

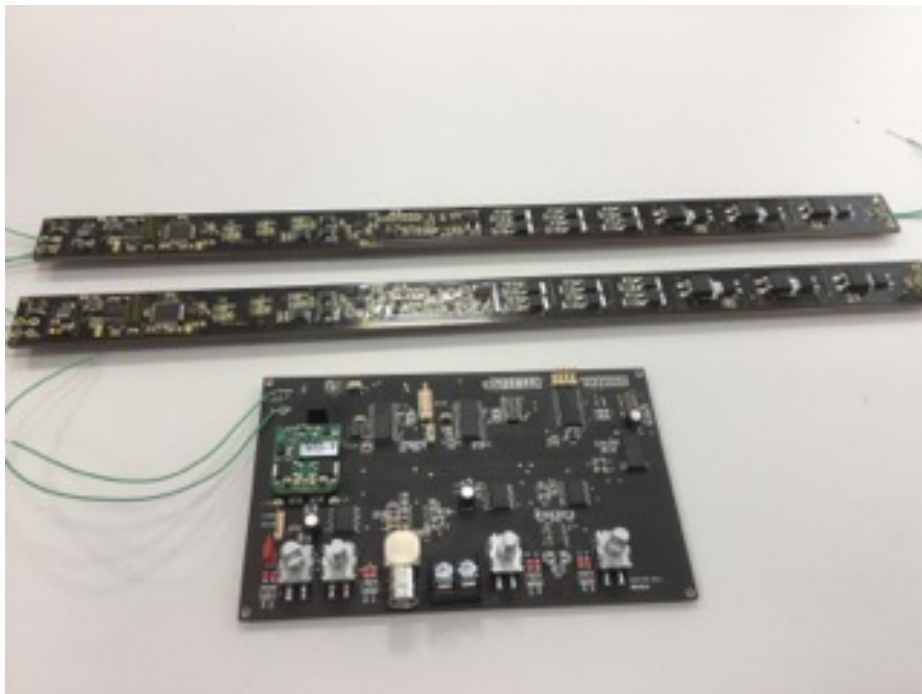
EM Link TYPHOON7

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EM Downhole Link TYPHOON7 consists of a downhole PCB and surface PCB designed to easily fit into the existing MWD system to provide the EM capabilities. The heart of the downhole transmitter is a DSP chip which handles the signal generation and any communication protocol. The signal generated can be made to any shape and form to fit customer's requirement, although usually it is a sinusoid. The transmission can be an FM, PM, AM, or any combination of these.

The receiver/filter/amplifier is a single board, which can be mounted inside existing MWD surface equipment. The receiver provides digitized filtered signal. The two boards are fully programable.

Downhole Transmitter

PCB dimensions: 1" x 16"

Transmitter frequency: 1-25 Hz, adjustable Transmission Power: 1-150 W, adjustable Output Signal Amplitude: 3-10Vrms

Max Environmental Temperature: 150 DegC

Vibration: 15g RMS (15-1000 Hz)

Shock: 1000g, 1ms, 1/2 Sine

Practical Data Rate: 1 to 10 bps, up to 40bps (system capability)

Transmission Modulation: PM, FM, AM (optional)

Adjustable Parameters

Data Rate

Transmission Protocol

Frequency

Current Limit and Power Output

Data Sequences

Waveform

Modulation

The transmitter operates in 2 modes:

1. Low Power Mode: up to 40W
2. High Power Mode: up to 150W

Surface Amplifier

Analog high end programable filters

Data output in analog or through 12 bit ADC stream

Programmable communication protocol

System Options

Real-Time decoding of the data: computer software and/or on-board DSP

Downlink: high power, 10-25 Hz modulated signal

Data Rates for different EM transmission parameters

Modulation Type	Carrier Frequency Hz	Cycles	Data Rate bps
BPSK, DBPSK			
	2.0	1	2
		3	0.67
		5	0.4
	5.0	1	5
		3	1.67
		5	1
	10.0	1	10
		3	3.3
		5	2
QPSK, DPSK			
	2.0	1	4
		3	1.3
		5	0.8
	5.0	1	10
		3	3.3
		5	2
	10.0	1	20
		3	6.7
		5	4
FM			
	2.0	1	4-16
		3	1.3-5.3
		5	0.8-3.2
	5.0	1	10-22
		3	3.3-7.3
		5	2.0-4.1
	10.0	1	20-32
		3	6.7-10.7
		5	4.0-6.4

EM Link Programming 2.3

Addresses
2B-Transmitter
2A-Receiver
02-PC

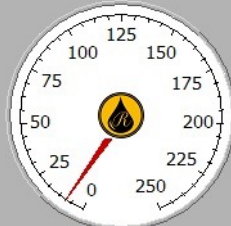
Sync FF Token AB Target 2B Source 2 Length 8

R/W 43 Modulation 1 BPSK Freq 10 Cycles 1 Power 40 Vout 60 Wave Type SINE
Comm 1 Data6 0 Data5 1 Data4 1 Data3 1 Data2 1 Data1 1 Data0 1

Parameters (F1)
Receiver commands
0x42-W/R-SF-ST-CH
0x43-W/R-MT-CF-DR-OW

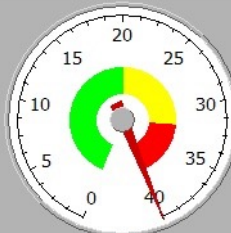
Commands
0x01 Tool Info
0x41 Tool Status
0x42 Transmit DATA
0x43 Parameters
0x44 Life Parameter
R/W=1 to write
R/W=0 to read

Response from Tool



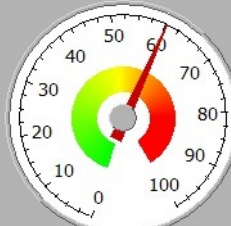
FREQUENCY

10



POWER

50



Vout

60

End Program

PORT SETUP

termination char
(0xA = '\n' = LF) 2
Enable Termination
Char (T) 2

COM12 OFF

PORT

COM12

baud rate

9600

data bits

8

parity

None

stop bits

1.0

flow control

None

delay read (ms) 1

500

delay read (ms) 2

500

The modules are easily programmed with a simple custom written computer interface.