NEW

TEC LITE

DATA PANEL

DRAMATIC APPEARANCE AND UNLIMITED VERSATILITY IN CONSOLE STYLING, PANEL LAYOUT AND INFORMATION DISPLAY

THIS TOTALLY NEW CONCEPT IN DISPLAY GIVES YOU EXTREME FLEXIBILITY OF MESSAGE, ARRANGEMENT, COLOR, SIZE
DATA*PANEL is used in the console of Control Data Corporation's 3600 Computing System.

A NEW, LOW COST CONCEPT THAT COMBINES DISPLAY VERSATILITY AND OUTSTANDING APPEARANCE

Your console and panel design capabilities are vastly expanded with the unusual flexibility and beauty offered by DATA•PANEL. Only this new concept can give you such latitude in selecting size, shape, color and location for each message as well as degree of emphasis. DATA•PANEL completely eliminates the individual indicator, places displays behind the smooth, glare-free glass planes that form the "panel" of DATA•PANEL. Now your system's information display panels can have modern, individualized styling tailored to your design.

Cost? Far less than you would expect for a custom-built unit and usually less than the cost of conventional modular indicators alone. You actually get the vastly improved appearance of DATA•PANEL at no additional cost when compared with present-day indication methods.

Simply order your console or panel displays as you would like them to appear. Specify size, shape, color and messages, and place them anywhere on the panel—they will be out of sight until their message is called for. Industrial designers have discovered that DATA•PANEL allows them to design console panels and information displays with none of the restrictions imposed by modular indicators. They have discovered that the brilliantly colorful visual versatility of DATA•PANEL opens broad new avenues for effectively displaying space-age data. If you do not have industrial design service available, TEC-LITE DATA•PANEL industrial designers will provide design sketches for your consideration based on your description of information display requirements.
**COMPLETE DISPLAY VERSATILITY**

New photographic techniques are employed to create the information display areas of DATA-PANEL, therefore any artwork which can be photographically reproduced can be displayed. Any typeface can be specified for legend areas and numerical displays. In addition, pictorial displays representing generators, switches, pumps, valves, etc., which would be used for a wide variety of automated control systems can be reproduced. Corporate trademarks or other designs can similarly be displayed.

Each legend or symbol to be illuminated appears within an area called a DATA*Module. This module may be of any size and shape including square, rectangular, triangular, diamond, round or elliptical. Illuminated or permanently visible lines representing process or materials flow channels can be provided.

Incandescent lamps used in DATA-PANEL assemblies can be switched on and off in the conventional manner with lamp supply voltages, or these easily replaceable miniature lamps can be switched on and off by transistORIZED lamp control circuitry operating directly from the low level signals present in computers, control, guidance and other solid state systems.

Readout devices, including segmented and projection displays using incandescent lamps and readouts using neon display tubes, mount behind the glass panel. TransistORIZED circuitry controls lamps and decodes low level BCD or other input signals to digital display. Other options include straight binary input to octal display or 10 line (decimal) input to decimal display. All transistORIZED lamp control circuitry is mounted on printed circuit boards and forms an integral part of the DATA-PANEL assembly.

**VISUAL VERSATILITY**

There are no restrictions, within practical limits, to the size of DATA-PANEL or to the sizes, shapes, colors and location of information to be displayed. Not only does DATA-PANEL give you design freedom, but it also allows you to determine intensity or attention value of individual legends by selecting size, color and brightness of illuminated indications that appear behind its gray (Graphic Gray) glass panel.

DATA-PANEL also offers totally visible, partially visible or invisible messages in the off condition. With totally invisible legends your panel is far less confusing to the operator. His eye is not distracted or confused by the visual presence of non-indicating indicators! He sees only—concentrates only on the important illuminated indications! On large panel areas, however, the operator may require visual reference to orient himself with the location of an indication. In this situation DATA-PANEL can provide any number of totally or partially visible legends, grid lines or other reference points.

**COLOR VERSATILITY**

Another unique and vital feature of TEC-LITE DATA-PANEL is its ability to display information not only in a variety of shapes and styles, but also in a wide range of colors. Basically, messages appear visually as illuminated white or colored characters on a Graphic Gray background. Various display options including visible, partially visible and invisible legends are shown on Page 4.

**VERSATILITY OF APPLICATION**

DATA-PANEL is designed for use wherever information must be displayed effectively, completely and with striking appearance. Already, designers and builders of large scale computers, guidance and industrial control systems have put DATA-PANEL to work as the modern solution to information display.
VERSATILITY OF VISUAL DISPLAY

This chart outlines the basic visual versatility of DATA PANEL. DATA Modules in square configuration are illustrated, but message areas may be larger, of various shapes and contain far more alpha-numeric information. Colors shown depict options and do not represent color fidelity.

If the OFF-ON visual color sequence you prefer is not illustrated, submit color sketches on TEC-LITE DATA PANEL "Design" Specification Sheet, Number 338 enclosed in the pocket of this brochure.

Photographic processes developed by TEC-LITE engineers reproduce any typeface of any size as well as pictorial displays, symbols or other graphic information in full color to your panel layout specifications.

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td></td>
<td></td>
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<tr>
<td>2B</td>
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<td>7G</td>
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</tbody>
</table>

A non-transistorized DATA PANEL, Common connection for one side of lamp supply simplifies hook up. Taper pin receptacle used for signal connection. Lamps are replaced by moving center contact axis.
TEC-LITE DATA•PANEL is uniquely flexible, not only in its unlimited display capabilities, but also in its mechanical and electrical options as well. Complete DATA•PANEL assemblies can be mounted in a variety of ways: flush with adjacent surfaces, recessed, at angles to surrounding planes or rack mounted. DATA•PANEL can be designed as an entire console surface or it may be provided in sections of varying sizes.

Electrically, DATA•PANEL is also completely versatile and adaptable to the signal and supply voltages and currents of any computer or control system. A wide range of incandescent and neon center flange base lamps operating from their normal supply voltages are offered. Lamps can be replaced easily and quickly from behind the panel.

DATA•PANEL also offers transistor controlled incandescent lamps that operate with current drain in logic lines as low as 100 micromamps. Transistor controlled neon lamps that operate from a signal swing as small as 2 volts (for example, lamp ON at +1 volt, OFF at -1 volt). These lamps are designed to function in solid state systems where low level signals are typically present. In these systems it is desirable to keep high voltages and currents normally required for lamp operation out of sensitive logic areas. Neon lamps, due to their inherent color output and low illumination level, restrict the visual versatility of DATA•PANEL and limit color selection to amber, red and orange.

Several types of digital display or readout devices can be accommodated behind the glass panel of DATA•PANEL. Transistorized readouts offered include TEC-LITE TSP Series Segmented Display (using incandescent lamps) and TNR Series Digital Display (using a neon display tube). Projection display devices using incandescent lamps are also compatible with DATA•PANEL and may be transistor controlled through the use of TEC-LITE TPD Series Projection Display Drivers. All transistor-controlled readouts operate from low level decimal or coded input signals. All readouts are completely invisible on the panel when in the off condition.

Transistor Electronics Corporation developed, patented and is the world's largest manufacturer of self-contained transistorized indicators. This unequalled design, engineering and production knowledge is applied to the transistorized lamp control circuits used in DATA•PANEL.

HOW DATA•PANEL SAVES YOU MONEY—DATA•PANEL can be delivered to you as a completely wired and tested display panel assembly that quickly mounts in place with standard hardware. All electrical connections can be brought out to a single connector, to common blocks or to individual taper pin receptacles.

While DATA•PANEL is built to your specific display requirements and offers many unique design advantages, its cost is usually less than the cost of a group of individual indicators mounted in your panel. DATA•PANEL eliminates the costs of indicator bodies, lenses and mounting hardware—provides substantial economies by placing many lamp control circuits on a single printed circuit board, by using common connections whenever possible and employing a simplified lamp mounting technique. Not only is DATA•PANEL less expensive initially, but it saves you these time consuming steps and costs:

1. fabricating multi-hole panels to accurate tolerances.
2. finishing the panel and engraving or anodizing legends.
3. installing individual indicators.
4. making all of the connections to individual indicators—including commons (no wiring required if completely wired DATA•PANEL is ordered).
5. simplifies incoming inspection.

Custom-built DATA•PANEL costs are kept at production-run levels because TEC-LITE engineers have developed mechanical production techniques and facilities that are adaptable to any DATA•PANEL order. Tooling, mechanical structure and component mounting techniques are standardized. Only charges for art preparation, photographic processes and tooling setup are unique to each order—and these charges are no more than the costs of panel fabrication and engraving, anodizing, hot stamping or silk screening processes used to label conventional panels.

Completely wired DATA•PANEL brings all connecting points for signal, supply, bias and test voltages out to five connectors in this application.

DATA•Modules present their messages in a variety of sizes, shapes, colors and visual display options. They are invisible when off.

Lamp control circuitry is mounted on printed circuit boards locked in place and removed by releasing spring clips and pulling out from the rear of DATA•PANEL.

Midget flange base lamps used on printed circuit boards are quickly replaced by removing lamp from its holder without tools.
DATA PANEL SIZE
(maximum single unit)

BACK PANEL DIMENSIONS

RECOMMENDED MINIMUM SIZE OF DATA Module

SHAPES OF DATA Module

INFORMATION DISPLAYED

"OFF" APPEARANCE

"ON" ILLUMINATION AND COLOR

PANEL MATERIAL

MOUNTING

PRINTED CIRCUIT BOARDS

TERMINAL OPTIONS

NON-TRANSISTOR CONTROLLED LAMPS

TRANSISTOR-CONTROLLED INCANDESCENT LAMPS

TRANSISTOR-CONTROLLED NEON LAMPS

LAMP REPLACEABILITY

READOUT DEVICES

ELECTRICAL CONNECTIONS

Any practical size can be built. At extreme sizes limitations will be encountered in glass handling and mounting. Large displays, with many lamps illuminated at one time, may require blower cooling.

Minimum dimension backpanel from the front surface of the DATA PANEL is 1/2" including lamp hardware, but without lamp control circuitry or digital displays.

Basic design is \( \frac{1}{2} \times \frac{1}{2} \) square, however smaller sizes can be built to fit special requirements. No limit to maximum size.

Square, rectangular, triangular, diamond, round—almost any geometric pattern or combinations of patterns in any size exceeding the minimum area required for lamps can be duplicated. Customer requirements determine size, shape and position of DATA Module within the DATA PANEL.

Any number, series of numbers, letters, words or messages composed of series of words in any typeface can be displayed within DATA Modules. Logotypes, trademarks and pictorial symbols such as generators, pumps, etc., can be duplicated. Messages may be in one line of any practical length or on several lines.

When no indication is required the DATA Module and its message is completely invisible behind the Graphic Gray DATA PANEL. If desired for operator orientation certain messages or grid lines can be made visible, in color, at all times on the DATA PANEL face.

Vivid information display is achieved by illuminating the various DATA Modules behind the legend areas. Page 4 shows the wide range of colored displays that can be achieved with DATA PANEL. Standard colors for incandescent lamps are red, green, blue, yellow, orange and white. Other colors may be specified.

Graphic Gray or clear glare-free glass. Other transparent materials including Plexiglas may be specified but scratch-resistance of material must be considered.

DATA PANEL can be installed as a complete, self-contained panel section on consoles or in equipment. It can be mounted flush with adjacent surfaces or recessed below and at various angles to surrounding surfaces. Rack mounting is also available.

Lamp control printed circuit boards contain the lamps and slide into position behind the DATA PANEL with the lamps projecting into the DATA Modules. Spring clips hold boards in place.

Series "53" taper pin receptacles are standard. Other terminals may be specified on special order.

Midget flange base incandescent and neon lamps are used and can be selected to meet a wide range of supply voltages. See Lamp Specifications Sheet.

High current drain typically encountered with incandescent lamps is solved by transistorized circuitry that switches lamps ON and OFF with low current level signals usually found in solid state designs. Midget flange base lamps can be selected to meet a variety of supply voltages and currents. See Lamp Specifications Sheet.

High voltage problems inherent in neon lamps are confined to the DATA PANEL through the use of transistorized lamp control circuitry. This enables the neon lamp to be operated from the low level logic lines frequently present in solid state designs. Low candlepower and color output of neon lamps limit display color choices to amber, red and orange. See Lamp Specifications Sheet for supply requirements.

All lamps, whether used in DATA Modules or in digital readout devices, are easily replaceable from the rear of DATA PANEL.

DATA PANEL permits integral installation of readout devices including TEC-LITE Digital Readout with NIXIE tube (Alpha-numeric neon display tubes may also be specified), TNR Series; Transistorized Segmented Readout, TSR Series; and projection units with TEC-LITE Transistorized Projection Display Drivers and decoders, TPD Series. All readouts mount behind the glass face of DATA PANEL. See separate data sheets on readouts for signal and supply voltage requirements.

All supply and signal voltages can be connected to DATA PANEL by use of one or more connectors for fast accurate installation, or by taper pin receptacles.
This new, ultra-modern facility was built specifically for the design and production of TEC-LITE Indicator Devices, Digital Readouts and precision electronic subassemblies. Here, DATA PANEL was conceived and is now produced. Photos are: 1) view of 52,200 square foot fully climatized administrative offices and plant; 2) a production area with high level lighting and spacious, efficient layout; 3) TEC-LITE inspection area where specially built test instruments duplicate in-system electrical conditions.
SWITCHES CUSTOM BUILT TO YOUR DESIGN

COMPLEMENT DATA•PANEL CONSOLES

Console styling freedom need not be limited to information display. TEC-LITE DATA•Switches can be manufactured to your specific design and can offer a wide variety of electrical, mechanical and visual options. These industrial designer's sketches represent a few of the infinite configurations possible. Your design will determine styling for your application.

Transistor controlled or conventional indicators can be incorporated within, but isolated from the switch to combine control and indication functions while conserving space on consoles. Many switch contact forms and capacities can be provided.

COMPLETE CONSOLE STYLING SERVICE

If you wish to take full advantage of the design freedom offered by DATA•PANEL, but do not have industrial designers available, Transistor Electronics Corporation can provide complete console styling service. These sketches represent some of the console designs that can be built around the highly versatile, dramatically colorful DATA•PANEL concept. Your letter requesting further information on console styling service will receive prompt attention.

Transistor Electronics Corporation

Box 6191 • Minneapolis, Minnesota 55424 • Phone (612)-941-1100

Printed in U.S.A.
TEC originated and developed the concept of transistorized indicators and has pioneered the development of a wide range of modern indicating devices—both conventional and transistorized. Units in TEC's basic line are electrically designed to cover the most commonly used signal and supply voltages encountered in equipment using indicators. Some units are specifically tailored to meet battery and aircraft supply voltages, for example. Others meet the more complex requirements encountered in the broad range of signal and supply voltages available in computer, data processing or control systems.

However, design engineers frequently need an indicator designed specifically to meet unique circuitry requirements and high reliability levels for today's sophisticated semiconductor systems. TEC specializes in this area and has designed several hundreds of custom-designed indicators for specific applications. While these units are custom designed, their cost and delivery schedule usually remains very close to standard Tec-Lite Indicators. TEC achieves this design versatility at minimum cost because its unique design and production facilities have been set specifically for this purpose.

Basic product designs as well as custom designs utilize similar components. A majority of the TEC engineering staff comes from the computer industry and are thoroughly versed in the needs of this industry.

"Transistorized" DIGITAL READOUT
Offer Optional Decoder Functions

"Transistorized" LOW VOLTAGE NEON INDICATOR LITE

TRANSISTOR CONTROLLED INCANDESCENT LITE

Compact readout using rectangular NIXIE® tube mounts on 1" centers. Self contained transistorized drivers control numeral display from signals as small as two volts. Circuitry options include binary to decimal or octal converters, counter and memory. Optional bezel contains Polaroid® filter to increase readability. Popular terminal types available. Size 1" w x 1 ¼" high, less than 3" deep.

LVN SERIES
Low voltage DC is stepped up internally to high voltage AC to fire both electrodes of the neon lamp. Provides a long life, low power drain neon operating from 3 to 24 VDC. Used where high voltage is not desired or available. May also be controlled with low signal voltage. Lite, 9/16" in dia., mounts on ⅜" centers—projects 1 ¾" behind panel.

TIL SERIES
Replaceable incandescent lamp indicator is internally switched on and off by signal currents as low as .3 ma. Ten models operate from signal and supply voltages most commonly used. Available in watertight version also. Standard replaceable midget flange base lamps available from jobbers. Mounts from the rear in ¾" holes on centers as close as ¾". Projects back 1 ¾".

TEC-LITE Transistorized Indicators are protected by one or more of the following patents: U.S. Pat. Nos. 2,985,874; 3,041,499; French Pat. No. 1,291,911; Italian Pat. No. 647,414; Belgian Pat. No. 608,246.
select from...  
a wide range of standard  

TEC-LITE INDICATORS  
transistorized or conventional

MTL SERIES  
"Transistorized" MINI-LITE INDICATOR  
Long life neon indicator is controlled from signals as small as two volts. Twenty basic models meet most signal and supply voltages commonly used. High voltages-to-fire lamp—are confined to panel. Lamp and transistorized circuitry are contained in 9/16" dia. body that mounts on 3/8" centers. Body projects 1 3/16".

RDL SERIES  
REPLACEABLE LAMP DISPLAY-LITE  
Five basic models offer unique variety in appearance, lens style and mounting methods. RDL-A and B Series use standard midget base neon and incandescent lamps, RDL-C, D, and E Series, incandescent only. Lens unscrews for fast lamp replacement. Solder plated terminals accept series incandescent lamps, RDL-C, D, and E Series, and B Series use standard midget base neon and incandescent lamps—confined to panel. Lamp signals as small as two volts. Twenty basic momentary contact button switch are combined within the 9/16" dia. body of this compact indicator. Operating from signals as small as two volts, 20 standard models, with A or B Form switch, fit most needs. Lites mount on 3/4" centers—body projects 1 3/4" behind panel.

MDL SERIES  
MINIATURE DISPLAY LITE  
A variety of optional features... lens colors, styles, neon or incandescent lamps, internal resistor, body color, finishes and terminals... make this indicator extremely versatile. Body 3/4" dia., mounts in 3/8" hole on 9/16" centers. Rear projection 3/4".

FML SERIES  
FRONT MOUNTING LITE  
Slip-in installation (no hardware required) of incandescent or neon lamp indicator is important when rear panel access is limited. Insert lens to lock flexible nylon collet body in place. Lite is insulated from panel and can contain 3/8" resistor. Front mounts in .375 hole on 3/8" centers in 5/8" panel. Projects 1/8" to rear.

MBL SERIES  
MINIATURE BUTTON-LITE  
Combines neon or incandescent lamp indicator and independent switch in one unit to save panel space. Momentary contact switch (see MBS for life) offers A, B, or AB Form contacts. Life of gold plated wiping action contacts exceeds 500,000 operations at 100 ma. current rating. Body, 1/4" in dia., mounts in 3/8" hole on 9/16" centers—projects 7/8" back of panel.

MBS SERIES  
MINIATURE BUTTON SWITCH  
Momentary contact push button switch offers A, B, or AB Form contacts. Life of gold plated wiping action contacts exceeds 500,000 operations at 100 ma. current rating. Body, 3/8" in dia., mounts in 3/8" hole on 9/16" centers—projects 3/4" back of panel.

LENS COLOR:  
1 - Translucent Red*  
2 - Transparent Red  
3 - Transparent Amber  
4 - Translucent Yellow*  
5 - Translucent Green  
6 - Translucent Blue*  
7 - Clear  
8 - Transparent White  
9 - Transparent White*  
10 - Transparent Orange*  
11 - Transparent Orange  
12 - Transparent Green  
13 - Transparent Blue*  
*For Incandescent Only

PTL SERIES  
With Replaceable Lamp  
PRESS-TEST INDICATOR LITE  
Mounting in 3/4" holes on 9/16" centers, this lite combines replaceable lamp and press-test feature in 1 3/16" dia. body. Standard midget flange base neon and incandescent lamps are tested independent of circuit indicator signals by pressing lens. Lamps available from jobbers. Gold-plated terminals accept series "78" taper tab receptacles or solder connections. Back panel projection 1 7/32".

FTL SERIES  
With Replaceable Lamp

RDL SERIES  
REPLACEABLE LAMP ASSEMBLY  
Permits continuous mounting—horizontally and vertically—of replaceable flange base neon or incandescent lamp indicators on 3/8", 1 3/8", 3/4" and 1" centers. Unlimited lengths and widths of display achieved with a combination of terminal strips and lamp sockets using standoffs or optional design that eliminates panel mounting screws. Projects 1 3/8" back of panel.

MCL SERIES  
MINIATURE CARTRIDGE LITE  
One piece plastic lens-body contains neon or incandescent lamp. Square or round lens, internal series resistor, wire lead or .040 pin terminals offered. Lite clip mounts in .312 hole on 3/8" centers. Rear projection 3/8".

LPS SERIES  
LITE POWER SUPPLY  
Compact unit (3 5/8"W x 6 1/4"L x 3 1/2"H) is expressly designed to provide supply and bias voltages for TEC-LITE Transistorized Indicators and standard neon indicators. Drives several hundred lites from 105-130 VAC.
or detail your requirements for
CUSTOM DESIGNED TEC-LITE INDICATORS here...

SPECIFICATIONS for NON-STANDARD*
TEC-LITE INDICATORS

COMPANY ................................................................. DATE ........................................
DIVISION OR DEPT. ................................................... PHONE ................................
ADDRESS ......................................................................................
CITY ...................................................................... ZONE .................. STATE ..............
ENGINEER ................................................................. BUYER ................................
APPLICATION ................................................................. MILITARY
COMMERCIAL

*This is a variation of a standard ............. Series TEC-LITE

ELECTRICAL SPECIFICATIONS

Supply Voltages Available AC ... V ± %; V ± %; V ± %; V ± %
Bias Voltages Available DC ... V ± %; V ± %; V ± %; V ± %
Signal Voltage [Specify polarity and Tolerance or Range] : ON OFF
Signal Current [Specify Tolerance or Range] : ON OFF
Input Impedance ....................................... Ohms
LAMP TYPE: Neon ........................................... Incandescent ........................ Replaceable Yes
( Specify lamp number if type critical)
SWITCH FUNCTION (if applicable): Contacts Normally Open ............................
                           Normally Closed .......................... Other .........................
(non-standard)
Other electrical requirements ..........................................................
(Sketch suggested schematic on reverse side)

MECHANICAL SPECIFICATIONS

LENSES

COLOR: See Catalog — Specify standard colors for neon or incandescent lamps — or indicate other non-standard color desired:
COLOR: ..............................................................
SHAPE: Flat Top .............................................. Spherical not available in Button Lites
HOT STAMPED LEGENDS: Up to 3 characters can be embossed on flat top lens faces. Specify legends desired on prototype. See TEC-DATA Sheet 108.
Quantity......Legend......; Quantity......Legend......;
Quantity......Legend......; Quantity......Legend......

DIMENSIONAL DATA
(See drawing at left)
FOR PANEL THICKNESS: ...... inch NOTE: Tooling setup for 1/16 inch to 1/8 inch and 9/64 to 3/16 inch panel thickness — others non-standard
MOUNTING HOLE DIAMETER: ...... inch NOTE: 3/8 inch and 15/32 inch diameter hole accommodates standard TEC-LITES.

OTHER LENS STYLE
(non-standard - sketch design)

Indicate maximum acceptable back panel length.

(OVER)
TERMINALS

NUMBER PINS: .......................................................... TYPE: □ Taper Pin □ Solder Lug/Taper Tab □ "Wire-Wrap" □ Other .......................................................... (non-standard)

FINISH: Anodize □ Other .......................................................... (non-standard)

COLOR: Black □ Other .......................................................... (non-standard)

BODY - NUT

ENVIRONMENTAL SPECIFICATIONS

Operating and Storage Temperature -40°C to +65°C. If other, specify .......................................................... Other requirements (indicate shock, vibration, acceleration factors if applicable) ..........................................................

MIL-FEDERAL SPECIFICATIONS

See Catalog - Specify any other required, but not listed in catalog ..........................................................

SAMPLE and ORDERING INFORMATION

Number Samples Required ............................................ Date Req’d ..........................................................

Prototype Quantity Required ............................................ Date Req’d ..........................................................

Production Quantity Required ............................................ Delivery Sched. Req’d ..........................................................

Sample based on ............................................ pieces Send Quote to: □ Engineer □ Buyer

Prototype based on ............................................ pieces Send Sample to: □ Engineer □ Buyer

Production based on ............................................ pieces

Signed by ..........................................................

USE THIS AREA FOR COMMENTS AND SCHEMATICS
How to use this DESIGN SPECIFICATIONS SHEET:
DATA•PANEL is uniquely flexible - - electrically, mechanically and visually - - therefore a va-
riety of questions are asked in order that TEC-LITE DATA•PANEL engineers will have a clearer
picture of your display requirements and so that accurate proposals can be made.

Please refer to the 8-page DATA•PANEL brochure when filling out this sheet.

COMPANY________________________________________DATE____________________
DIVISION OR DEPT.________________________________PHONE_____________EXT.
ADDRESS____________________________________________________M/S________________
CITY____________________STATE____________________ZIP CODE___________
ENGINEER__________________________________________BUYER_____________MILITARY
APPLICATION____________________________________________________COMMERCE-
AL
PROTOTYPE QUANTITY REQUIRED________________________DATE REQUIRED
PRODUCTION QUANTITY REQUIRED________________________DELIVERY SCHED. REQ'D.
SEND QUOTATION ON PROTOTYPE □ BASED ON __________PIECES
SEND QUOTE TO BUYER □
ENGINEER □

DATA•PANEL ELECTRICAL SPECIFICATIONS*

*Select supply and signal voltages and currents from “STANDARD ELECTRICAL SPECIFICA-
TIONS” Sheet enclosed. Enter these below or, if other voltages or currents are required specify
below.

FOR NON-TRANSISTORIZED LAMPS:
Supply Voltages Available:
AC □ __________V± ____%; __________V± ____%; __________V± ____%; __________V± ____%.
DC □

Can one side of circuit be used as common? YES _______ NO _______.
Lamp Type: Incandescent ____; Neon ____. NOTE: Neon Lamps not recommended due to inherent color output and
low candlepower.

FOR TRANSISTOR CONTROLLED LAMPS:
Supply Voltages Available:
AC □ __________V± ____%; __________V± ____%; __________V± ____%; __________V± ____%.
DC □
Bias Voltages Available: __________V± ____%; __________V± ____%; __________V ± ____%; __________V ± ____%.

Signal Voltage Specify Polarity and Tolerance or Range ON _______ OFF _______
Signal Current Specify Tolerance or Range ON _______ OFF _______

Minimum Input Impedance ___________ OHMS.
Lamp Type: Incandescent ____; Neon ____. NOTE: Neon Lamps not recommended due to inherent color output and
low candlepower.

DIGITAL READOUT OPTIONS are described on Page 5 of this sheet.
The sample drawing below illustrates the information needed to know your panel layout requirements - both visually and mechanically. Draw and dimension your panel as you visualize it on the grid at right. Note that the minimum size of DATA Modules (the light confining area behind the legend) is 1/4" x 1/4", but length and width may be increased to any practical size.

Itemize the content of each legend area (or DATA Module) in the "Legend Tabulation Chart" provided below and as shown in the example immediately below.

Legends and background colors may be selected in a variety of OFF-ON combinations as shown on Page 4 of the DATA PANEL Brochure. Specify the OFF-ON display appearance (not color) you desire by placing the number (1A, 4D, etc.) in the "Display Style" column. Colors available for incandescent lamps are red, green, blue, yellow, orange and white. (Neon lamps - amber, red, orange).

Refer to the DATA PANEL Typeface chart to select type style and size (average character count per inch is given in order that you can determine type size).

NOTE: TEC-LITE DATA PANEL engineers will determine the number of lamps required to properly illuminate legend areas.
**LIST LEGEND REQUIREMENTS HERE**

<table>
<thead>
<tr>
<th>DATA Module</th>
<th>Legend</th>
<th>Display Style (Brochure pg.4)</th>
<th>Type Face and Pt. Size</th>
<th>Legend Color</th>
<th>Background Color</th>
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<td>Legend Color</td>
<td>Background Color</td>
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<tr>
<td>DATA</td>
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</tbody>
</table>

Please place legend tabulation in charts at bottom of sheet.
Segmented, neon display tube or projection type readouts (with or without self-contained transistor-control and decoder circuitry) can be mounted behind the glass panel of DATA PANEL. Select readouts and their voltages and currents from "STANDARD ELECTRICAL SPECIFICATIONS" Sheet enclosed. Enter selected voltages and currents below, or if other voltages or currents are required, specify below.

READOUT TYPE PREFERRED
Segmented [ ] Neon Display Tube [ ] Projection [ ]
* 1EE 10000 or 120000 Series (Specify)

SIGNAL AND SUPPLY VOLTAGES
Supply Voltages Available [ ] Indicate [ ] AC or DC [ ]
Bias Voltages Available [ ]
Signal Voltage [ ] Specify Polarity and Tolerance or Range
Signal Current [ ] Specify Tolerance or Range
ON or “1” OFF or “0”

Minimum Input Impedance [ ] OHMS.
List desired character sequence (0 through 9, etc.) for Readouts as part of your panel layout sketch.

DECODER OPTIONS
Signal Logic [ ]
MODE:
Decimal to Decimal [ ]
Binary to Decimal [ ]
Binary to Octal [ ]
Type of Input
10 Wire [ ]
8 Wire [ ]
4 Wire (Single Ended) [ ]
6 Wire [ ]
3 Wire (Single Ended) [ ]

Other input codes such as 1, 2, 4, 2; 1, 2, 2, 4; XS-3; Gray (cyclic); XS-3 Gray, etc., can be accommodated on special order. Describe

MECHANICAL SPECIFICATIONS
(Use these dimensions to plan your DATA PANEL layout)

TEC-LITE TSR Series
Segmented Readout

TEC-LITE TNR Series
Digital Readout

Projection Display with TEC-LITE TPD Series Projection Display Driver.
MECHANICAL MOUNTING SPECIFICATIONS

DATA PANEL may be mounted in a variety of ways. Three popular methods are illustrated below:

1. DATA PANEL with bezel, mounted in panel hole. Can be used in rack mounting.

2. DATA PANEL mounted behind panel hole. Can be used in rack mounting.

3. TYPICAL CONSOLE EXTRUSION SUPPLIED BY CUSTOMER. GLASS MOUNTED SEPARATELY IN CONSOLE FRAME. DATA PANEL (WITHOUT INTEGRAL GLASS) MOUNTS AGAINST GLASS. SUPPORT SUBSTRUCTURE.

Which do you prefer?  1☐, 2☐, 3☐. Other: (Send sketch) ☐.

Please contact your TEC-REP or TEC directly if you require application assistance.

Transistor Electronics Corporation
TWX 612-292-4165  Box 6191 Telephone (612) 941-1100
612-292-4165  Minneapolis, Minn. 55424  (612) 941-1100
LOCATED ON COUNTY ROAD 18 ½ MILE SO. OF U.S. HWY. 169
**TYPEFACE SPECIFICATIONS CHART**

Virtually any type face can be specified for legend areas in DATA- PANEL. The type faces shown here are of a block or sans-serif style which have proved very legible in computer display applications. Height and average character count per inch are provided for design information. Type sizes both larger and smaller than those shown can be provided.

<table>
<thead>
<tr>
<th>NEWS GOTHIC CONDENSED</th>
<th>NEWS GOTHIC BOLD CONDENSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 pt. DATA • PANEL</td>
<td>10 pt. DATA • PANEL</td>
</tr>
<tr>
<td>(.100 high. Average 12 capital letters per inch.)</td>
<td>(.100 high. Average 12 capital letters per inch.)</td>
</tr>
<tr>
<td>12 pt. DATA • PANEL</td>
<td>12 pt. DATA • PANEL</td>
</tr>
<tr>
<td>(.120 high. Average 10 capital letters per inch.)</td>
<td>(.120 high. Average 10 capital letters per inch.)</td>
</tr>
<tr>
<td>14 pt. DATA • PANEL</td>
<td>14 pt. DATA • PANEL</td>
</tr>
<tr>
<td>(.140 high. Average 8 capital letters per inch.)</td>
<td>(.140 high. Average 8 capital letters per inch.)</td>
</tr>
<tr>
<td>18 pt. DATA • PANEL</td>
<td>18 pt. DATA • PANEL</td>
</tr>
<tr>
<td>(.182 high. Average 6 capital letters per inch.)</td>
<td>(.182 high. Average 6 capital letters per inch.)</td>
</tr>
<tr>
<td>24 pt. DATA • PANEL</td>
<td>24 pt. DATA • PANEL</td>
</tr>
<tr>
<td>(.245 high. Average 5 capital letters per inch.)</td>
<td>(.245 high. Average 5 capital letters per inch.)</td>
</tr>
</tbody>
</table>

NEWS GOTHIC ITALIC and NEWS GOTHIC BOLD ITALIC are also available in the point sizes illustrated above.

TRADE GOTHIC EXTENDED is a typical type face used for identifying Registers, Addresses, etc., and is available in all point sizes.

Dozens of other type faces are suitable for DATA•PANEL legends. Your TEC-Rep has samples of these type faces, or write directly to:

**Transistor Electronics Corporation**

TWX
612-292-4165
Minneapolis, Minn. 55424
(612) 941-1100

Located on County Road 18  •  ½ MILE SO. OF U.S. HWY. 169
STANDARD ELECTRICAL SPECIFICATIONS

Indicator and Digital Readout supply and signal voltages listed in this sheet are typical and are generally compatible with those present in solid state system designs.

Variations in supply voltages, signal levels or signal swing can be easily accommodated, however, and should be requested if the standard electrical specifications listed do not meet your requirements.

INCANDESCENT LAMP SUPPLY VOLTAGES

Incandescent indicators - non-transistorized and transistor controlled - used in DATA•PANEL and TSR Series Transistorized Segmented Readouts require midget flange base lamps. Projection display readouts require either midget flange base or miniature bayonet base lamps depending upon model. Dual filament lamps or two-lamp installation can be provided for fail safe operation.

<table>
<thead>
<tr>
<th>Midget Flange Base (S.C. Midg. Flg.)</th>
<th>Miniature Bayonet Base (S.C. Min. Bay.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAMP TYPE</strong></td>
<td><strong>SUPPLY VOLTS</strong></td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>331</td>
<td>1.35</td>
</tr>
<tr>
<td>338</td>
<td>2.7</td>
</tr>
<tr>
<td>345</td>
<td>6.0</td>
</tr>
<tr>
<td>328*</td>
<td>6.0</td>
</tr>
<tr>
<td>380</td>
<td>6.3</td>
</tr>
<tr>
<td>350</td>
<td>6.3</td>
</tr>
<tr>
<td>349*</td>
<td>6.3</td>
</tr>
<tr>
<td>381</td>
<td>6.3</td>
</tr>
<tr>
<td>344</td>
<td>10.0</td>
</tr>
<tr>
<td>367</td>
<td>10.0</td>
</tr>
<tr>
<td>330*</td>
<td>14.0</td>
</tr>
<tr>
<td>382</td>
<td>14.0</td>
</tr>
<tr>
<td>370</td>
<td>18.0</td>
</tr>
<tr>
<td>327*</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Supply Polarity: Non-Transistorized may be AC or DC; Transistor Controlled must be DC, + or -.

TYPICAL SIGNAL VolTAGES FOR TRANSISTOR CONTROLLED INCANDESCENT LAMPS USED IN INDICATORS AND DIGITAL READOUTS

<table>
<thead>
<tr>
<th>For Positive Supply</th>
<th>For Negative Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ON: +4 to +15 volts</td>
<td>2) ON: +4 to -15 volts</td>
</tr>
<tr>
<td>OFF: +.5 to -10 volts</td>
<td>OFF: -.5 to +10 volts</td>
</tr>
<tr>
<td>3) ON: -.5 to +10 volts</td>
<td>4) ON: +.5 to -10 volts</td>
</tr>
<tr>
<td>OFF: -4 to -10 volts</td>
<td>OFF: +4 to +10 volts</td>
</tr>
</tbody>
</table>

Nominal Input Impedance is 1000 ohms or more

FOR CODED INPUT (B.C.D.)

Use any ON-OFF signal pair above for logic "1" and logic "0" with + or - supply.

Example: Signal pair 2, above, used with + supply results in:

-4 to -15 volts = logic "1"
-.5 to +10 volts = logic "0"

or

-4 to -15 volts = logic "0"
-.5 to +10 volts = logic "1"

NEON LAMP SUPPLY VOLTAGES (Non-Transistorized)

Neon lamp indicators used in DATA•PANEL require replaceable midget flange base neon lamps (NE-2 type). Note: Use of neon lamps in DATA•PANEL should be restricted to those applications where the neon color is specifically desired. If used, restrict color selections to amber, red and orange. Other colors should be avoided due to the neon's low candlepower and inherent color output.

65VAC, or greater supply voltage.

85VDC, or greater supply voltage.
TYPICAL TRANSISTOR CONTROLLED NEON LAMP SUPPLY VOLTAGES

-100 ± 10 volts, +100 ± 10 volts
for neon lamp indicator circuits.

+170 to +190 volts for TNR Series Readouts with neon digital display tube.*

*NOTE: To avoid separate power supplies when TNR Series Readouts are used in DATA PANEL, +170 to +190 VDC may be used to supply non-transistorized or transistor controlled lamps.

TYPICAL SIGNAL VOLTAGES FOR TRANSISTOR CONTROLLED NEON LAMPS AND NEON DIGITAL DISPLAY TUBES

ON: +4 to +10 volts
OFF: +.5 to -3 volts
ON: +.5 to -3 volts
OFF: +4 to +10 volts

Nominal input impedance is 1000 ohms or more.

Any of these signal pairs may be used as Binary "1" and "0".

STANDARD ELECTRICAL SPECIFICATIONS

TYPICAL SIGNAL VOLTAGES FOR TRANSISTOR CONTROLLED NEON LAMPS AND NEON DIGITAL DISPLAY TUBES

ON: -4 to -6 volts
OFF: -.5 to +6 volts
ON: -.5 to +6 volts
OFF: -.5 to +6 volts

For specific technical details on any of these digital readout devices see your TEC-LITE Indicator Devices catalog, contact your TEC-Rep, or write directly to:

Transistor Electronics Corporation

TEC-LITE TNR Series Digital Readout

This compact unit provides decimal readout from decimal or binary coded decimal input signals of low level. Elements of the rectangular neon display tube are controlled by internal transistorized circuitry. All decoder functions are offered.

DIGITAL READOUT DEVICES FOR

Three basic types of readout devices can be used behind the glass face of DATA PANEL in conjunction with information display. Permanently visible borders or grid lines can be provided around readout areas as shown in the illustration on page 3 of the DATA PANEL brochure.

Projection Readouts with TEC-LITE TPD Series Transistorized Projection Drivers

Incandescent lamps of 10000 and 120000 Series projection readouts are controlled from low level logic lines by TPD Series transistorized driver-decoder modules mounted on the rear of the readout. Complete decoder functions are available.

TEC-LITE TSR Series Transistorized Segmented Readout

Incandescent lamps, transistor controlled from low level signals, are used in this completely self-contained display. Full input signal decoder functions are available.

For specific technical details on any of these digital readout devices see your TEC-LITE Indicator Devices catalog, contact your TEC-Rep, or write directly to: