



**4 Analog plus
8 status or PDM**



QDTS90 Digital Telemetry System

QEI/Quindar's over 30 years experience in providing the finest remote monitoring and control products to government and industry has given us the insight and knowledge to develop programmable digital telemetry. Understanding our customers' needs for reliability, accuracy, affordability, and simplicity; we continue our tradition of technological innovation and introduce the QDTS90 Digital Telemetry System.

The QDTS90 System is a versatile, state of the art, powerful microprocessor based, Digital and Analog multiplexing system that can be utilized for a wide range of industrial applications. Analog, Pulse Duration Measurements (PDMs) and Status signals are multiplexed over the QDTS90 System's synthesized narrow-band Programmable FSK tone channel. Both center frequency and shift are user selectable to provide the optimum in flexibility and convenience. Units can be "field-set" for either Standard or Hi-Speed operation. Up to 18 Standard or 10 Hi-Speed systems can operate over a single communication line. In addition, the new QDTS90 offers backward compatibility with its predecessor, the QDTS20. This means a spare QDTS90 system will serve as a universal replacement for any other QDTS90 or QDTS20 in your system and freedom from carrying spare frequency networks in your inventory. Simplified set-up, convenience, accuracy, reliability, and multiple I/O configurations are standard features which make the QDTS90 the best value in telemetry.

FEATURES

- FSK TONE: Frequency and Bandwidth User Programmable
- TWO SPEEDS: 40 or 80 Baud, User Selectable
- DATA CONVERSION: Analog-PDM, PDM Analog
- TEST PATTERN GENERATOR: Easy system set-up and check.
- LED DISPLAY, QDTR90: Complete Operational Diagnostics.
- MEMORY, QDTT90: A 20 Millisecond change is recognized per transmission
- NOISE IMMUNITY, QDTR90: Multiple sampling each data bit
- MESSAGE SECURITY: BCH Code
- IC SOCKETS: All micro-circuits plug-in
- CALIBRATION: Simple receiver adjustment, accurate to 0.5%
- 4-20 mA SOURCE CURRENT, QDTR90: Available option
- TEST JACKS: 3, Front panel convenience

QDTS90 Digital Telemetry System

QEI's QDTS90 Digital Telemetry System consists basically of two plug-in modules, a QDTT90 Transmitter and a QDTR90 Receiver. Each QDTS90 System has the capability of transmitting 8 digital (ON/OFF) signals and 4 analog signals over a single FSK tone channel which is programmable in each module. Up to 18 transmitters and 18 receivers can be used on one communication line. With this configuration, a total of 144 digital and 72 analog signals can be simultaneously monitored. Standard unit frequencies for leased telephone lines range from 1075 Hz to 3000 Hz with 100 Hz spacing, shift ± 25 Hz at 40 Baud. High speed unit (80 Baud) frequencies range from 935 Hz to 2465 Hz with 170 Hz spacing, shift ± 42.5 Hz. Data transmission is three-state (RTZ). Optimum data security is achieved by the use of BCH error detection coding and sync intervals. System update periods are typically four to six seconds. The actual speed or update time is a function of the analogs and how many PDMs are involved. High speed operation requires greater frequency spacing. Therefore, instead of the 18 channels available at 40 baud, only 10 channels are used per communications line.

Transmission can be made over dedicated phone lines, radio, microwave links or satellite communications for country-wide or world-wide monitoring and control applications.

QDTT90 Transmitter

The QDTT90 Transmitter allows monitoring of 4 analog voltages or currents and 8 digital (ON/OFF) signals. The Transmitter accepts full scale analog inputs of 2.5 Volts dc, 1 milliampere or 20 milliamperes.

The 8 digital signals can represent status points and/or 15 second PDM values. Through program jacks, the 8 digital signals may be 8 status points, 8 PDM values or 4 status and 4 PDMs. The digital inputs to the QDTT90 Transmitter are fully protected by opto-isolators and may be keyed by various optionally selectable voltage sources from 12 to 125 Volts dc or 115 Volts ac.

The QDTT90 Transmitter is equipped with program jacks which simplify customizing a transmitter for various modes of operation. No soldering or adding of jumper wires is required. In addition, a single front panel LED provides an operator with information as to the value for each analog input as well as power and unit failure.

QDTR90 Receiver

The QDTR90 Receiver is designed to accept a serial message from the QDTT90 Transmitter and convert it into the corresponding digital and analog outputs. The Receiver's digital outputs are open collector, and each will operate with loads up to 200 mA at 60 Volts dc, allowing for a direct annunciator or relay interface. The analog outputs are capable of providing a full scale 20 mA output utilizing current sinking or (optional) sourcing techniques. An external power supply rated up to 26 VDC may be used to drive higher impedance loads.

The QDTR90 Receiver contains a front panel LED which permits an operator to determine if a valid message was received, whether or not there is a carrier failure, unit failure, or power failure. This single LED represents a very important operator diagnostic tool.

System Specifications

SECURITY:	3 State RTZ, BCH error detection code, Sync Interval
SPEED:	40 Baud, Standard; 80 Baud, Hi Speed
TEMPERATURE:	-30°C to +70°C
HUMIDITY:	95%, non-condensing
ACCURACY:	0.5%

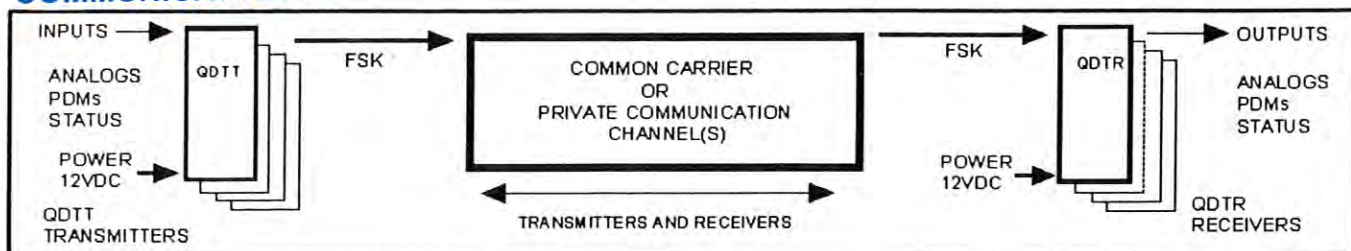
QDTT90 Transmitter

OUTPUT LEVEL:	0 dBm max. at 1 kHz output
OUTPUT IMPEDANCE:	Greater than 10K ohms
FREQUENCY:	120 - 5235 Hz Switchable in 5 Hz steps
ANALOG INPUTS:	4
RANGE:	0-1 mA, 4-20 mA, 2.5 VDC
ISOLATION:	CMRR = 100dB
DIGITAL INPUTS:	8; Opto-Isolated 12V, 24V, 48V 125 VDC, or 115 AC keying
POWER:	12V DC, ± 1 0% at 225 mA

QDTR20 Receiver

INPUT SENSITIVITY:	To -45 dBm
OUTPUT IMPEDANCE:	Greater Than 10K ohms
FREQUENCY:	120 - 5235 Hz Switchable in 5 Hz steps
ANALOG OUTPUTS:	4
RANGE:	0-1 mA, 4-20 mA Sinking 4-20 mA Sourcing (Optional)
DIGITAL OUTPUTS:	9; 1 Data Fail, 8 Digital each rated at 200 mA at 60 VDC
POWER:	12V DC, ± 1 0% 275 mA

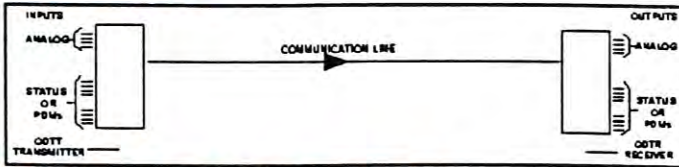
COMMUNICATIONS



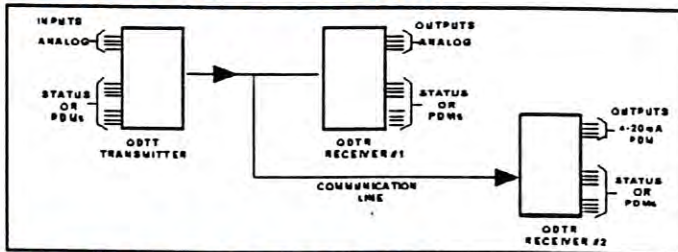
System Applications

The QDTS90 System can be configured in a variety of combinations. The one-on-one system is where a single QDTT90 Transmitter transmits to a single QDTR90 Receiver. A Multiple Output System utilizes two or more Receivers operating with one Transmitter. This versatility enables unlimited combinations. As shown on the Application Drawings, three options are available for the QDTT90 Transmitter. Option D1 is analog and status points, Option D2 is analog and PDMs and Option D3 is analog, status and PDMs. The QDTR90 Receiver has six options available. Options D1, D2 and D3 exactly match the QDTT90 Transmitter options D1, D2 and D3. However, Options D4, D5 and D6 permit conversions. For instance, Option D4 can provide PDM information in current form from the Receiver's analog output as well as status and PDM outputs. Option D5 provides PDM information in current form from the Receiver's analog output and separate PDMs. Option D6 provides straight analog and status outputs with analogs converted to PDMs.

ONE-ON-ONE



MULTIPLE OUTPUT SYSTEM

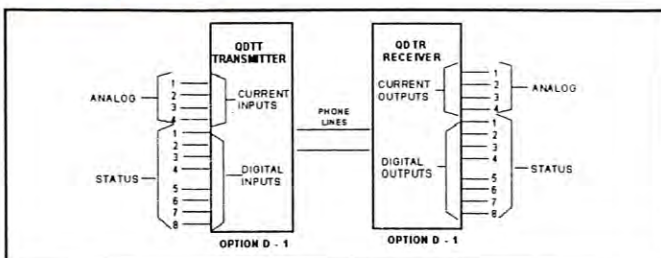


APPLICATION DRAWINGS

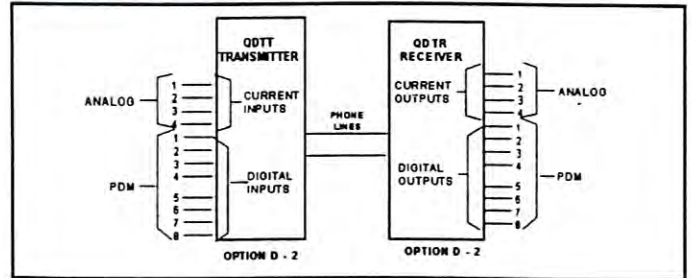
The QDTS90 can be configured in a variety of combinations. The application drawings illustrated the most common configurations. Other combinations can be configured based upon the characteristics shown. Review the application drawing for you particular requirements.

NOTE: Numbers shown are for typical applications and not for actual terminal strip wiring.

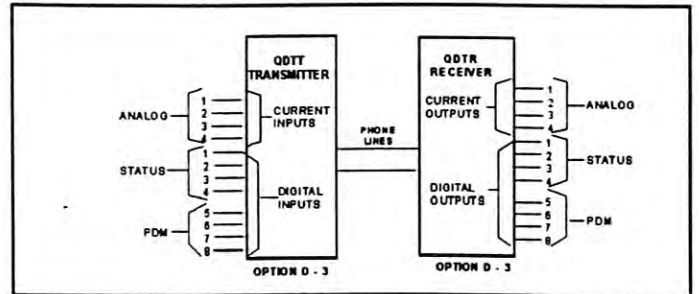
4 Analog, 8 Status



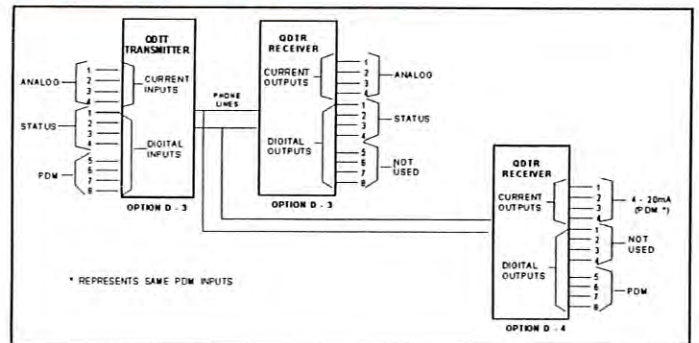
4 Analog, 8 PDM



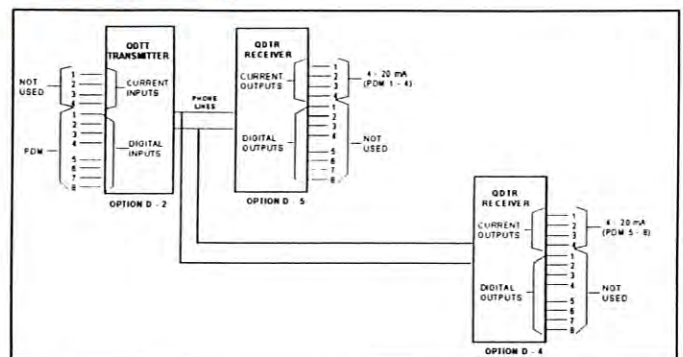
4 Analog, 4 Status, 4 PDM



4 PDM to Analog, 4 PDM, 4 Status

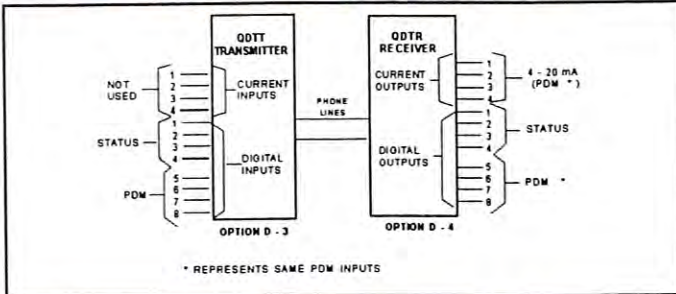


8 PDM to 8 Analog

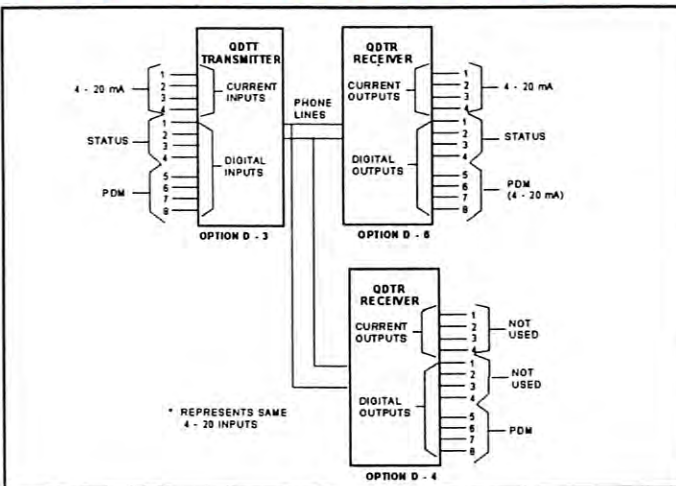


Application Drawings (cont.)

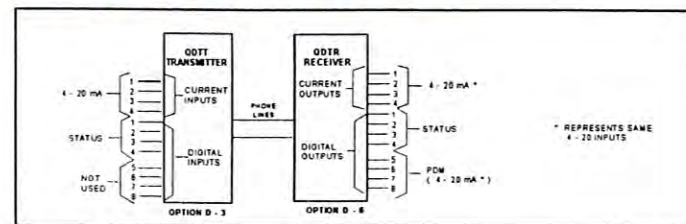
4 Analog, 4 PDM to Analog, 4 PDM, 4 Status



4 Analog to PDM, 4 Analog, 4 Status, 4 PDM



4 Analog to PDM, 4 Analog, 4 Status



NOTES:

1. Input and output configurations are illustrated in the application drawings.
2. The digital outputs (5-8) are in PDM form converted from 4-20 mA current inputs

ORDERING INFORMATION

QDTR90 TRANSMITTER QDTR90-A/B/C/D

A- Parts List Identification _____
 B- Digital Input Keying Voltage _____
 C- Analog Input _____
 D- Input Configuration _____

A. Parts List Identification

1.

B. Digital Input Keying Voltage

- | | |
|-----------|------------|
| 1. 12 Vdc | 4. 125 Vdc |
| 2. 24 Vdc | 5. 115 Vac |
| 3. 48 Vdc | |

C. Analog Input

1. 20 mA Full Scale
2. 1 mA Full Scale
3. 2.5 Vdc Full Scale

D. Input Configuration (Note 1)

1. 4 Analogs, 8 Status
2. 4 Analogs, 8 PDM's
3. 4 Analogs, 4 PDM's (5-8), 4 Status (1-4)

QDTR90 RECEIVER QDTR90-A/B/C/D

A. Parts List Identification _____
 B. Output Current Range _____
 C. Digital Outputs _____
 D. Output Configuration _____

A. Parts List Identification

1.

B. Output Current Range & Speed

1. 20 mA Current Sinking
2. 1 mA Current Sinking
3. 20 mA Current Sourcing

C. Digital Outputs

1. Maintained on Scan Fail
2. Reset on Scan Fail

D. Output Configuration (Note 1)

1. 4 Analogs, 8 Status
2. 4 Analogs, 8 PDMs
3. 4 Analogs, 4 Status (1-4), 4 PDMs (5-8)
4. 4 Analogs from PDMs, 4 Status (1-4), 4 PDMs (5-8)
5. 4 Analogs from PDMs, 4 PDMs (1-4)
6. 4 Analogs, 4 PDMs from Analogs (5-8), 4 Status (1-4) (See Note 2)
7. 4 Analogs, 8 Status, (Analog Reset to 4 mA on Scan Fail)

When selecting frequencies for use over telephone lines, consult local phone company for conditioning requirements for frequencies over 2500 Hz.



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