EXHIBIT 8

OWNER'S MANUAL

User's Manual

Instruction to the User

WARNING: This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC Rules.

Version 98.3.18

Wireless Communications Modules...

MICRILOR has developed versatile, high performance RF modules and subsystems which can be used for stand-alone data communications with your product.

The simplex and half-duplex link capabilities feature low-power operation in a compact configuration. This allows for rapid integration into your products.

Units can also be customized to meet many extended requirements, and provide you with a competitive advantage. Your advantages are reduced development and interface costs, which brings your product to market ahead of the competition.

MICRILOR

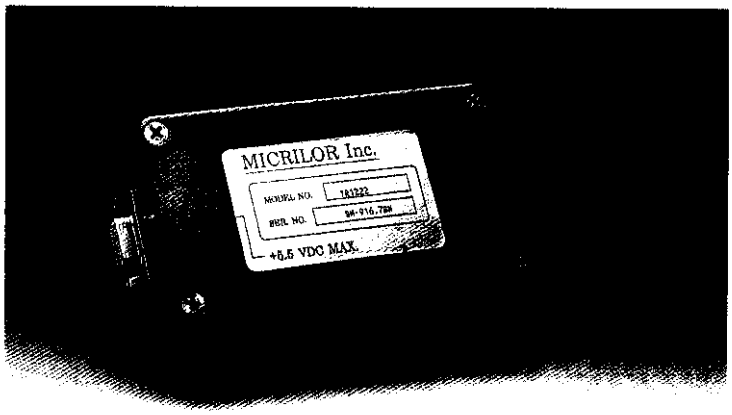
Connecting companies through RF and Signal Processing Circuits and Subsystems.

WIRELESS COMMUNICATIONS MODULES

MICRILOR's Wireless Modules are designed to provide companies with a fast, economical means of incorporating wireless connectivity into their products. These versatile, low power RF modules can be used as add-on subassemblies in products, or as stand-alone units for wireless data-communications. Aside from the competitive selling price of these modules, customers benefit by reducing interface development costs and by getting their product to market ahead of competitors.

Transmitter/Receiver Modules

Four Standard Configurations are available which can be used in a wide variety of applications; 1) An externally mountable RS232-compatible half-duplex transceiver with an attached antenna and standard 9-pin, D-sub connector; 2) an internally mountable half-duplex transceiver; and; 3&4) internally mountable simplex transmitter and receiver. The internal modules provide a coaxial cable for connection to an antenna and a 16-pin header for simple digital interfacing. Applications ranging from simple one-way telemetry links to sophisticated multi-user communications networks can be accommodated.



TR1222 Transceiver

These modules can be customized to meet many requirements; additional frequency channels can be provided, operating range can be traded off against data rate, and many special interface and packaging requirements can be provided.

General Features

- Designed for FCC Part 15 Operation (902-928 MHz Band; No User License)
- Data Rates of 64-kbaud (and higher)
- Over 200 ft. Operating Range
- High Performance Double-Heterodyne Design
- Low Cost at High Performance
- Low Supply Power (35mA @ 3V)
- High Sensitivity Receivers (<-101 dBm)
- Simple Interface with DC-Coupled Data Port

GENERAL SPECIFICATIONS

Carrier Frequency	902-928 MHz Band
Modulation Type	Frequency Shift Keying (FSK)
Data Rate	0 to 64 kbaud & higher
Data Format	Asynchronous Binary
Range - Indoors	To 200 ft
Range - Line of Sight	To 2000 ft
Transmit Power	≈ 1mW ERP (FCC Part 15)
Receive Bandwidth	≈ 250 kHz
Receive Selectivity	> 80 dB/ 400kHz from carrier
Transmit/Receive Delay	<500 μSec.
Link Figure of Merit	>101 dB (at 10^{-6} P_E)
Operating Temperature	-20°C to +60°C
Power Supply Requirements	35 mA (3V)

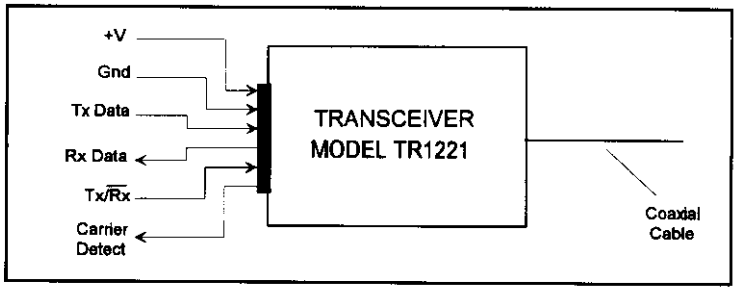
T1221 (Transmitter), R1221 (Receiver), TR1221 (Transceiver):

Package Size	1.5" x 3.6" x 2.25" (TR1221)
	1" x 3.6" x 2.25" (T1221,R1221)
Interface	CMOS Binary, DC Coupled
	Serial Asynchronous, Any format
Antenna Cable	2-ft long, RG174 Coaxial Pigtail
Digital/Power	16-pin Header

TR1222 (External Transceiver):

Package Size	2.56" x 4.53" x 1.57"
Antenna	Monopole (Attached)
Digital Driver	RS-232, Serial Asynchronous
Digital Connector	9-Pin, D-Sub Connector

Example Configuration:



APPLICATIONS

- Wireless Sensors & Telemetry
- Remote Monitoring & Remote Displays
- Wireless Industrial Process Control
- Wireless Computer Networks
- Commercial Computer Games
- Instrumentation & Data Collection

APPLICATION NOTES

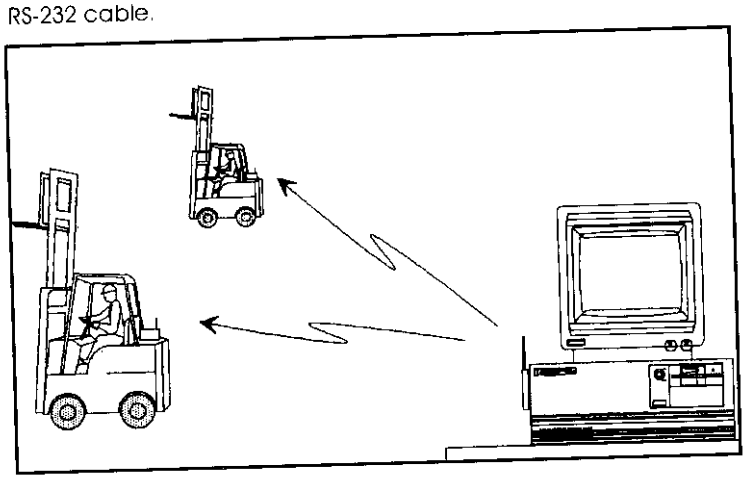
Interfacing

TR1221, R1221, T1221: A 16-pin header is provided for data input and/or output and control. The user supplies data for transmission to the transmit data pin. The received data pin provides data to the user that has been received from another unit; when no signal is received, the CMOS output remains high. The digital input-output drive levels should equal the power supply levels for best performance, *but should never exceed standard CMOS levels, i.e. 0 to +5V.*

A carrier detect pin is provided; this indicates whether a received signal is present (based on received-signal-strength). If a signal is present, the carrier detect will provide a logic-high and enable the data out line. Note that a strong interference will assert the carrier detect also. This signal is similar to a squelch and is intended to protect the user from noise when the transmitter is shut off. It is not adjustable in these models and is set to trip at a level just higher than the receiver threshold.

Pin 11 on the header is used to select either transmit or receive operation in model TR1221, where a logic-high causes the unit to transmit. On models R1221 and T1221, Pin 11 is used as a standby pin; a logic-high will place the T1221 in transmit mode and will place the R1221 in standby (lower power) mode. A logic low on pin 11 will put the T1221 in standby mode and will allow the R1221 to receive data. VCC and ground connections can be made to any of the pins listed for this purpose on page 4. Note that in standby, the power drain of the R1221 and T1221 drops to a few milliamps at 3 Volts. The user must switch out the supply to drop the power further. The T1221 standby mode allows multiple transmitters to be coordinated on the same frequency channel.

TR1222: A 9-pin D-subminiature connector (the type used for RS-232 connections) is provided. The pin-out for this connector is shown on page 4. This unit is designed to provide and accept RS-232 signal levels and can be directly connected to an RS-232 port. Transmit- and received-data pins are directly compatible with RS-232 operation, as is the carrier-detect pin. Transmit/receive switching is done at the T/R pin with the RS-232 request-to-send (RTS), pin 7. A logic 1" on RS-232, while being equal to +V on the CMOS side, is -V on the RS-232 cable.



General Interfacing Rules

When setting up the signals for interfacing to the radio, care should be taken to ensure that the RTS signal is at a logic-high over the whole transmit data-stream, and returns to a logic-low afterwards. MICRILOR can supply an example software routine written in C for interfacing our transceivers to an IBM-compatible PC. Any binary waveform that does not violate the baud rate specification is acceptable. The data line is DC coupled.

Two power supply options are provided for the TR1222; direct powering through two of the pins on the 9-pin D connector, or external powering through an optional wall-plug-in supply. Supply voltage can range from 2.7-5.2 volts. The absolute maximum voltage allowed is +5.5V. The VCC pin (pin 9) on the 9-pin D-connector is typically used as the ring-indicator pin in RS-232 connections and is an input signal to a computer's RS-232 port; in order to supply power to the radio through this pin, either the cable must be modified to bring in power, or the user's equipment must supply a power source through this pin. *The power should not be supplied by the user's RS-232 driver directly as this could damage the driver.* When the user powers the unit externally, VCC and ground are available on pins 5 and 9 of the 9-pin D-connector; these pins may be used to power a user's equipment directly if power requirements are within the limits of the external supply. If the radio is powered externally, the presence of VCC and ground at the 9-pin D-connector will not damage the user's RS-232 driver because the ring indicator pin is an input at the user's equipment.

Module Mounting Considerations

Two 0.144"-diameter through-mounting-holes are provided on the internal units for direct mounting. On the T1221, R1221, and TR1221 models, a 2-foot coaxial antenna cable lead is provided for connection to an external antenna.

On the TR1222, two mounting screws can be inserted through 0.3 " diameter holes on the front panel and screwed to a wall through 0.17" holes in the back panel. The holes do not protrude the inner seal of the case, which protects the circuitry from the external environment. The antenna is attached internally to the pc board and protrudes from the top of the splash proof case.

Timing Constraints

The maximum time delay from power off status to transmit or receive status is 0.5 milliseconds. When switching between receive and transmit modes, or visa versa, a nominal 200 µsec. delay should be designed into the timing plan. Operation at low temperatures, may extend transmit/receive transition delays beyond the nominal 200 µsec.

Packaging Restrictions

Removal of the RF circuit board assembly from its protective plastic housing will invalidate all warranties. The values of critical tuning inductors and capacitors can be easily modified by mechanical contact or by bringing these RF parts into close proximity with any metal objects or ferrite materials.

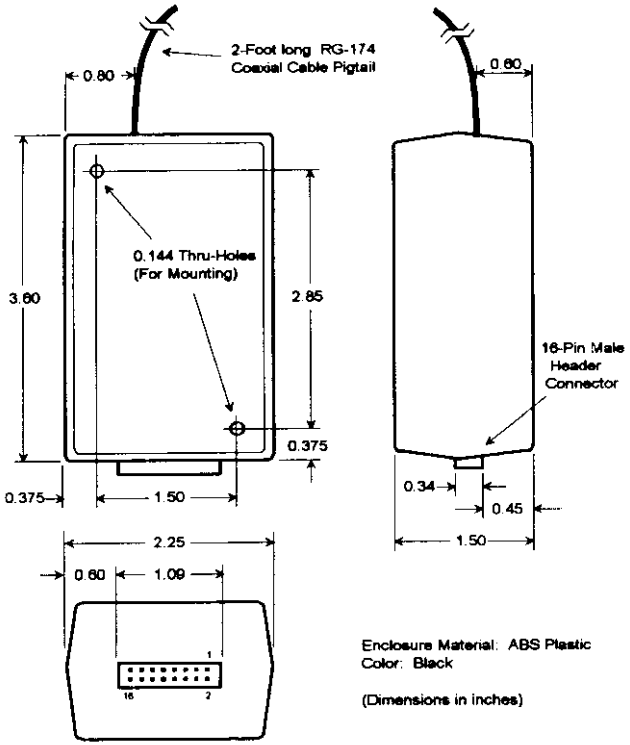
Wireless Data Communications

These RF modules provide one direction at a time wireless data communications capabilities. There is no microprocessor or UART in the RF modules. The incoming data is not sampled and there is no output clock. To provide some radio modem functions, the user may need to provide external protocol and control capabilities.

Any binary waveform that does not violate the specified baud rate (bandwidth) is acceptable. It can be, for example an N,8,1 RS232 waveform, a PWM motor control, or a simple timing pulse. The modem directly modulates the data and is DC coupled so that there are no input waveform constraints other than maximum baud rates and specified voltage operating ranges. It is good practice when sending data to use packets that include a source and destination address, and some type of checksum (CRC being the best).

MECHANICAL DRAWINGS AND PINOUT INFORMATION

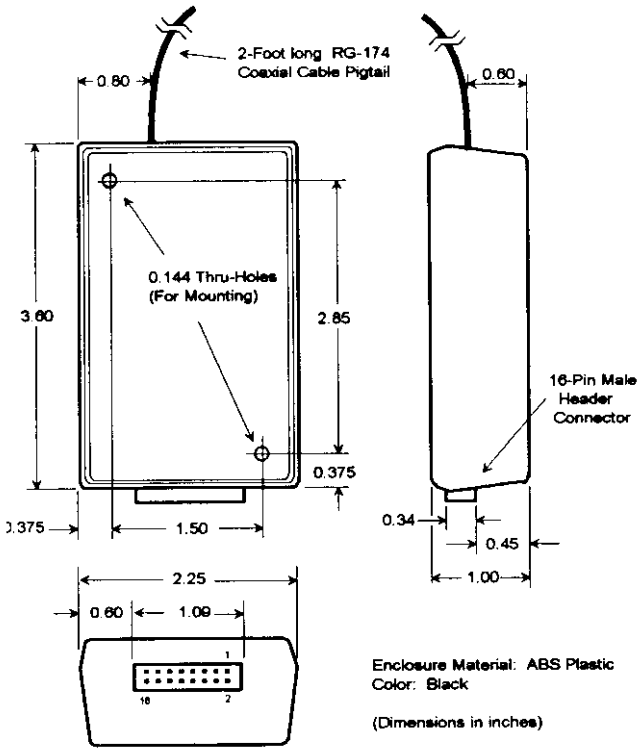
TR1221



Enclosure Material: ABS Plastic
Color: Black

(Dimensions in inches)

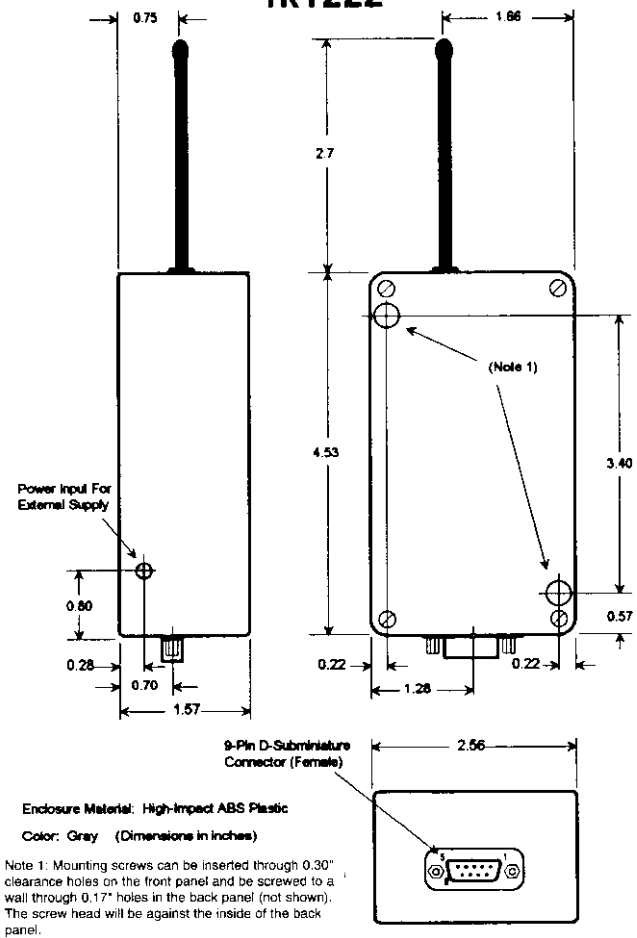
T1221, R1221



Enclosure Material: ABS Plastic
Color: Black

(Dimensions in inches)

TR1222



Enclosure Material: High-Impact ABS Plastic

Color: Gray (Dimensions in inches)

Note 1: Mounting screws can be inserted through 0.30" clearance holes on the front panel and be screwed to a wall through 0.17" holes in the back panel (not shown). The screw head will be against the inside of the back panel.

TR1221

1 Received Data
3 Carrier Detect
11 T/R
15 Transmit Data
5,7 VCC
2,4,6,8,10,12,14,16 Ground
9,13 N/C

R1221

1 Received Data
3 Carrier Detect
11 Standby/RX
5,7 VCC
2,4,6,8,10,12,14,16 Ground
9,13,15 N/C

T1221

11 TX/Standby
15 Transmit Data
5,7 VCC
2,4,6,8,10,12,14,16 Ground
1,3,9,13 N/C

TR1222

1 Carrier Detect	6 N/C
2 Received Data	7 T/R
3 Transmit Data	8 N/C
4 N/C	9 VCC
5 Ground	

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Specifications subject to change without notice.