**AM-20**

Solid State Analog Meter
Twenty 0.15” LED Segments
in a Slim Bezel Case

A rugged, high accuracy LED bargraph panel meter with 20MΩ input impedance, multiple display modes, dual scaling and powered from 4V to 6VDC Bargraph mode 4V to 24VDC in Dot mode.

**General Features**

The AM-20 is a highly versatile, solid-state analog meter capable of a variety of user programmable display modes. It is designed to meet the requirement in many applications for a rugged, high input impedance meter that has instantaneous response and is immune to the vibration, sticking and overshoot problems associated with needle-type meters.

The meter's display consists of 20 LED segments individually driven by 20 comparators divided into a left side set and a right side set of ten comparators each.

The user can select and adjust the three internal reference voltages that are applied respectively, to the left side of the left comparator set, the center point where the two comparator sets are joined in series and the right side of the right comparator set. The meter's circuitry detects when the input signal corresponds to the voltage at any one of the 20 points along the two comparator divider networks with a step accuracy of better than 0.1%. The meter can be adjusted so that both comparator sets have an equal reference voltage across them which will produce a linear full scale display, or if required, they can have a different reference voltage which will enable each half of the meter’s display to have a different scale or sensitivity.

**Compatibility**

The AM-20 is shipped in a standard Slim Bezel case. The Slim Bezel case is compatible with the CM, SM, PM, & SP Series of meters. The AM-20 can be ordered in End Mount cases for twin mounting or combinations of multiple center mount cases and two end mount cases for stack mounting.

**Specifications**

Input Configuration: Single-ended

Input Impedance: Exceeds 20MΩ on 2V range; 10MΩ on all other ranges.

Full Scale Ranges: 2VDC (Standard)
20VDC
200VDC
1200VDC (Maximum Input Signal)

All ranges except 1200VDC are field adjustable from 20% to 120% of the basic full scale range value.

A/D Converter: Flash Converter

Accuracy: ±0.5% of Full Scale

Temperature Coefficient: 150 PPM/˚C on 2V range; 200 PPM/˚C on all other ranges

Warm Up Time: Instantly to specified accuracy

Conversion Rate: Instantaneous Flash Converter

Display: 0.15” Segment height; 20 LED's

Over-range Indication: All bars flash

Power Supply: 5V DC @ 280mA

Operating Temperature: –10°C to +60°C

Storage Temperature: –20°C to +70°C

Relative Humidity: 95% non condensing

Case Dimensions: Bezel 2.76” x 1.17” (69.75 x 29.7mm) Depth behind Bezel 3.32” (84mm) plus 0.68” (17.27mm) for connector.

Weight: 90.72 gms (3.2 oz) 136.1 gms (4.8 oz) when packed

**AM-Series, the choice for easy user adjustability**

AM-30 . . . . . . . . . . . . . Red 30 Seg. Bargraph, 0.05/0.1/0.2/1/5/10VDC/4-20mA
AM-30R1 . . . . . . . . . . . . . Red 30 Seg. Bargraph, 1 VDC std w/one 2 A/120 VAC relay

AM-30R2 . . . . . . . . . . . . . Red 30 Seg. Bargraph, 1 VDC std w/two 2 A/120 VAC relays
**Connector Pinouts**

The Texmate Model AM-20 interconnects by means of a standard PC board edge connector having two rows of 10 pins, spaced on 0.156" centers. Connectors are available from Texmate, or from almost any connector manufacturer.

**Functional Diagram**

The diagram below depicts the Model AM-20 in its standard 2V F.S. form with all component values indicated for this mode of operation. Variations from the standard for use in special applications will be found under the heading Typical Application Circuits & Connection Instructions.

**Connector Pinouts**

The Texmate Model AM-20 interconnects by means of a standard PC board edge connector having two rows of 10 pins, spaced on 0.156" centers. Connectors are available from Texmate, or from almost any connector manufacturer.
are connected in series. This voltage is adjustable from 0 to 1.2V and the same relationship between the reference voltages on Pin 7 and Pin 8 as described for Pin 7 also exists between the reference voltage on Pin 8 and the reference voltage adjusted by potentiometer R3 that is applied to the right-most side of the second comparator (LSI-2). The reference voltage adjusted by R3 is not brought out on the connector as the required scale is easily determined during calibration by adjusting R3 so that the displayed reading agrees with the applied input signal. When the input signal is isolated from the meter's power supply it is possible to operate the meter in a bipolar mode with the center point as zero. For linear bipolar operation R4 should be adjusted to half the voltage of the required input signal span, i.e., for 1V full scale, if R5 were adjusted to 0V on Pin 7, R4 would be adjusted to 1V on Pin 8. The input signal low would then be applied to Pin 8 instead of Pin H. With +1V applied R3 would be adjusted until the displayed signal reached full scale at which time the reference voltage applied to the right-most side of the second comparator would equal 2V. In the bipolar configuration the meter is best operated in the dot mode as the dot will move from the center either right or left, depending on the amplitude of the negative input signal. For a positive signal the 10th to 20th segments will turn on sequentially left to right.

**Pin 9**-Auxiliary Power Ground: Pin 9 is connected internally to Power Ground and is provided to facilitate the connection of Half Brightness Scale Enable Pin K to power ground.

**Pin 10**-Auxiliary Positive Power Output: Pin 10 is connected internally to positive Power Input Pin 1 and is provided to facilitate the connection of Proportional Brightness Dot Enable Pin L to positive power.

### Component Layout

![Component Layout Diagram]

### Signal Conditioning Components

**SPAN Potentiometer (Pot)**
The 15 turn SPAN Pot is on the left side (as viewed from the back of the meter). Typical adjustment is 50% of the input signal range.

**CENTER POINT Potentiometer (Pot)**
The 15 turn CENTER POINT Pot is the middle pot (as viewed from the back of the meter). Typical adjustment is 50% of the input signal range.

**ZERO Potentiometer (Pot)**
The ZERO Pot is to the right side (as viewed from the back of the meter). It enables the Digital Display Span to be offset 50% of the input signal range.

### Proportional Brightness Band Potentiometer

The Proportional Brightness Potentiometer superimposes a proportional brightness band to the leading edge of the bargraph which creates the optical appearance of a pointed arrow. This feature produces a display of infinite resolution. The position of the signal in relation to any two adjacent segments and the scale on the faceplate can be accurately ascertained to within 1%. When the amplitude of the proportional band is adjusted counterclockwise to zero, the smooth proportional advance of the display will be replaced by a step by step movement as each bar is either turned full on or full off.

### Calibration Procedures

Calibrate the meter according to the instructions shown with each application drawing for the selected operating mode. Improper calibration of R3, R4, R5 and R12 can result in a misleading display, the cause of which may be difficult to analyze. The center-zero mode, center-full scale mode, offset mode and conventional bar mode all have the same input circuit connection. The different display formats are created by the interaction of the different reference voltages adjusted by R3, R4 and R5. (Read pin descriptions for Pin J, Pin 7 and Pin 8.)

It is possible to definitely check for correct operation of the meter by selecting the bargraph mode (connect Pins D & 4 to Pin 3, power in to Pins A & 1, signal in to Pins H & J and disconnect all other pins). The following calibration steps should then be followed. Adjust R5 clockwise (at least 10 turns) to its maximum, then adjust R3 and R4 counter clockwise (at least 10 turns) to their maximums. The meter will now operate at approximately 2.4V full scale with the segments being lit sequentially from left to right, proportionate with the input signal.

### Optional PCB Edge Connector

**PCB Edge Connector**

A standard 20-pin edge connector (two rows of 10 pins on 0.156" centers) is used to connect the AM-20 meter. Order part no. CN-L10.

### Custom Face Plates

**Texmate Produces Thousands of Custom OEM Face Plates**

Have Texmate Design and Build a Custom Face Plate to Suit your Next project!

- Custom face plates have a non-recurring artwork charge. A serial number is then assigned to each artwork, to facilitate re-ordering.
- Small Run or One-Off custom face plates incur an installation charge, and are generally printed on a special plastic film, which is then laminated to custom faceplate blanks as required.
- Large Run (250 pieces min): custom face plates are production silk screened, issued a part number, and held in stock for free installation as required by customer orders.
- OEMs may also order Custom Meter Labels, Box Labels Custom Data Sheets and Instruction Manuals.
AM-20 Data Sheet (A1)

0.95” Front Panel Cutout

Copyright © 2004 Texmate Inc. All Rights Reserved.

February 27, 2004

STANDARD SLIM BEZEL CASE

SLIM BEZEL CASE
Standard Black ABS case with matte finish bezel for single unit mounting.
Part No. SL-CASECLR for LCD’s

OPTIONAL TWIN MOUNTING OR MULTIPLE ARRAY CASES

END MOUNT CASE
Same styling as Slim Bezel case but with bottom edge of bezel removed. Two End Mount cases can be twin mounted in a single cutout.
Part No. EM-CASECLR for LCD’s

CENTER MOUNT CASE
Any number of Center Mount cases may be fitted between two End Mount cases for multiple arrays.
Part No. CM-CASECLR for LCD’s

Ordering Information

Standard Options for this Model Number

Part Number Description

<table>
<thead>
<tr>
<th>BASIC MODEL NUMBER</th>
<th>DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM-20 . . . . . . .</td>
<td>. . Vertical Red</td>
</tr>
<tr>
<td>AM-HORIZ/RED . . .</td>
<td>. . Horizontal Red LED option</td>
</tr>
<tr>
<td>AM-VERT/GRN . . . .</td>
<td>. . Vertical Green LED option</td>
</tr>
<tr>
<td>AM-HORIZ/GRN . . .</td>
<td>. . Horizontal Green LED option</td>
</tr>
<tr>
<td>AM-20DOT . . . . .</td>
<td>. . Dot mode - one segment display. Specify left or center zero</td>
</tr>
</tbody>
</table>

Special Options and Accessories

Part Number Description

<table>
<thead>
<tr>
<th>SPECIAL OPTIONS (Specify Inputs or Outputs &amp; Req. Reading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF-0020V . . . . .</td>
</tr>
<tr>
<td>VF-0200V . . . . .</td>
</tr>
<tr>
<td>VF-1200V . . . . .</td>
</tr>
<tr>
<td>VS-BAR20 . . . . .</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCESSORIES (Specify Serial # for Custom Artwork Installation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN-L10 . . . . . . .</td>
</tr>
<tr>
<td>TB-KIT . . . . . . .</td>
</tr>
<tr>
<td>SL.CASECLR . . . .</td>
</tr>
<tr>
<td>CM.CASECLR . . . .</td>
</tr>
<tr>
<td>EM.CASECLR . . . .</td>
</tr>
</tbody>
</table>

Prices subject to change without notice.

WARRANTY

Texmate warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment. Texmate’s obligations under this warranty are limited to replacement or repair, at its option, at its factory, of any of the products which shall, within the applicable period after shipment, be returned to Texmate’s facility. Transportation charges pre-paid, and which are, after examination, disclosed to the satisfaction of Texmate to be thus defective. The warranty shall not apply to any equipment which shall have been repaired or altered, except by Texmate, or which shall have been subjected to misuse, negligence, or accident. In no case shall Texmate’s liability exceed the original purchase price. The aforementioned provisions do not extend the original warranty period of any product which has been either repaired or replaced by Texmate.

USER’S RESPONSIBILITY

We are pleased to offer suggestions on the use of our various products either by way of printed matter or through direct contact with our sales/application engineering staff. However, since we have no control over the use of our products once they are shipped, NO WARRANTY WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE is made beyond the repair, replacement, or refund of purchase price at the sole discretion of Texmate. Users shall determine the suitability of the product for the intended application before using, and the users assume all risk and liability whatsoever in connection therewith, regardless of any of our suggestions or statements as to application or construction. In no event shall Texmate’s liability, in law or otherwise, be in excess of the purchase price of the product.

Texmate cannot assume responsibility for any circuitry described. No circuit patent or software licenses are implied. Texmate reserves the right to change circuitry, operating software, specifications, and prices without notice at any time.

Texmate has facilities in Japan, New Zealand, Taiwan, and Thailand. We also have authorized distributors throughout the USA and in 28 other countries.

For product details visit www.texmate.com

Local Distributor Address