Myopac Wireless – Model T50-6
40 Channel EMG Telemetry System
Operation and Product Specification

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Replacement Parts List –

Myopac Wireless, Model T50-6, 40 Channel EMG Telemetry System

Item #	Part Number	Description	Manufacturer
1		**TR10-6 Base Station and Receiver Decoder Subsystem**	
A	**TR10-6**	Receiver Decoder	Konigsberg Instruments
B	**TI20-19-6**	40 Channel Breakout Box	Konigsberg Instruments
C	**TC68-26**	Breakout Box Accessory Cable	Konigsberg Instruments
D	**TC68-14**	A to D Converter Accessory Cable	Konigsberg Instruments
E	**TR10-PS1**	Medical Grade AC Power Supply	Konigsberg Instruments
F	**Line Cord**	3-Prong US 120 VAC to IEC 320	Generic / KI
2		**System PC and Software**	
A	**Software**	Custom Operating Software	Konigsberg Instruments
B	**PC**	Hewlett Packard or Equiv w/Windows	Generic / KI
C	**USB Cable**	USB A to mini-USB2	Generic / KI
3		**T50-6 Encoder/Transmitter Subsystem**	
A	**T50-6**	40 EMG Channel Encoder Transmitter	Konigsberg Instruments
B	**TB1-73**	3.6 V Rechargeable Battery Pack	Konigsberg Instruments
C	**TC27-1-16MP**	16 Channel EMG Lead Set	Konigsberg Instruments
4		**TB2-1 Battery Charging Station Subsystem**	
A	**TB2-1**	Charging Station	Konigsberg Instruments
B	**3P10-L-1004**	Lithium Polymer/Li-ion Smart Charger	Powerizer USA / KI

General Information –

The Konigsberg Instruments Myopac Wireless/T50 EMG system is made up of the following elements (see figure 1):

1. TR10 diversity receiver/decoder with output breakout box and AC mains power supply
2. PC-based Software that is used to change the settings on the transmitter and receiver
3. T50-series encoder/transmitter with input EMG leads and optional sensors
4. Battery Charger for the lithium battery used in the T50-Series Encoder/Transmitter

Third Party Test equipment is supplied with the Myopac Wireless system. A laboratory oscilloscope/function generator is included with the system that can be used to calibrate the Myopac Wireless system and third party data acquisition systems (see figure 9).

Servicing the equipment

To purchase replacement items or to request a Return Material Authorization for assemblies in need of repair please contact:

Konigsberg Instruments, Inc.
Sales and Repairs
Phone (626) 585-4073
FAX (626) 585-4068
Email kisales@konigsberginc.com

The user may replace the following peripheral items or accessories if they wear out:

1. TB1-73 Battery Pack (may be returned to KI for waste recycling)
2. TB2-1 Charging Station
3. TC27-1-X EMG Lead Set
4. EMG Lead Set
5. Powerizer 3P10-L 1004 Smart Battery Charger
6. TR10-PS1/Jerome WXZ909M AC/DC Power Supply
7. TC68-26 Accessory Cable
8. TI20-19-6 Breakout Box
9. TC68-14 Accessory Cable

There are no user serviceable parts inside the following; These Items must be returned to the factory for repair:

1. T50 Encoder/Transmitter
2. TB2-1 Battery Charging Station
3. TR10 Base Station Receiver/Decoder
4. Powerizer 3P10-L 1004 Smart Battery Charger
5. TR10-PS1/Jerome WXZ909M AC/DC Power Supply

Opening the cases on the power supplies, T50, TB2 or TR10 will void all warranties.

General Information, continued –

Software

The Myopac Wireless system uses Windows/PC-based software with a Graphical User Interface (GUI) and a USB connecting cable to program the following system characteristics into the transmitter and receiver:

1. T50-Series Encoder/Transmitter
    a. Transmitter frequency
    b. Amplifier Gain for EMG Channels
    c. Special function characteristics on optional DC channels
2. TR10 Base Station, diversity receiver/decoder
    a. Receiver frequency

Hardware (See Figure 1)

The T50 Encoder/Transmitter is powered by the TB1-73 battery pack, a 3.6 Volt 2.5 AHr rechargeable lithium battery. The T50 has no power switch. To turn on the T50, plug in the TC27-1-X EMG Leads. To turn the T50 off disconnect the EMG Leads. The TR10 Receiver/Decoder is powered on AC mains power via a medical grade power supply. There is a rocker-switch on the front panel of the TR10 that turns the unit on and off.

Once the T50 and TR10 gain settings and transmit frequency are set up, the USB cable should be disconnected from the Myopac hardware and the PC may be shut down to reduce ambient computer noise in the room. The T50 and TR10 settings are permanently stored in these units and the PC need not be hooked up again unless the settings need to be changed.

The basic system hardware elements are:

1. TR10 Base Station diversity receiver/decoder with power supply and breakout box
2. PC with Software and USB connector
3. T50-Series Encoder/Transmitter with TB1-73 rechargeable battery, EMG leads and accessories
4. TB2 Battery Charging Station with smart charger power supply
5. Third Party Test Equipment

The TB1-73 is a high-capacity rechargeable lithium battery. Lithium Batteries last longer when charged after each use, even if it requires only a “partial” recharge. Unlike the older NiCad technology, Lithium rechargeable batteries can actually be damaged with repeated deep discharges. For longest battery life, **RECHARGE THE TB1-73 BATTERY AFTER EVERY USE** and fully charge the battery before prolonged storage.

Myopac Wireless Block Diagram

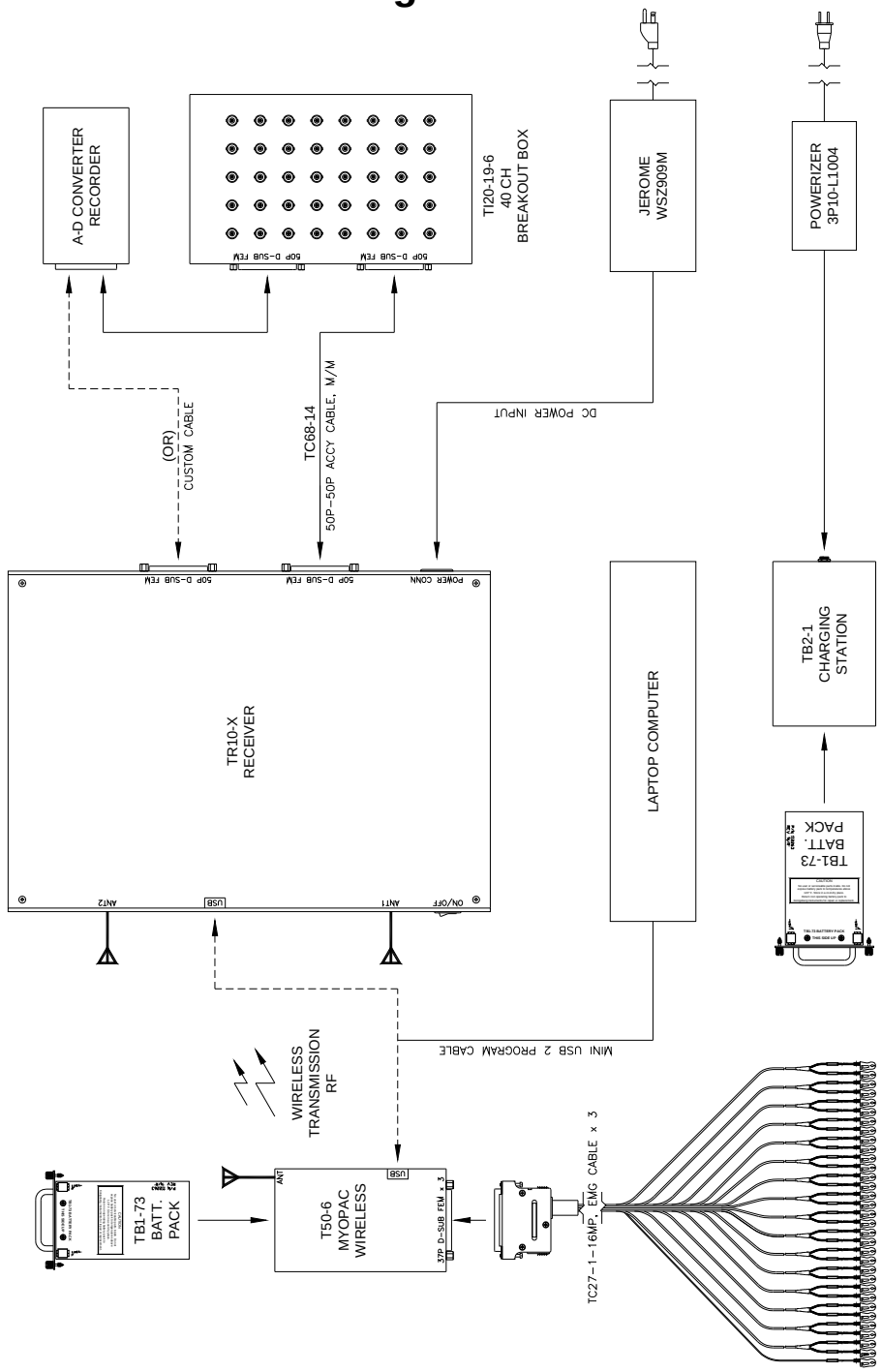

Figure 1

System Operation –

Please refer to the Software Operation Manual, OTM02623, for details of the radio tuning and hardware setup procedures using the GUI (Graphical User Interface) software. Once the T50 and TR10 are setup the PC may be shut down and removed. The Myopac Wireless System does not require an active software interface to operate. Refer to Table 1A for T50 Encoder/Transmitter details and Table 1B for the TR10 Base Station Receiver/Decoder system specifications.

T50-Series Encoder/Transmitter

The T50 Encoder/Transmitter is a portable, multi-channel, battery powered signal conditioner that uses a variety of amplifier techniques to acquire and transmit bio-data from the research subject to a remotely located Base Station using spread spectrum radio techniques. Depending on the model, all T50 encoders transmit between 8 and 32 EMG channels.

Encoder Power –

The T50 Encoder/Transmitter is powered by the TB1-73 battery pack, a 3.6 Volt 2.5 AHr rechargeable lithium battery. The T50 does not use an external Power Switch (that could be inadvertently switched off during recording). Instead, a power jumper is incorporated into the TC27-Series EMG lead connector. *To turn the T50 on simply plug in the EMG leads. To turn the T50 off, or when it is not in use, unplug the EMG leads.* Recharge the Battery after every use.

Encoder Software Setup –

The following T50 parameters may be modified via software:

1. Amplifier Gain for EMG Channels
2. Special function characteristics on optional DC channels (not available on odd numbered T50 encoders; T50-1, -3, -5)
3. Transmitter tuning

EMG Amplifier Gain Setup –

Amplifier gain should be set as high as possible to maximize signal to noise ratio, but low enough to avoid clipping at the decoder output, in accordance with instructions in the Software OTM manual.

The subjects EMG signals are connected to the T50 via TC27-Series EMG Leads. The TC27-Series biopotential leads are used in conjunction with pre-gelled silver/silver chloride electrodes that should be applied to shaved, cleaned skin. The presence of dirt, hair, skin oils and so on under the electrodes can degrade the signal quality. Position the gel electrodes on the skin to maximize the signal of interest and to minimize crosstalk as much as possible. The lead arrangement is configured in differential pairs, one for each channel. An additional pre-gelled electrode should be attached for use with the Green Common Mode Reference Connector.

System Operation, continued –

T50-Series Encoder/Transmitter, continued

The skin-contact electrode is one of the most important parts of the system; if there is poor contact at the skin there is nothing that can be done later to make the signal better.
Please note: pre-gelled electrodes do get "stale". Once near the date code, or if you notice an overall degradation in the quality of signal you have come to expect, dispose of the older electrodes and replace them with fresh ones.

For best results, you should use only self-adhering, pre-gelled silver/silver-chloride electrodes, preferably those with an integrated "contact sponge". Electrodes that are designed for long-term monitoring are usually the best choice. For best results, do not use tape-on dry electrodes, conductive plastic electrodes or electrodes that are designed for the user to wet them with a gel from a tube.

We have included samples of two electrode types with the system:
Conmed Cleartrace P/N 2710-003 ECG Electrode
Conmed Pediatric/Neonate P/N 1620-003 ECG Electrode

If you have a preferred electrode that you feel provides better signals, please use them. We would also appreciate it if you could let us know what they are.

Special Function Module Setup –
The even numbered encoders (T50-2, -4, -6) include an additional signal conditioner card that, depending on the version, supports a variety of other sensors and parameters in addition to the basic EMG channels. Among these additional channels may be:

1. Foot switches
2. Goniometers
3. Accelerometers
4. Other custom channels

Set up these parameters in accordance with instructions in the Software Operations Manual, OTM02623, and the manual provided with the special function card.

System Operation, continued –

T50-Series Encoder/Transmitter, continued

Transmitter tuning Setup –
Set the transmitter frequency between 911 – 919 MHz in accordance with instructions in the Software Operations Manual, OTM02623.

Industrial, Scientific and Medical Band –
The Myopac Wireless system has been tested and found to comply with the limits for devices in the 902-928 MHz ISM Band pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Please Note –
A wide variety of devices are authorized to use the 902-928 MHz ISM Band. Devices sharing the ISM Band may interfere with each other, depending on the requirements of these devices, physical conditions of use and equipment location.

The user is encouraged to try to correct any interference by one or more of the following measures if this equipment causes interference to reception by other equipment using this band, (this can be determined by turning the equipment off and on):

- Reorient or relocate the T50 transmitter antenna or TR10 Base Station
- Reorient or relocate the receiving antenna of other devices seeing interference
- Increase the separation between the EMG equipment and other ISM receivers
- Change the tuning on the T50 or other ISM device seeing interference; or both
- Connect the equipment to an outlet on a circuit breaker different from that to which the receiver is connected
- Use only one of the ISM class devices at a time
- Consult Konigsberg Instruments customer support for help

NOTE:
The T50 Encoder/Transmitter may only be used with factory approved antennas. FCC rules specifically forbid changing or replacing the factory antenna on the T50 transmitter with a different type.

System Operation, continued –

TB1-73 Rechargeable Lithium Battery

The TB1-73 contains a high-capacity rechargeable lithium battery
! HANDLE WITH CARE !

General Guidelines and Warnings from the battery manufacturer –

- ***Lithium Polymer and Li-ion batteries are volatile.*** Failure to read and follow the instructions below may result in fire, personal injury and damage to property if charged or used improperly.
- ***Use specific Lithium Polymer/Li-ion charger only. Do not use with a NiMH, a NiCd charger or a DC Power supply.*** Use of unauthorized power supplies may cause a fire, which can result in personal injury and property damage.
- ***Never charge batteries unattended.*** When charging LiPo/Li-ion batteries you should always maintain constant observation to monitor the charging process and react to potential problems that may occur.
- ***General battery awareness and management.*** If you notice that the battery is leaking, swelling, out gassing or is otherwise not normal discontinue use of the battery and DO NOT ATTEMPT TO RECHARGE IT.
- ***Battery charging awareness and management.*** If at any time you observe a battery starting to balloon, swell up, heat up more than normal, smoke, etc. discontinue use or charging. Remove power, place the battery pack/charger within a fireproof container and observe it for at least 15 minutes or until it is cool.
- ***Battery disposal.*** Dispose Lithium Battery within State & Local Regulation Laws.

The housing around the TB1-73 battery module is designed to protect the battery during handling and use. It is internally fused, and every effort has been made to make it very difficult to short out the battery connections while handling. If the ± Battery Connections are shorted the protective fuse should open and the battery module will have to be returned to the factory for repair or replacement.

Rechargeable Lithium Batteries last longer when charged after each use, even if it requires only a “partial” recharge. Unlike the older NiCad technology, Lithium rechargeable batteries can actually be damaged with repeated deep discharges. To maximize battery life, **RECHARGE THE TB1-73 BATTERY AFTER EVERY USE** and store the batteries after a full charge. During prolonged storage, it is best to recharge the battery every two months or more often. Store batteries in a cool, dry place.

During EMG recording, the TB1-73 is inserted into the T50 Encoder/Transmitter on the same end as the transmit antenna. To charge the battery, partially back out the thumbscrews, remove the battery pack from the T50, and insert in into the TB2-1 Charging Station.

System Operation, continued –

TB2-1 Charging Station & Powerizer 3P10-L-1004, Smart Charger

The TB2-1 Charging station is designed to house the TB1-73 during charging and connects the Powerizer 3P10-L-1004, Smart Charger, to the Lithium Battery inside the TB1-73.

The Powerizer 3P10-L-1004 is a special Smart Charger
! DO NOT SUBSTITUTE WITH OTHER POWER SUPPLIES !
! Permanent battery damage *or worse* will occur !

ALWAYS UNPLUG the Powerizer 3P10-L-1004 Smart Charger from both the TB2-1 Charging Station and AC Power (wall outlet) between charges; this is required to reset the charger's smart circuits for the next charge. Failure to perform this reset might discharge or damage the battery pack.

Charging the TB1-73 using the TB2-1 Charging Station and Powerizer Smart Charger.

The Smart Charger must be unplugged from the AC power (wall outlet) before starting the charging procedure.

1. Plug TB1-73 battery into the TB2-1 Charging Station
2. Connect the Smart Charger to the AC power (wall outlet).
3. Indicator light should be Green
4. Connect the Smart Charger to the TB2-1 Charging Station
5. If the battery needs charging the Indicator light will turn Red
6. When the battery is charged the Indicator light will turn Green
7. Charging time varies, depending on how deeply the battery was discharged. Maximum charge time should be 3 Hours or less.

System Operation, continued –

TR10-series Base Station and Receiver/Decoder

The TR10 Receiver/Decoder is powered on AC mains power via a medical grade power supply. There is a rocker-switch on the front panel of the TR10 that turns the unit on and off.

The following TR10 parameters may be modified via software:

1. Receiver frequency

Receiver tuning Setup –
Set the receiver frequency to match the T50 Encoder/Transmitter frequency in accordance with instructions in the Software Operations Manual, OTM02623.

TR10-Series Receiver/Decoder physical setup and placement

For best performance, assume that the TR10 diversity receiver is more-or-less a line-of-sight receiver.

1. Whenever possible, the TR10 should be placed in your laboratory with the front panel and the two receive antennas more less perpendicular to the long axis of the room so that the TR10 can "see" the T50 encoder transmitter.
2. The receive antennas should be oriented at "10 O'clock" and "2 O'clock" (see Figure 7).
3. Placing the TR10 within a nest of equipment, metal, or "around the corner" and out of sight will result in degraded performance. Avoid placing the TR10 with large objects such as cabinets, desks, metal window shades and walls between the TR10 and T50.
4. Placing the TR10 closer than 10 feet to the T50 may result in some intermodulation distortion.
5. If you want to mount the TR10 in a metal equipment rack, the rack should be oriented in the same way recommended for the TR10 alone. It may be advantageous to remove the antennas mounted directly on the TR10 and replace them with coaxial cables that connect to a remotely mounted diversity antenna module. Contact Konigsberg Instruments' Customer Support for more information on this option.

Connecting the TR10-Series Receiver/Decoder to a Data Acquisition System

The analog outputs from the TR10 decoder are located on two 50-Pin D-Subminiature Connectors mounted on the back edge of the TR10. The two connectors are wired in parallel, with the same analog outputs located on the corresponding pin of each connector. This permits a variety of recorder and Analog to Digital Converter connection options, including dual signal processing. (See Figure 1 for system setup and Table 3 for connector pinouts).

In most applications your recorder/A to D converter will be connected to the TR10 receiver decoder through the TI20 breakout box. This allows you to monitor the outputs of the Base Station while recording, or to inject test signals into the A to D converter via the BNC connectors.

If you want to use the oscilloscope/function generator to test the A to D system, first unplug the TC68-26 connector that connects the TR10 to the Breakout Box.

Connecting the Myopac Wireless System to the Oscilloscope/Function Generator

A third party Oscilloscope/Function Generator test system is provided with the Myopac Wireless System at no charge. Product Registration (directly with the instrument manufacturer) is the responsibility of the user. Warranty repair, if required, will be the responsibility of the instrument manufacturer, not Konigsberg Instruments, Inc.

FOR THE PURPOSES OF THE FOLLOWING STEPS THE T50 EMG AMPLIFIER GAINS SHOULD BE SET TO 1,000/10 mVPP inputs. See Figure 10

A laboratory oscilloscope with integrated function generator is supplied with the system to facilitate calibration and testing of the telemetry system. Konigsberg Instruments adds the following accessories to the oscilloscope to interface it to the telemetry system:

1. Three BNC to BNC coaxial cables
2. A PE140-5, 0.25mV to 25 mV Voltage Divider
3. A BNC "T Adapter"

Turn on the Oscilloscope, adjust the intensity and focus, and Setup as follows:

1. Set the Horizontal Time/Division to 1 mS/division
2. Set the (display) Mode Switch to Dual
3. Set the Channel 1 Vertical amplifier to 5 Volts/Division, DC coupled
4. Center the Channel 1 trace 2 divisions above the center line
5. Set the Channel 2 Vertical amplifier to 5 Volts/Division, DC coupled
6. Center the Channel 2 trace 2 divisions below the center line
7. Readjust intensity and focus as necessary

Setup the Function Generator as follows:

1. Connect the cables to the oscilloscope and PE140-5 in accordance with Figure 10
2. Select the Sine Wave Function Switch
3. Select the 1,000 Hz Range Switch
4. Set the Frequency Knob to Mid Range (12 O'clock on the dial)
5. Set the amplitude/offset switch for 10 Volts Peak to Peak with no DC offset (this appears on Channel 2; should be two divisions or "boxes" in amplitude).
6. Adjust the Frequency Knob for a sine wave on Channel 2 with a period of 2 horizontal boxes, 2 mS.

A 10 Volt Peak-to-Peak (VPP) signal displayed on Channel 2 of the 'scope will be divided by the PE140-5 down to seven selectable voltages of 0.25mV to 25mV that will be applied to the EMG leads. Connect EMG Channel 1 of the T50 input leads (Figure 3) to the PE140 and Connect the Oscilloscope Channel 1 Input cable to the BNC output on the Breakout Box (Figure 9). The "Full Scale" analog output from the TR10 decoder is defined as 10VPP; a Full Scale EMG signal will nominally be ±5 Volts, centered about O Volts. If the T50 EMG amps are set for a Gain of 1,000/10mVPP input the signal displayed on Channel 1 of the oscilloscope should be 2 boxes, 10 VPP amplitude. If the sine wave displayed on Channel 1 is clipped the T50 gain is too high. If the sine wave on channel is less than 1 box high the T50 gain is too low.

T50 Series Encoder –

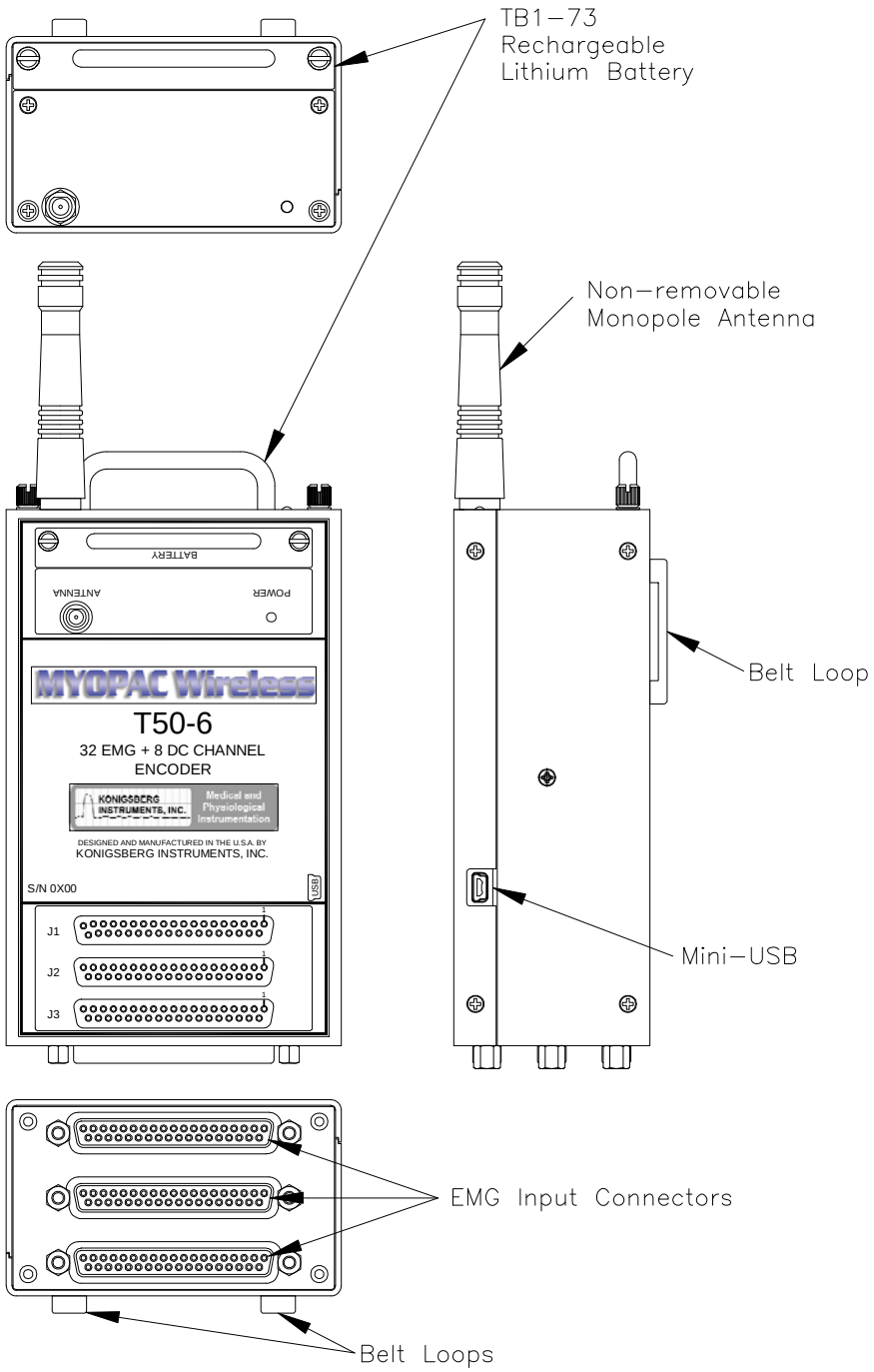

Figure 2

TC21-1-16MP, EMG Lead Set –

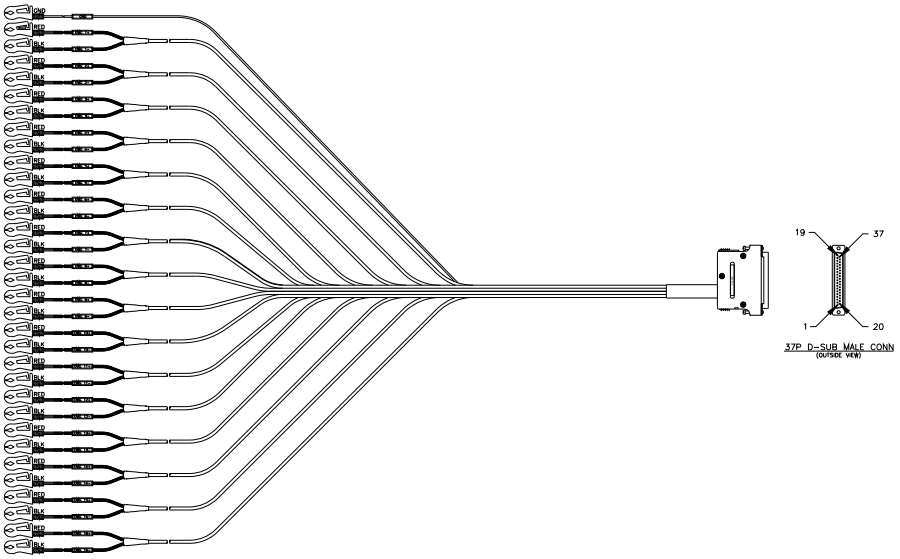

Figure 3

TB1-73 Rechargeable Battery –

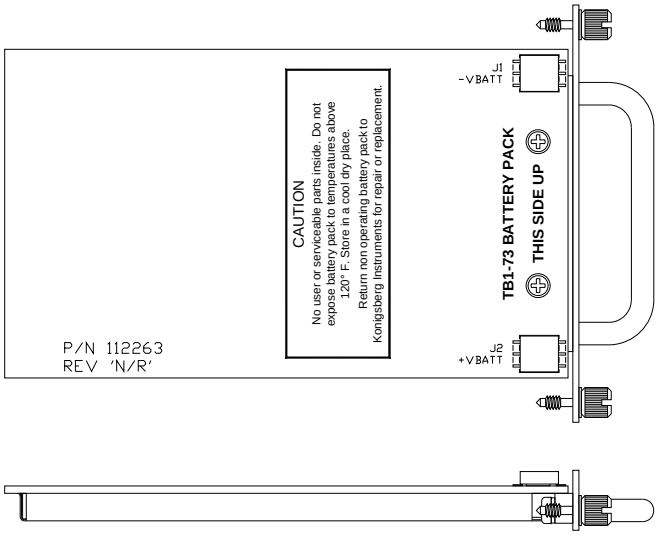

Figure 4

TB2-1 Battery Charging Station –

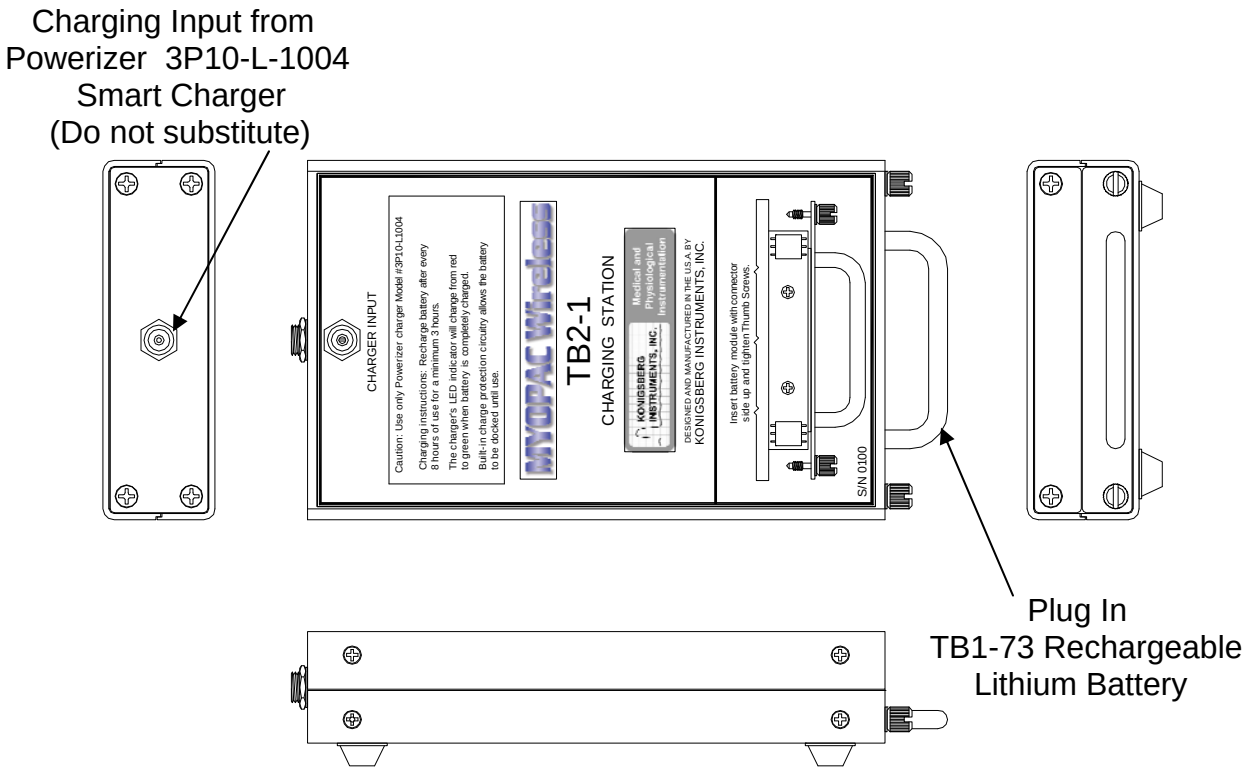

Figure 5

Powerizer 3P10-L 1004 Smart Charger –

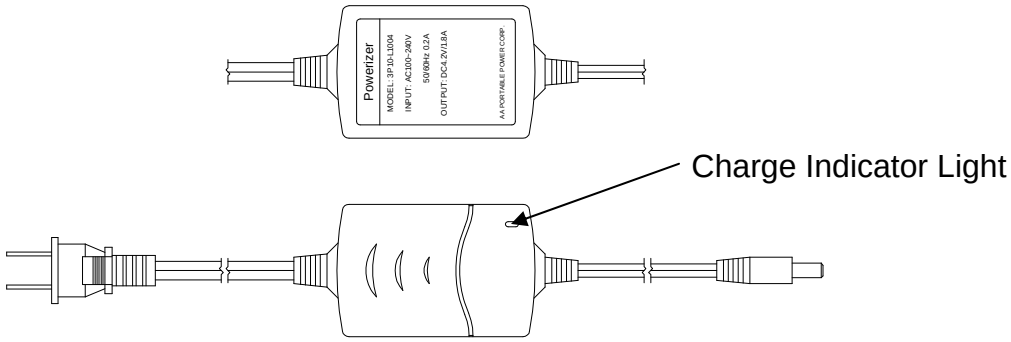

Figure 6

TR10 Base Station –

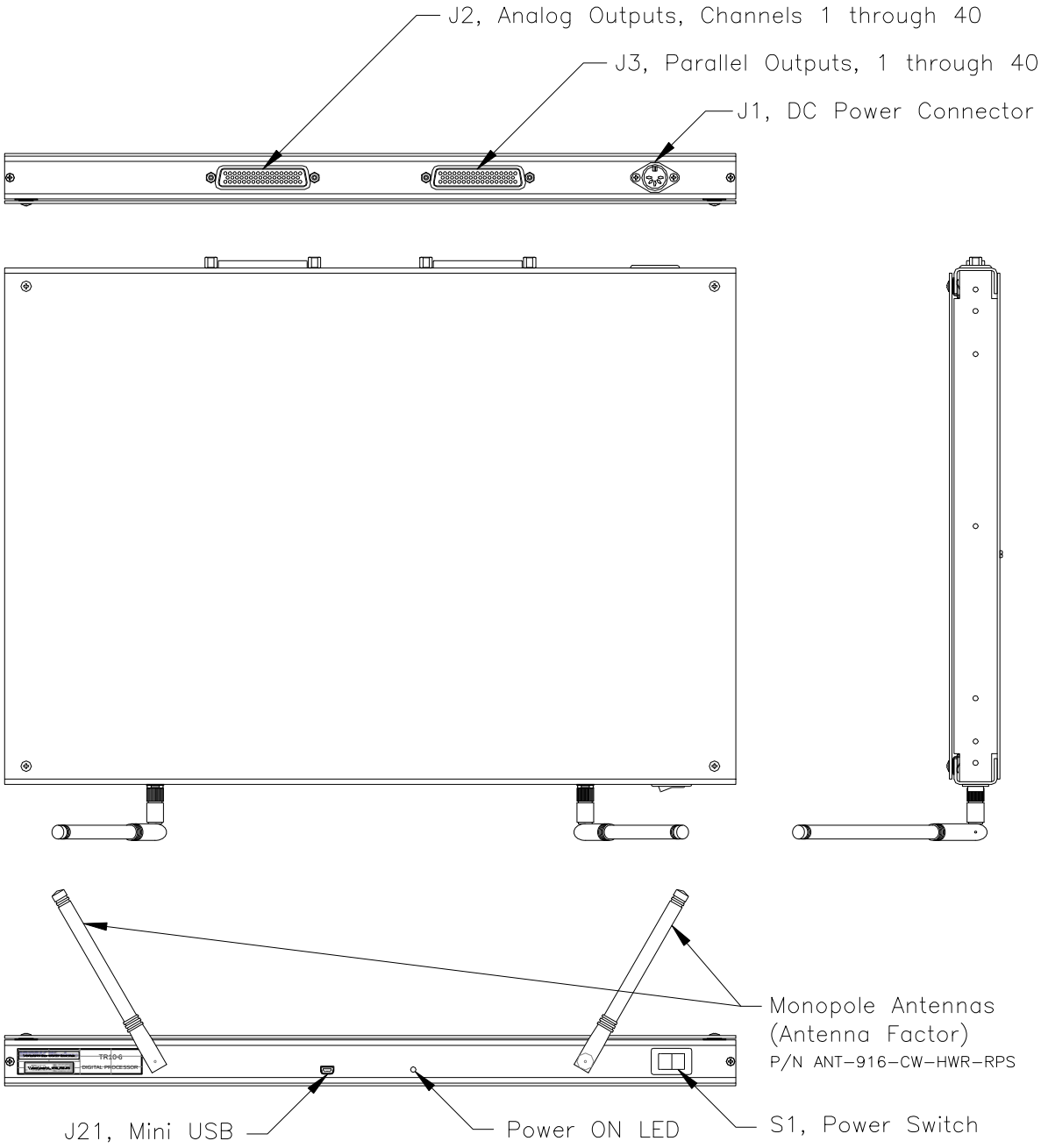

Figure 7

Base Station Power Supply –

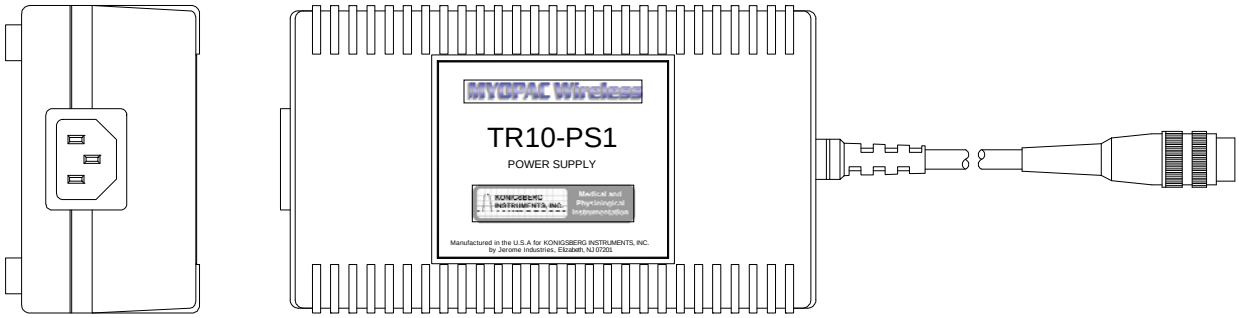

Figure 8

Base Station TI20-19-6 Breakout Box –

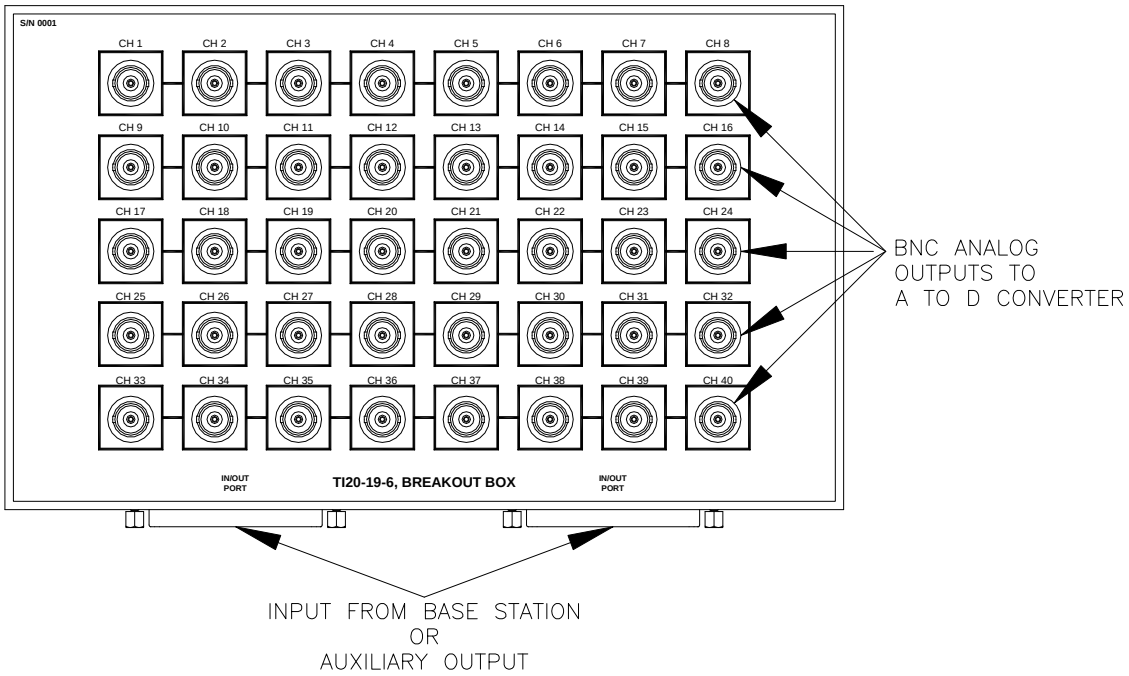

Figure 9

Oscilloscope/Signal Generator & PE 140-5 voltage divider –

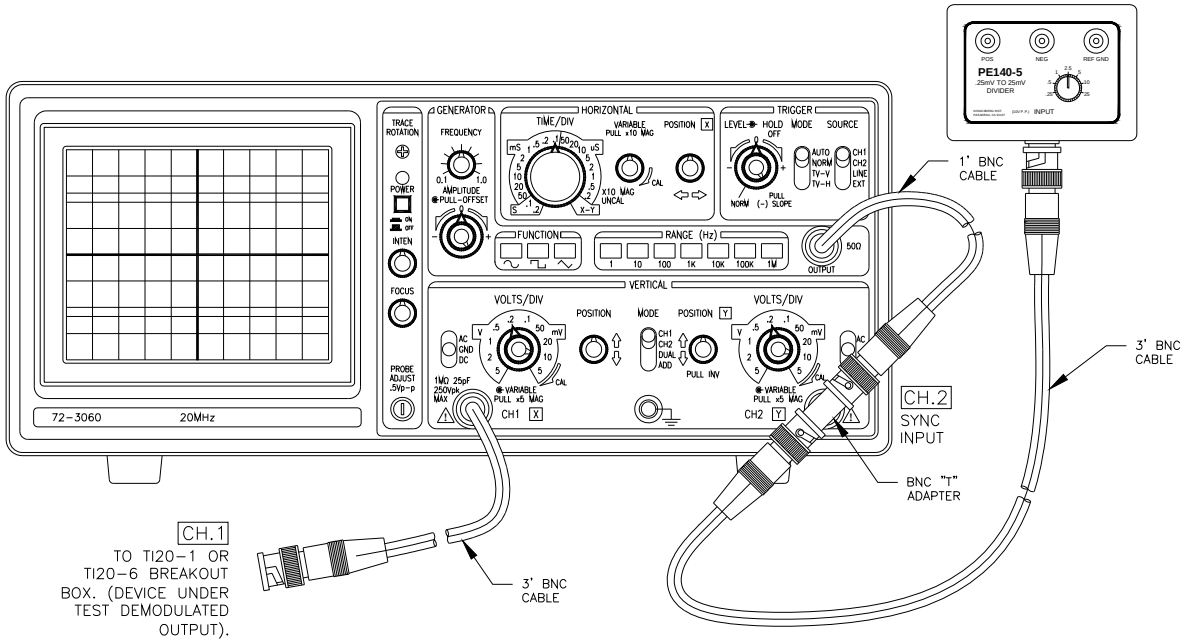

Figure 10

Myopac Wireless – Model T50-6
40 Channel EMG Telemetry System
Operation and Product Specification

System Specifications –

Parameter	Specification	Comments
EMG Channels		
No. of EMG Channels	32	Differential Inputs
EMG Bandwidth	10 Hz to 500 Hz	-3db Corners
EMG Sample Rate	2 KHz per channel	
EMG Input Impedance	> 5 MegOhms	Differential Inst Amplifiers
High Pass Filter	6 dB/Octave	1 Pole Butterworth
Low Pass Filter	30 dB/Octave	5 Pole Butterworth
EMG Lead Types	Shielded mini-Pinch	Optional Fine Wire Interface
EMG Input Gain Settings		User Programmable
250 µVPP	System Gain = 40,000	2.0 uVPP Sensitivity *Note 1*
500 µVPP	System Gain = 20,000	2.0 uVPP Sensitivity *Note 1*
1 mVPP	System Gain = 10,000	2.0 uVPP Sensitivity *Note 1*
2.5 mVPP	System Gain = 4,000	4.0 uVPP Sensitivity *Note 1*
5 mVPP	System Gain = 2,000	8.0 uVPP Sensitivity *Note 1*
10 mVPP	System Gain = 1,000	16.0 uVPP Sensitivity *Note 1*
25 mVPP	System Gain = 400	32.0 uVPP Sensitivity *Note 1*
EMG Signal/Noise Ratio	>50 dB	System Noise, End-to-End
CMRR	>90 dB	@ 50/60 Hz
Cross Talk	<-70 dB	
Transmitter Tuning	911 MHz to 919 MHz	PC Programmable Tuning
Transmit Range	30 Meters Typical	Spread Spectrum
DC Channels		
No. of DC Channels	8	T50-6
Bandwidth	DC to 125 Hz, 18 dB/Octave	-3db Crnr, 3 Pole Butterworth
Sample Rate	500 Hz per channel	
Input Impedance	> 5 MegOhm	Differential Inst Amplifiers
DC Module Options		
DC Amplifiers	8 general purpose inputs	
Goniometers	8 Goniometer Inputs	
Foot Switch + Goniometer	2 FS Channels X 4 Positions + 6 Goniometer Inputs	B & L Engr Typical *Note 2* Biometrics Typical *Note 2*
General		
Encoder Size	5.8" X 3.6" X 2.1"	14.7 cm X 9.2 cm X 3.8 cm
Encoder Weight	18 Ounces	515 grams
Power Source	3.6 Volt Lithium Battery	Rechargeable
Operating Time	8 Hrs per charge	

Table 1A

System Specifications, continued –

Parameter	Specification	Comments
Base Station		
RF Input	Diversity Antennae	
# of Analog Channels	40	
Analog Output Level	±5 V (10 VPP)	Full-Scale, Single-Ended
Base Station Size	17" L X 12" W X 1.23" Bench Top or 19" Rack	44cm X 31cm X 3.2cm
Weight	8 lbs	3.6 K grams
Power Sources		
Mains	110VAC/220VAC 50/60 Hz	External AC/DC Power Supply
Calibration Equipment	Analog Function Generator/ Oscilloscope	Included with system

Table 1B

Note 1 System Noise floor. Lead whip or other mechanical noise may reduce sensitivity.
Note 2 Purchase accessory sensors directly from these 2nd party manufacturers.

EXTERNAL INPUTS and OUTPUTS –

Parameter		Specification	Comments
T50-series Encoder / Transmitter			
Transmitter RF Output	Out	Fixed Antenna	*On End Panel*
EMG Analog Input	In	37-Pin D-Subminiature	*On Opposite End Panel*
Transmitter Programming	I/O	Mini USB Read/Write	*On Side Panel*
TR10-series Receiver / Decoder			
RF Input	In	Removable Antennas (2)	*On Receiver Front Panel*
Analog Outputs	Out	Female 50 Pin D-Sub	*On Receiver Rear Panel*
Receiver Tuning	I/O	Mini USB Read/Write	*On Receiver Front Panel*
AC/DC Power Supply	In	(WSZ909)	±15 VDC; +7.5 VDC
TB1-73 Lithium Battery		⚠	
Powerizer Smart Charger	In	3P10-L 1004 *via TB2-1*	DO NOT SUBSTITUTE
DC Output	Out	2.5 AHr @ 3.6 Volts	
KI Control PC			
Custom Control Software	I/O	USB Read/Write	Qty 1

Table 2

DECODER OUTPUT CONNECTIONS –

50 Pin Conn J2 & J3 Pin#	T50 Encoder Transmitter Output Channels					
	-1	-2	-3	-4	-5	-6
1	EMG 1	EMG 1	EMG 1	EMG 1	EMG 1	EMG 1
2	EMG 2	EMG 2	EMG 2	EMG 2	EMG 2	EMG 2
3	EMG 3	EMG 3	EMG 3	EMG 3	EMG 3	EMG 3
4	EMG 4	EMG 4	EMG 4	EMG 4	EMG 4	EMG 4
5	EMG 5	EMG 5	EMG 5	EMG 5	EMG 5	EMG 5
6	EMG 6	EMG 6	EMG 6	EMG 6	EMG 6	EMG 6
7	EMG 7	EMG 7	EMG 7	EMG 7	EMG 7	EMG 7
8	EMG 8	EMG 8	EMG 8	EMG 8	EMG 8	EMG 8
9	n/c	DC 1	EMG 9	EMG 9	EMG 9	EMG 9
10	n/c	DC 2	EMG 10	EMG 10	EMG 10	EMG 10
11	n/c	DC 3	EMG 11	EMG 11	EMG 11	EMG 11
23	n/c	DC 4	EMG 12	EMG 12	EMG 12	EMG 12
13	n/c	DC 5	EMG13	EMG13	EMG13	EMG13
14	n/c	DC 6	EMG 14	EMG 14	EMG 14	EMG 14
15	n/c	DC 7	EMG 15	EMG 15	EMG 15	EMG 15
16	n/c	DC 8	EMG 16	EMG 16	EMG 16	EMG 16
17	n/c	n/c	n/c	DC 1	EMG 17	EMG 17
18	n/c	n/c	n/c	DC 2	EMG 18	EMG 18
19	n/c	n/c	n/c	DC 3	EMG 19	EMG 19
20	n/c	n/c	n/c	DC 4	EMG 20	EMG 20
21	n/c	n/c	n/c	DC 5	EMG 21	EMG 21
22	n/c	n/c	n/c	DC 6	EMG 22	EMG 22
23	n/c	n/c	n/c	DC 7	EMG 23	EMG 23
24	n/c	n/c	n/c	DC 8	EMG 24	EMG 24
25	n/c	n/c	n/c	n/c	EMG 25	EMG 25
26	n/c	n/c	n/c	n/c	EMG 26	EMG 26
27	n/c	n/c	n/c	n/c	EMG 27	EMG 27
28	n/c	n/c	n/c	n/c	EMG 28	EMG 28
29	n/c	n/c	n/c	n/c	EMG 29	EMG 29
30	n/c	n/c	n/c	n/c	EMG 30	EMG 30
31	n/c	n/c	n/c	n/c	EMG 31	EMG 31
32	n/c	n/c	n/c	n/c	EMG 32	EMG 32
33	n/c	n/c	n/c	n/c	n/c	DC 1
34	n/c	n/c	n/c	n/c	n/c	DC 2
35	n/c	n/c	n/c	n/c	n/c	DC 3
36	n/c	n/c	n/c	n/c	n/c	DC 4
37	n/c	n/c	n/c	n/c	n/c	DC 5
38	n/c	n/c	n/c	n/c	n/c	DC 6
39	n/c	n/c	n/c	n/c	n/c	DC 7
40	n/c	n/c	n/c	n/c	n/c	DC 8
41 to 50	System Analog Ground Connections					

Table 3

CONTROLS –

Nomenclature	Description	Function
Via PC	SEE Software Manual OTM02623 for instructions	

Table 4

Accessory Cables/Accessories Provided –

Nomenclature	Description	Function
TC27-1-16MP	EMG Leads	Mini-Pinch input leads to Encoder/Transmitter
TC68-26	Accessory Cable	Connects Decoder Output to TI20-19-6
TC68-14	Accessory Cable	Connects Decoder Output to A/D Converter via TI20-19-6
TI20-19-6	Breakout Box	Breakout Box for TR10-6 – 40 Analog Channel Outputs
3P10-L1004	Battery Charger	Charger for TB1-73 Battery via TB2-1
TB2-1	Charging Station	Housing for TB1-73 Rechargeable Lithium Battery
ANT-916-CW-HWR-RPS	Monopole Antennas	Two receive antennas for TR10-6 Receiver/Decoder
TR10-PS1 or TR10-PS2	TR10-6 Power Supply	Universal Supply 90-260 VAC; 4 - 63 Hz, 150 VA ±15 VDC @ 1.8 Amps each; +7.5 VDC @ 3 Amps
Computer		Telemetry Control PC + USB Cables
Oscilloscope	Test Equipment	Used to test/calibrate the Myopac system

Table 5

TR10-PS1 AC/DC Power Supply
Jerome Industries Model Number WXZ909M

Parameter		Specification				Comments
Mechanicals						Desk Top Supply
Case Size		17 cm X 10 cm X 6 cm				6.50" X 3.75" X 2.20"
Weight		1 kG				2 lbs
Connectors	**I/O**					
Mains Power Input	In	IEC 320				
DC Output	Out	5 PIN DIN Male Barrel				
Mains Power Input						
Voltage		90-260 VAC				150 VA
Frequency		47-63 Hz				
Regulated DC Outputs						
		Volts	Tol.	Amps	Ripple (max)	
Output 1		+15.0	± 10%	1.8	100 mVPP	27 W
Output 2		-15.0	± 10%	1.8	100 mVPP	27 W
Output 3		+7.5	± 5%	3	100 mVPP	22.5 W
Protection		Short Circuit & Overload Protected				Combined Load 60W max
Secondary Isolation						
TR10-PS1		Connected to Mains Ground				
TR10-PS2		No Ground; Floating				Base Station must be separately grounded in accordance with ANSI/TIA/EIA 607
Operating Temperature		0º to 40º C; Humidity 10% to 95%				non-condensing
Storage Temperature		-40º to 75º C; Humidity 10% to 95%				non-condensing
EMC Compliance		EN60601-1-2 / IEC60601-1-2				
Emissions		FCC Part 15 class B				
		CISPR11 and CISPR11 class B				
Immunity		EN61000-6-1 / EN55024 / EN61326				
Isolation						
		IEC60601 class B, earthed				TR10-PS1
		IEC60601 class BF, floating				TR10-PS2
Safety		EN60601-1 / CE LVD				
		UL 60601-1				
		cUL (CSA) 22.2 #601-1				

Table 6

Underwriters Laboratories Inc.®

Melville Division
1285 Walt Whitman Road
Melville, NY 11747-3081 USA
www.ul.com
tel: 1 631 271 6200
fax: 1 631 271 8259
Customer service: 1 877 854 3577

NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

May 9, 2007

Mr. David Love
Jerome Industries Corp.
730 Division Street
Elizabeth, NJ 07201

E-mail: david.love@jeromeindustries.com

Reference: File E160908 Project 07ME06406 PO# DAVID LOVE

Product: USR/CNR & USL/CNL – New Model WSZ909
(E160908, Vol. 1, Sec. 25 & E148586, Vol. 2, Sec. 19)

Dear Mr. Love,

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

UL's investigation of your product has been completed under the above project number and the subject product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Recognized/ Listing Markings only at the factory under UL's Follow-Up Service Program to the subject product, which is constructed as described below:

Similar to the subject model, which was submitted to UL for this investigation. The UL Records covering the product will be in the Follow-Up Services Procedure, File E160908, Volume 1 & E148586, Volume 2.

This authorization applies only to the address on this letter.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent to the indicated manufacturing locations in the near future. Please note that Follow-Up Services Procedures are sent to the manufacturers only unless the Applicant specifically requests this document.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn.

Sincerely,

Roy Y. Shinmachi
Senior Engineering Associate
Department: 3013AMEL
Tel: (631) 271-6200, ext. 22631
E-mail: roy.y.shinmachi@us.ul.com

Reviewed by:

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An independent organization working for a safer world with integrity, precision and knowledge.

FCC Part 15 Notice of Compliance

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

* Reorient or relocate the receiving antenna.
* Increase the separation between the equipment and receiver.
* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
* Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception.

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

CAUTION: To comply with FCC RF exposure compliance requirements, a separation distance of 20 cm must be maintained between the antenna of this device and all persons.