAPER

One 82 foot (25 m) roll of thermal CHART PAPER is provided. This paper is specially designed for use with the 880 instrument.

CAUTION: To avoid possible damage to the printer, only IRD Chart Paper (P/N 24444) should be used.

8) OPERATOR MANUAL (Fig. 2-4, Ref. 8)

The OPERATOR MANUAL, P/N 28838, provides complete instructions for setup and operation of the analyzer. Additional copies of this manual are available from IRD MECHANALYSIS.

9) SELF-STUDY TRAINING MODULE (not illustrated)

The Self-Study Training Module, Part No. 29177, consists of a Workbook, a set of color slides, a slide carousel, and two cassette tapes. The tapes are keyed to the color slides. One tape contains an audible cuing signal at each slide change point, and the other tape contains a 1000 Hz synch pulse of each change point for automatic slide changes.

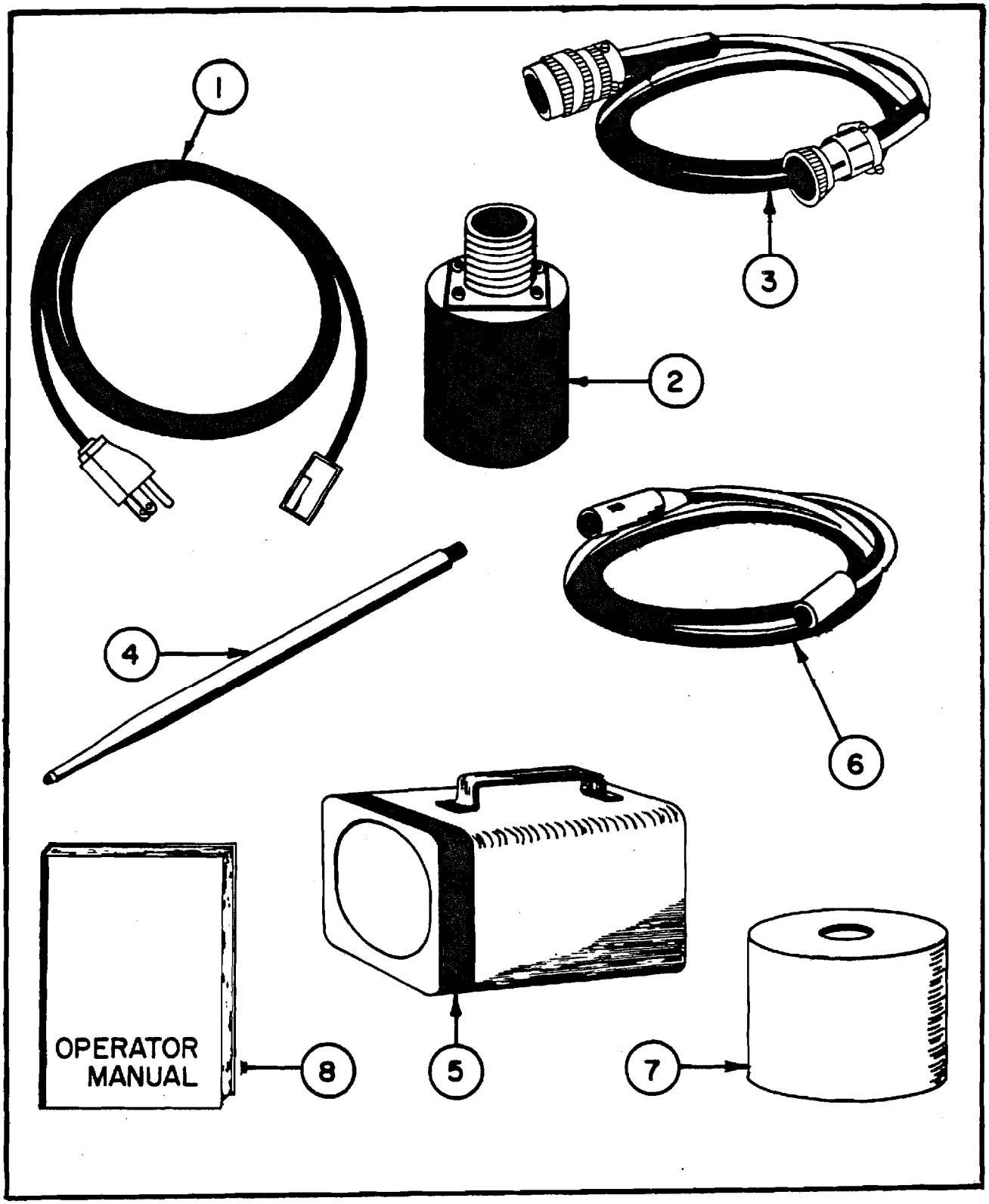


FIGURE 2-4 STANDARD ACCESSORIES FOR MODEL 880 INSTRUMENT

2.6 OPTIONAL ACCESSORIES

The OPTIONAL ACCESSORIES which are available for use with the Model 880 Analyzer/Balancer are shown in Figure 2-5, Page 2-13.

The following **Optional Accessories** are illustrated in Figure 2-5:

A. **Accessory Case** - P/N 25345.
B. **Chart Paper** - One (1) lot (48 rolls per lot), sold only by lot, P/N 24444.
C. **Calibrator** - P/N 21073.
D. **Vibration Chart Storage Notebook** - with 50 filler sheets, P/N 25864.
E. **Extra Notebook Filler Sheets** - pack of 100, P/N 25865.
F. **Velocity Transducer** - Model 544, P/N 4526.
G. **Pickup Cable** for Model 544 - 12-foot (3.7m), P/N 20433.
H. **Extension Pickup Cable for Model 544** - 25-foot (7.6m), P/N 21045.
I. **Extension Pickup Cable for Model 544** - 50-foot (15.2m), P/N 21049.
J. **Magnetic Pickup Holder for Model 544 or Model 970** - P/N 04332.
K. **Magnetic Shield for Model 544** - P/N 10449.
L. **Extension Cable for Model 970** - 25-foot (7.6m), P/N 21044.
M. **Extension Cable for Model 970** - 50-foot (15.2m), P/N 21048.
O. **Velocity Transducer, Low Frequency, Model 560** - P/N 24957.
P. **Pickup Cable for Model 560,** 12-foot (3.7m) - P/N 25136.
Q. **Extension Cable for Model 560,** 25-foot (7.6m) - P/N 25137.
R. **Extension Cable for Model 560,** 50-foot (15.2m) - P/N 25138.
S. **Cable,** Non-Contact Monitor Output with a BNC connector for connection to Model 880, 12-foot (3.7m) - P/N 24809.
(Monitor output sensitivity of 200 mv/mil or 8 mv/u m is required).
T. **Vibration/Sound Level Meter,** Model 308.
U. **Non-Contact Displacement Accessory, Single Channel,** (403 type) - P/N 29093.
V. **Non-Contact Displacement Accessory, Dual Channel,** (403 type) - P/N 29094.
W. **Extension Cable for Strobe Light,** 12-foot (3.7m) - P/N 28836.
X. **Cable for Non-Contact Signal Sensor** - with power lead and 3 spade lugs, 12-foot (3.7m) - P/N 29030.

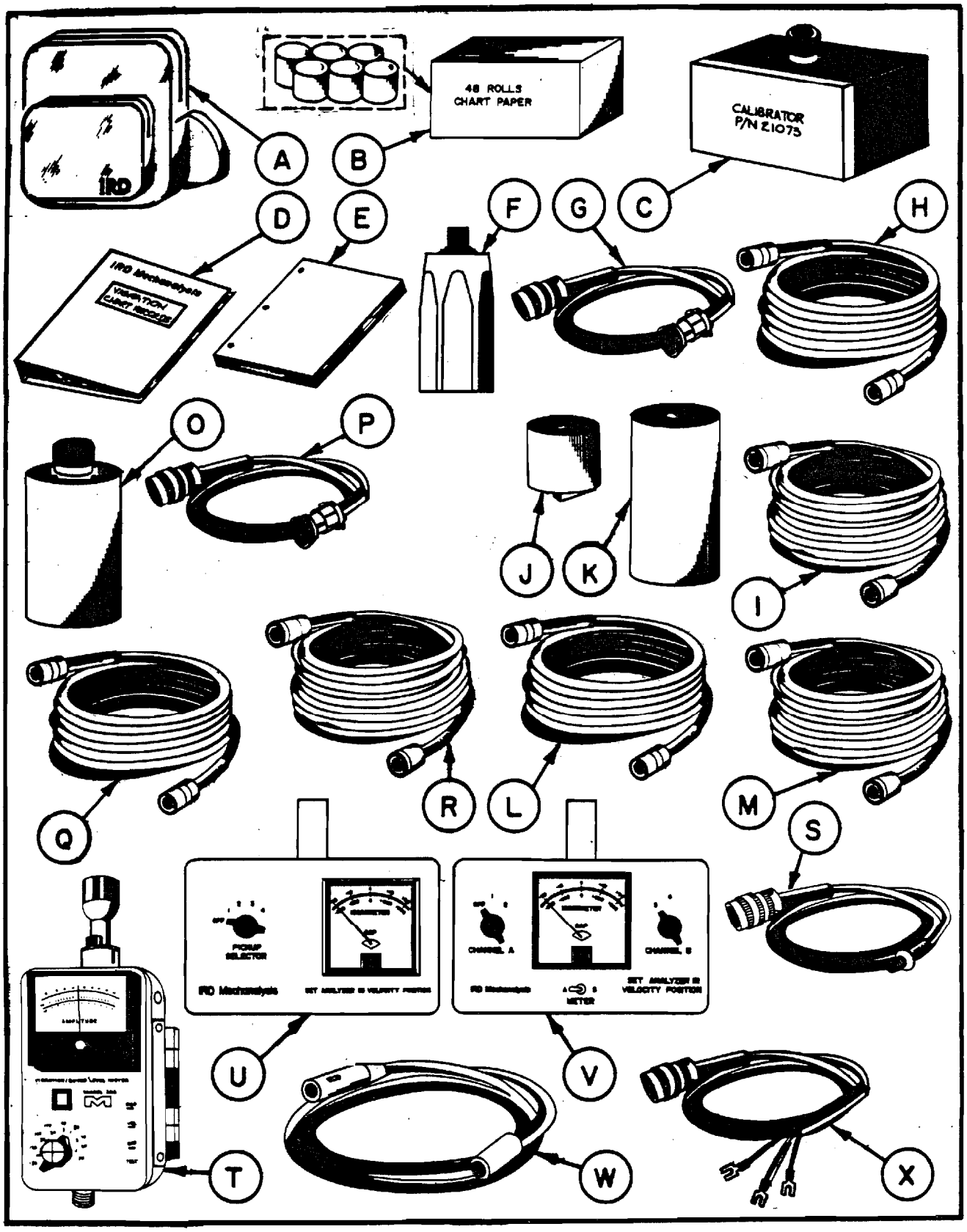


FIGURE 2-5 OPTIONAL ACCESSORIES FOR MODEL 880

SPECIFICATIONS, MODEL 880 MICROPROCESSOR ANALYZER-BALANCER INSTRUMENT

FREQUENCY RANGE
- 60 to 600,000 CPM (1 to 10,000 Hz)

TUNABLE FILTER RANGE
- 60 to 600,000 CPM in two ranges: 60 to 60,000 CPM and 600 to 600,000 CPM

TUNABLE FILTER CHARACTERISTICS
- Broad Filter: 10% BW (Q = 10) for fast plotting
- Sharp Filter: 5% BW (Q = 20) for high resolution
- Balance Filter: 2.8% BW (Q = 35) for Balancing
- Automatic Filter Sweep: 60-60,000; 600-600,000 CPM
- Manual Filter Tune: 60-60,000; 600-600,000 CPM

INTERNAL OSCILLATOR RANGE
- 60 to 600,000 CPM in two ranges: 60-60,000; 600-600,000 CPM

STROBOSCOPIC LIGHT
- High intensity strobe
- One flash per cycle to 15,000 CPM; submultiple firing to 600,000 CPM

DISPLACEMENT RANGES (SEE NOTE*)
- English: 0 to 100 mils in nine full-scale overlapping ranges: 0 to .03; 0 to 1; 0 to .3; 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100 mils peak-to-peak
- Metric: 0 to 3,000 micrometers in nine full-scale overlapping ranges: 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100; 0 to 300; 0 to 1000; 0 to 3000 micrometers peak-to-peak

VELOCITY RANGES (SEE NOTE*)
- English: 0 to 100 inches/sec in nine full-scale overlapping ranges: 0 to .03; 0 to .1; 0 to .3; 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100 inches/sec peak
- Metric: 0 to 3,000 millimeters/sec in nine full-scale overlapping ranges: 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100; 0 to 300; 0 to 1000; 0 to 3000 millimeters/sec peak (or RMS factory option)

ACCELERATION RANGE (with Model 970)
- English and Metric: 0 to 100 g's in nine full-scale overlapping ranges: 0 to .03; 0 to .1; 0 to .3; 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100 g peak (1 g = 386 inches/sec^2, or 980 cm/sec^2)

SE (SPIKE ENERGY) UNITS RANGE
- English and Metric: 0 to 100 g's SE in nine full-scale overlapping ranges: 0 to .03; 0 to .1; 0 to .3; 0 to 1; 0 to 3; 0 to 10; 0 to 30; 0 to 100 g's SE with special circuits designed to detect and analyze **SPIKE ENERGY** (SE) units.

TEST SIGNAL
- Internally generated test signal operates on AC or battery power—checks circuit operation in test. Test signal is synchronous to and in phase with the line power when switched to AC PWR.

BATTERY CHECK
- Digital "LO BATT" indicator
- Analog Meter display of battery voltage to indicate remaining battery operating time in BATT CK
- Analog Meter of battery voltage when charging (Power switch off) to indicate charge condition.

INPUTS
- Two input channels, switch selectable for analysis and balancing with four transducers (544, 560, 970 or non-contact inputs of 200 mv/mil (8 mv/um), or acoustic input from Model 308 Vibration/Sound Level Meter.

OUTPUTS:
- Built-in XY Printer/Plotter provides annotated frequency and time plots.
- Diagnostic tabular printout to aid in data interpretation.
- Harmonic Markers on spectrum plots to aid in identification of harmonic vibrations
- Display and Printout of RPM
- Printout of overall amplitude: average, maximum and minimum levels over 6 second sample period, at start of frequency plots.
- Printout of prompting messages to guide operator through single-plane and two-plane balancing.
- D.C. Power Output (−24 volts) to drive non-contact signal sensors.
- Analog Amplitude Meter
- Analog Frequency Meter
- Digital Amplitude Meter; covers range of 3½ digits (.0000 to 1500 English, or .0000 to 15K metric).
- Digital Frequency Meter; covers range of 60 to 600,000 CPM.
- Digital Display of Measurement Units: English: Mils P-P, in/sec Pk, g Pk. Metric: Micrometers P-P, mm/sec Pk, or RMS (factory option) g Pk.
- Scope/Tape Recorder AC Output Receptacle.
- Strobe Light Output Receptacle.
- XY Plotter Output Receptacle—DC outputs of amplitude, frequency, penlift and (zero-full scale) calibration.
- AC Power Outlet Receptacle.
- Signal overscale indication.

*NOTE: FOR DISPLACEMENT OR VELOCITY READINGS BELOW 200 CPM, OPTIONAL LOW FREQUENCY PICKUP (MODEL 560) IS RECOMMENDED.

TEMPERATURE RANGE
- 5° to +122°F (−15° to + 50°C) on AC power
- 5° to +122°F (−15° to + 50°C) on battery power (not charging)
- 5° to +122°F (−15° to + 50°C) charging.

OVERALL DIMENSIONS:
- Analyzer: 17" × 14" × 6½" (43.2 cm × 35.6 cm × 16.5 cm)

WEIGHT:
- Analyzer (with built-in battery): 32 lbs. (14.5 Kg)
- Analyzer (with built-in battery and standard accessories): 36 lbs. (16.4 Kg)

POWER REQUIREMENTS
- AC Power: 50 to 400 Hz; 90 to 250 volts, 25 watts.
  Battery Power: Built-in, replaceable sealed rechargeable Gel Cel battery pack; 10 hours operation of instrument; 2 hours minimum continuous operation of strobe at maximum flash rate.
- Battery Charger: Automatic charge whenever on AC Power with circuit to prevent overcharge. Maximum charging rate available when power switch is turned off.

STANDARD ACCESSORIES

1—Model 970 Accelerometer, P/N 19697
1—Straight Probe, P/N 1103
1—12 ft. (3.7 m) Pickup Cable for Model 970, P/N 20431
1—Model 571 Stroboscopic Light, P/N 28830.
1—12 ft. (3.7 m) Strobe Cable for Model 571 Strobe, P/N 28836
1—Power Cable, P/N 19643
8—Rolls Thermal Printer Paper, P/N 24444.
2—Fuses for 220 VAC Operation, P/N 28578
1—Self Training Module P/N 29177
1—Operating Instructions Manual, P/N 28838.

OPTIONAL ACCESSORIES
- Model 544 Vibration Velocity Pickup, P/N 4526
- 12 ft. (3.7 m) Pickup Cable for Model 544, P/N 20433
- Magnetic Pickup Holder for Model 544 and Model 970. P/N 4332
- Magnetic Shield for Model 544 Transducer, P/N 10449
- Non-Contact Displacement Accessories:
  - Single Channel, P/N 29093
  - Dual Channel, P/N 29094
- 12 ft. (5.7 m) Extension Cable for Strobe Light, P/N 28836.
- 25 ft. (7.6 m) Extension Pickup Cable for Model 970 Accelerometer, P/N 21044
- 25 ft. (7.6 m) Extension Pickup Cable for Model 544 Transducer, P/N 21045
- 50 ft. (15.2 m) Extension Pickup Cable for Model 970 Accelerometer, P/N 21048
- 50 ft. (15.2 m) Extension Pickup Cable for Model 544 Transducer, P/N 21049
- 12 ft. (3.7 m) Non-Contact Monitor Pickup Cable with BNC connector for connection to non-contact monitor outputs with sensitivity of 200 mv/mil (8 mv/um), P/N 24809
- 12 ft. (3.7 m) Non-Contact Signal Sensor pickup cable with spade lugs to connect to non-contact signal sensors with sensitivity of 200 mv/mil (8 mv/um), P/N 22874.
- 12 ft. (3.7 m) Non-Contact Signal Sensor Pickup Cable with spade lugs to connect to non-contact signal sensor, P/N 29030. Similar to P/N 22874, but with an added wire and spade lug to apply power (−24V) to the signal sensor.
- 3.3 ft. (1.0 m) power cable to enable Model 1080 or 1081 to receive power from Model 880, P/N 19644
- Model 560 Low Frequency Velocity Transducer, P/N 24957
- 12 ft. (3.7 m) Pickup Cable for Model 560, P/N 25136
- 25 ft. (7.6 m) Extension Pickup Cable for Model 560, P/N 25137
- 50 ft. (15.2 m) Extension Pickup Cable for Model 560, P/N 25138
- Model 308 Vibration/Sound Level Meter
- One lot (48 rolls per lot) of chart paper; sold only by lots, P/N 24444
- Calibrator, P/N 21073
- Vibration Chart Storage Notebook with 50 Filler Sheets, P/N 25864
- Package of 100 Extra Notebook Filler Sheets, P/N 25865
- Accessory Case, P/N 25345