EM Link TYPHOON7

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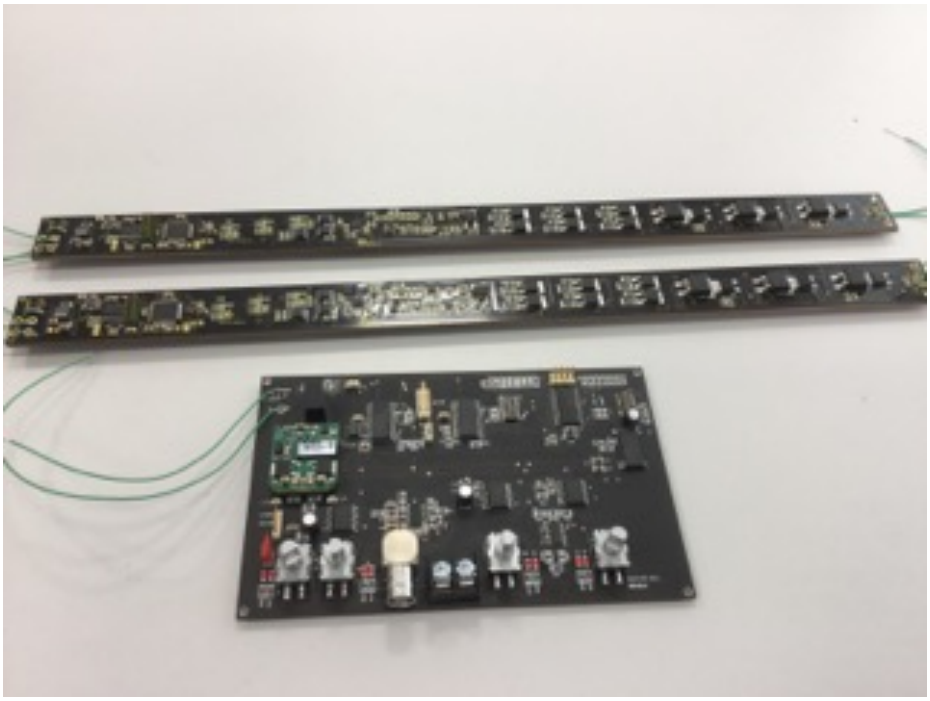


EM Downhole Link TYPHOON7 consists of a downhole PCB and surface PCB designed to easily fit into the existing MWD system to provide the EM capabilities. The heart of the downhole transmitter is a DSP chip which handles the signal generation and any communication protocol. The signal generated can be 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

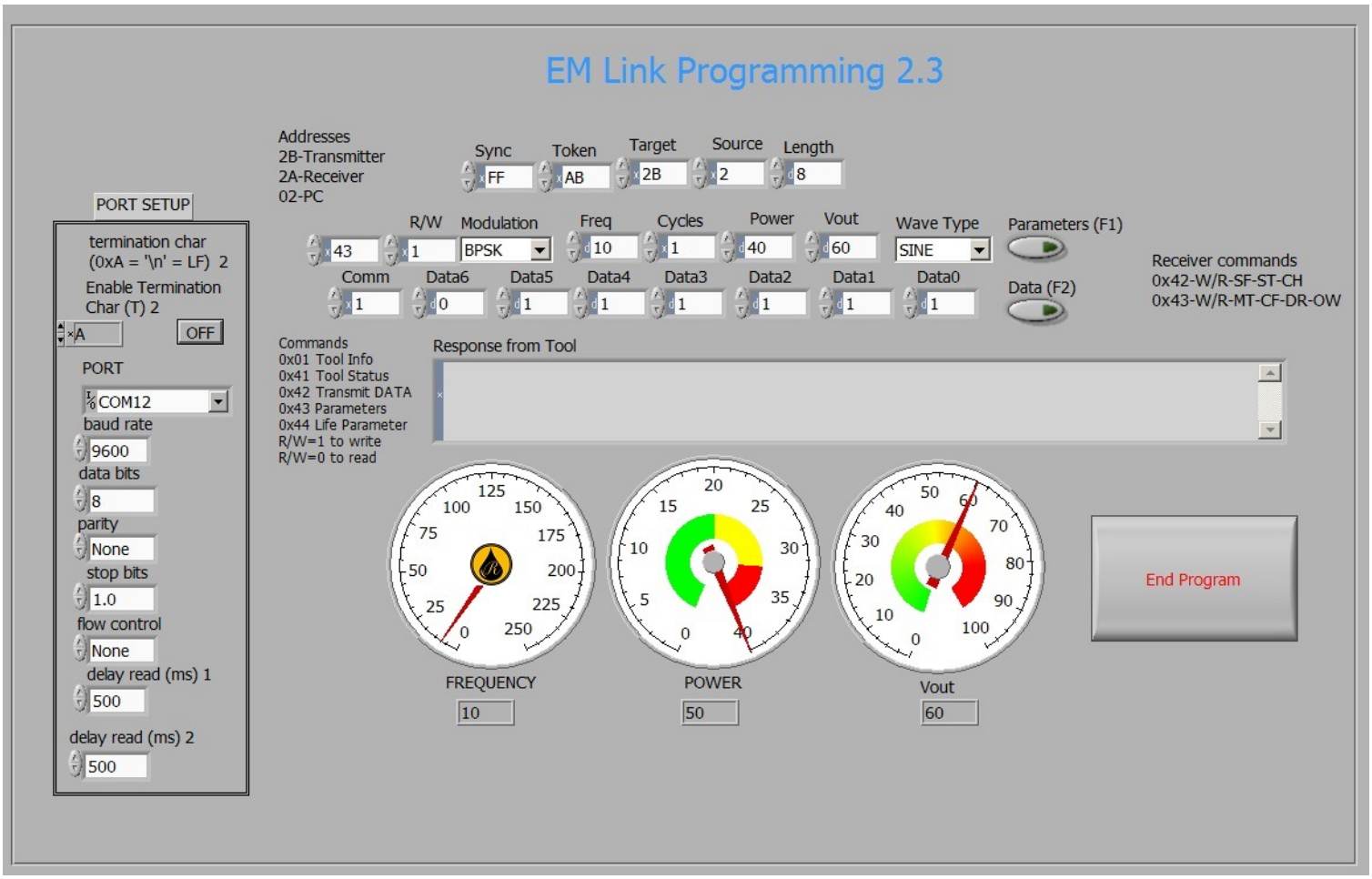
System Options

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



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