

## Modems

### **MOT202T**

"Born-Again"  
UDS/Motorola 202T



- ▲ 2-wire half duplex or 4-wire full duplex private line operation
- ▲ 0 to 1200 bps data rate over unconditional lines and 1800 over high quality lines
- ▲ Anti-streaming
- ▲ Phase coherent, frequency shift keyed (FSK) modulation
- ▲ LED indicators
- ▲ Front panel rotary switch function selector
- ▲ Integral test features
- ▲ 12, 24, 48, 125VDC Power (Rack)
- ▲ 115VAC, 60Hz - 220/240VAC 50 Hz power (Standalone)

Introducing the latest addition to the Telenetics® family of industrial grade, temperature hardened modems, the MOT202T is a pin-for-pin, form, fit and function replacement for the Motorola/UDS Model RM16M202T.

A must for industrial applications, the MOT202T (Standalone) features built-in diagnostic, anti-streaming, multi-power inputs (115 to 240AC, 12 to 125VDC) and -40°C to +80°C operating range capabilities.

The modem operates over leased or dedicated, loaded or unloaded lines equal to or better than the ITU (formerly CCITT) M.1020/1025 or the BELL 3002 leased line services. It operates over point-to-point or multi-point polled systems and operates in full or half-duplex over 4-wire or 2-wire circuits.

The modem employs circuitry to prevent data and carrier detect errors over noisy lines. In multi-drop systems it is very common to have noise spikes and other harmful high frequency components caused by carrier turn-offs from other modems on the same line. The modem uses a combination of soft-carrier generation and soft-carrier detection in conjunction with a signal to noise ratio (SNR) detector to eliminate errors caused by line noise.

The MOT202T's anti-streaming capability prevents a modem from remaining in the transmit mode when the modem is not actively transmitting data. In addition, the MOT202T allows users to verify transmitted and received data via the diagnostic feature.

The MOT202T interchangeable design between the Universal Data Shelf multiple modem enclosure (RM16M series) and the standalone modem enclosure, enables the modem to be directly inserted in the Universal Data Shelf when the optional front panel is attached. Thus, data-communications facility can easily upgrade from front multiple standalone enclosures to a centralized rack without the expense and trouble of purchasing new modems.

## Specifications\*

### FUNCTIONAL DESCRIPTION

#### General

|                                  |   |
|----------------------------------|---|
| Data Rate                        | From 0 to 1800 bps (baud) depending on transmission facility  |
| Modulation                       | Phase-coherent Frequency shift keying (FSK).  |
| Line Impedance                   | 600 ohms $\pm$ 10 %, transformer coupled and transient protected  |
| Operation                        | The modem operates at full duplex or half duplex over four-wire lines, or half-duplex only over two-wire lines. It operates asynchronously.   |
| Receive and Transmit Frequencies | Space: 2200 Hz<br>Mark: 1200 Hz<br>Soft carrier: 900 Hz   |
| Timings                          | All settings and timings are controlled by jumpers on the modem board.  |
| Anti-streaming                   | Option to turn transmitter OFF after a selected time, even if Request To Send is ON   |
| Test Features                    | The modem employs a rotary switch that selects these test options: <ul style="list-style-type: none"> <li>· Data Mode</li> <li>· Self Test</li> <li>· Analog Loop back</li> <li>· Digital Loop back</li> <li>· Test Pattern Transmit</li> </ul> |
| Indicators                       | The modem has LED indicators for the following interface circuits:<br>RTS, CTS, DCD, RD, TD, TM (Test Mode) and PWR.  |

#### Receiver

|                                     |  |
|-------------------------------------|--|
| Receiver Center Frequency Tolerance | 1700Hz $\pm$ 16 Hz   |
| Receiver Performance                | The modem receiver will operate with the following performance at 3002/C2 or M1025 lines |
| 1200Bps:                            | B.E.R. equal to $1 \times 10^{-5}$ with 12 db signal to noise ratio                      |
| 1800Bps:                            | B.E.R. equal to $1 \times 10^{-5}$ with 18 db signal to noise ratio                      |
| Carrier Detect Threshold            | The received carrier detect threshold can be configured by the on-board jumper.          |

#### With jumper option:

DCD off  $\rightarrow$  on Carrier stronger than -30 dBm

OR

DCD off  $\rightarrow$  on Carrier stronger than -45 dBm

Hysteresis: Approximately 2 dB

Receiver Dynamic Range 0 dBm to - 43 dBm

#### Transmitter

|                               |   |
|-------------------------------|---|
| Transmit Frequency Tolerances | Space frequency: $\pm$ 0.1 %<br>Mark frequency: $\pm$ 0.1 %<br>Soft Carrier frequency: $\pm$ 0.1 %            |
| Transmit Levels               | The modem transmit level is selectable from 0 dBm to - 14 dBm in 2 dB steps by the on-board jumper S2-1 to 8. |

### POWER REQUIREMENTS

#### Rack & Standalone

|          |   |
|----------|---|
| AC Power | 20 VAC RMS @ 150 mA, centertapped.<br>10 VAC RMS @ 225 mA.<br>115VAC & 220/240VAC |
| DC Power | +15 VDC referred to gnd<br>-15 VDC referred to gnd.<br>+8.5 VDC referred to gnd.  |

### ENVIRONMENTAL SPECIFICATIONS

|                       |                       |
|-----------------------|-----------------------|
| Operating Temperature | -40 to + 85 degrees C |
| Storage Temperature   | -40 to + 85 degrees C |
| Relative Humidity     | 95%, non-condensing   |

### INTERFACE SPECIFICATIONS

Analog Line edge connector An 8-pin edge connector located at the backend of the modem board. The four signals routed to and from this connector are the analog transmit and receive pairs. Each pair are fully differential signals.

| Pin | Signal Name | Function                                   |
|-----|-------------|--|
| 3   | DTR         | Receive Line for four wire systems         |
| 4   | DTX         | Transmit/Receive Line for two wire systems |
| 5   | DRX         | Transmit/Receive Line for two wire systems |
| 6   | DRR         | Receive Line for four wire systems         |

#### The maximum data rate for this modem is:

- ▲ 0 to 1200 bps (baud) over ITU M.1025 or BELL 3002 Basic services.
- ▲ 0 to 1800 bps (baud) over ITU M.1020 or BELL 3002 C2 conditioned lines.

#### Interface Compatibility

- ▲ The modem's line interface is compatible with the Bell Systems/WE 202 specifications and with the ITU V.23 recommendation.
- ▲ The modem's data interface is compatible with the RS 232C specifications and with the ITU V.24/28 recommendations.

**Power edge connector**

A 12-pin edge connector located at the left side of the modem board. This connector supplies the modem board with power from the standalone case or the modem rack. Header H1 is located on top of P1.

| Pin | Voltage    | Function               | Header H1 Pin |
|-----|------------|------------------------|---------------|
| 10  | + 15 VDC   | Transformer 20 VAC     | 2             |
| 12  | - 15 VDC   | Transformer 20 VAC     | 1             |
| 8   | Center Tap | Transformer center tap | 3 & 4         |
| 4   | + 8.5 VDC  | Transformer 10 VAC     | 6             |
| 6   | + 8.5 VDC  | Transformer 10 VAC     | 5             |
| 2   | GND        | Chassis Ground         | n.c.          |

**Digital Data edge connector**

P2 is a 25-pin edge connector located at the backend of the modem board. The eleven signals routed to and from this connector are the RS 232 data interface signals.

| Pin | RS 232 circuit | V.24 circuit | Function             |
|-----|----------------|--------------|----------------------|
| 1   | AA             | 101          | Protective Ground    |
| 2   | BA             | 103          | Transmitted Data     |
| 3   | BB             | 104          | Received Data        |
| 4   | CA             | 105          | Request To Send      |
| 5   | CB             | 106          | Clear To Send        |
| 6   | CC             | 107          | Data Set Ready       |
| 7   | AB             | 102          | Signal Ground        |
| 8   | CF             | 109          | Data Carrier Detect  |
| 9   | ----           | ----         | + 12 Volt. Test only |
| 10  | ----           | ----         | - 12 Volt. Test only |
| 25  | ----           | ----         | Analog Loop back     |

**Modem Board Selective Jumper Options**

**Operational Settings**

| Data Carrier Detect Level |
|---------------------------|
| - 30 dBm                  |
| - 45 dBm                  |

| Transmit Level |
|----------------|
| 0 dBm          |
| - 2 dBm        |
| - 4 dBm        |
| - 6 dBm        |
| - 8 dBm        |
| - 10 dBm       |
| - 12 dBm       |
| - 14 dBm       |

| Line Connection |
|-----------------|
| 2- wire         |
| 4- wire         |

| Turnaround Squelch |
|--------------------|
| In                 |
| Out                |

| Transmit Carrier |
|------------------|
| RTS Control      |
| Constant Carrier |

| Local Copy Squelch |
|--------------------|
| No Local Copy      |
| Local Copy         |

| Test Generator Baud rate |
|--------------------------|
| 1                        |
| 18                       |
| 37                       |
| 75                       |
| 150                      |

| Chassis GND Option                            |
|---|
| Chassis GND and Signal GND not connected      |
| Chassis GND and Signal GND connected together |

**Modem Timing**

| RTS/CTS Delay |
|---------------|
| 8 ms          |
| 33 ms         |
| 59 ms         |
| 219 ms        |

| Data Carrier Detect Delay |
|---------------------------|
| 6 ms                      |
| 23 ms                     |

| Turnaround Squelch Time |
|-------------------------|
| 83 ms                   |
| 159.6 ms                |

| Soft Carrier Timing |
|---------------------|
| No Soft Carrier     |
| 8.3 ms              |
| 26.6 ms             |

| Anti-Streaming Time |
|---------------------|
| 4 ms                |
| 7.6 ms              |
| 14 ms               |
| 28 ms               |
| 56 ms               |
| Out                 |

\*Specifications are subject to change without notice

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