Type B Applied Part
Medical Equipment

Class II Medical Device

This device meets these standards:

EN 14971:2009	EN 60601-1-2:2007(E)	EN 980:2008(E)
EN ISO 10993-1:2009	EN 60601-2-37:2007	EN 1041:2008
EN ISO 10993-5:2009	EN 61157:2007	
EN ISO 10993-10:2002/A1:2006	EN 60601-1:1990+ A1:1993 + A2:1995	

This non-invasive system meets the safety requirements for a Class II Medical Device.
This device is intended for use by health care professionals only .

C US

LR 78294
CAN/CSA -C22.2 No. 601.1-M90
UL 60601-1 IEC 60601-1

This device must be plugged into a **120 V ac, 60 Hz, 500 VA** '**HOSPITAL ONLY**' or '**HOSPITAL GRADE**' power outlet.

This device is manufactured by:

PARKS Medical Electronics, Inc.
19460 SW Shaw St
Aloha OR 97078-1242 USA
Phone: 503-649-7007
Fax: 503-591-9753

Technical Support for the Parks Flo-Lab 1-888-356-9522

Monday - Friday 7:00 am to 3:30 pm Pacific Time

Mailing Address: PO Box 5669 Aloha OR 97006-0669 USA
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Fax: 503-591-9753 • *e-mail:* info@parksmed.com • *Web Site:* www.parksmed.com

INTRODUCTION

Thank you for choosing the Parks Medical Electronics Computerized Flo-Lab. The Flo-Lab is a high performance, multi-function noninvasive vascular diagnostic system which utilizes today's most advanced technology to enable you to perform a variety of physiologic vascular examinations with greater accuracy and speed than ever before possible.

The Flo-Lab is the product of Parks Medical Electronics' over 30 years experience as a leader in production of vascular Doppler products, combined with feedback and input from users of our computerized vascular systems in hundreds of vascular laboratories worldwide since 1986. This system has a host of new features, many of which will be new to you, and we urge you to take the time to familiarize yourself with this manual to assure that you and your patients are getting the most out of your Flo-Lab.

OVERVIEW

The Parks Flo-Lab is a state-of-the-art instrument for the noninvasive physiologic assessment and diagnosis of peripheral vascular disease. This system combines all of the modalities needed to perform a broad range of vascular examinations, including:

Doppler Evaluation (Arterial, Venous & Periorbital)

Volume Pulse Recording (Arterial & Venous)

Segmental Pressures

Digital Pressures

Post Exercise / Reactive Hyperemia

Penile Pressures

Digital Waveforms

Venous Outflow (DVT)

Reflux (Chronic Venous Insufficiency)

MULTI-FUNCTION SYSTEM

The Flo-Lab combines Parks directional Dopplers, bilateral Volume Pulse Recording (VPR), and bilateral Photoplethysmography in a compact, ergonomic package. The Flo-Lab features a highly advanced, microprocessor controlled, cuff inflation system, which provides a new degree of smoothness, accuracy and precision to blood pressure measurements. Other new features offered on the Flo-Lab include: a new multi-sensor wireless remote control; an optional automatic cuff selector (controlled by the computer); and an integrated Multi-Mode display to simplify the selection of Flo-Lab user options.

The Flo-Lab has been designed with one goal in mind, to assist the user in producing vascular studies with a greater degree of accuracy, in less time, than was ever before possible.

WARNINGS / HAZARDS

WARNING: MISUSE OF THIS EQUIPMENT AND INAPPROPRIATE ELECTRICAL CONNECTIONS WILL CREATE A SHOCK HAZARD. What appears to be simple connections to other equipment can place the p atient and/or the operator at risk of electrical shock. **DO NOT** connect to an amplifier or intercom system. **DO NOT** connect items which are not specified as part of the original system.

FOLLOW THE MANUAL INSTRUCTIONS ON THE USE OF THIS EQUIPMENT. Avoid use involving electrical contact with other equipment. *We assume no responsibility for misuse of our equipment.*

ELECTRICAL WARNING: The multiple socket outlets of the power supply shall only be used for supplying power to equipment which is intended to form p art of the system. Additional portable multiple socket outlet s or extension cords shall not be connected to the system. Power for the non-medical equipment supplied with the system (computer, monitor & printer) is intended to be supplied via the multiple socket outlet s of the medical grade transformer supplied with the system. Plugging the non-medical equipment directly to wall power will compromise electrical safety and place the patient and/or the operator at risk of electrical shock.

WARNING: The printer, monitor and computer must be approved to the f ollowing st andards by CSA, VDE and/or other appropriately recognized approval body:

UL Std No 60601-1 (1st Edition) and IEC Publication 60601-1 (1988)
IEC 60601-1 Amendment 1:1991 and IEC 60601-1 Amendment 2:1995

Should y ou have reason to replace any of these non-medical components, i t is best to obtain them from Parks Medical Electronics, Inc. to insure they will meet the aforementioned standards.

WARNING: THIS EQUIPMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE ANAESTHETIC MIXTURES WITH AIR, OXYGEN OR NITROUS OXIDE.
The possibility of explosion or fire always exists when this equipment is used in such an environment.

THIS EQUIPMENT SHOULD NOT BE USED WITH A DEFIBRILLATOR.

POTENTIAL ELECTROMAGNETIC OR OTHER INTERFERENCE: This Doppler may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as reorienting or relocating the Doppler , or shielding the location.

The Flo-Lab's IR remote receiver may respond to other IR equipment in the user 's facility, which can interfere with the function of the Flo-Lab. If you suspect this is occurring, please cont act Parks Technical Support at 1-888-356-9522. You may be provided with a corded remote to prevent further occurrences.

SUSCEPTIBILITY: This Doppler may experience a high pitched tone or buzzing noise from radio interference caused by a cell phone, mobile service or police st ation nearby. Interference may also be experienced from another Doppler, electrocautery or other sp arking device, as well as defective fluorescent light fixtures or neon signs, if located in the close proximity .

⚠ **VPR MODE OF OPERATION:** Continuous Operation wit h Short-time Loading. The air pump s for the blood pressure cuffs shall be operated for a maximum of 4 minutes continuously , and then allowed to cool to ambient temperature, which will take 1.5 hours.

INSPECT THE PROBE: Before using the probe, inspect for any cracks or breaks in the protective material covering the probe that could allow for ingress of conductive fluids such as acoustical coupling gel. Damage to the protective covering could create a shock or burn hazard if an uni nsulated instrument is grounded and used with or touches other electronic equipment.

PHYSIOLOGICAL EFFECTS OF ULTRASOUND

IMPLANTED DEVICES

Implanted devices such as cardiac pacemakers should be avoided due to the possibility of affecting their operation. Some plastics used in replacement surgery may be af fected by absorption of ultrasound energy . Metal implants may lead to reflections and as a precaution, avoid using ultrasound close to these.

STUDIES NEAR SENSITIVE TISSUES

Extreme care should be taken when treating areas near the eye because of the danger of damage to the retina. Similarly, extreme care should be taken near other sensitive nervous tissue. Based on experimental and epidemiological data, there is presently no identified risk associated with diagnostic ultrasound. However, a prudent and conservative approach is recommended in which diagnostic ultrasound should be used only for medical benefit and with minimal exposure.

THIS DOPPLER IS INTENDED FOR USE BY HEALTHCARE PROFESSIONALS ONLY.

ENVIRONMENTAL HAZARDS: There are no potential environmental hazards from the gels used with the probes.

SPECIFICATIONS

DOPPLER

Pencil Probes:	High frequency (nominal 8 MHz). Low frequency (nominal 4 MHz). Optional skinny pencil probe (nominal 8 MHz).

The exact frequencies of the instrument are indicated by labels attached to the probe cables. Be sure to reorder replacement probes by these frequencies.

Output Filter :	User selectable for 28, 14, 7, 3.5 (Hz) or mean flow.
Output Select:	User selectable for normal or inverted recording.
Headphones:	Standard low-impedance stereo headphones.

PLETHYSMOGRAPH

VPR:	Pneumoplethysmograph (volume pulse recording).
PPG:	Photoplethysmograph. Sensor, Parks part # 832-8000-00.
Modes:	AC coupled (arterial mode pulsations only). DC coupled (venous mode gross volume changes).
Calibration:	PPG - none. VPR - user selectable calibrated pulse volume measurement. Pressure ± 2 mm @ 100 mm Hg, ± 5 mm above 100 mm Hg.

CUFF INFLATOR

Inflate modes:	Momentary (BP mode) or fill to preset (VPR mode).
Inflator Preset:	User selectable.
Inflation Rate:	BP mode - Linear, variable speed, user selectable 5-30 mm Hg/sec. VPR mode - fixed 30 mm Hg/sec.
BP Bleed rate:	User selectable 1-10 mm Hg/sec.
Valve type:	Variable flow & solenoid activated.
Verification/Calibration:	Cuff volume verification/calibration every 1000 hours or once a year. The calculated volume should be within ± 3% of the value marked on the calibration chamber.

REMOTE CONTROL

Functions:	18 button, rechargeable, infrared remote for volume, position, size, mute, trace auto scale, cuff inflator and deflator, freeze, save, escape, enter and four direction cursor.

PHYSICAL

Height:	55 inches.	140 cm.
Width:	26½ inches.	67 cm.
Depth:	30 inches.	76 cm.
Weight:	117 pounds.	60.66 kg.

SPECIFICATIONS

ELECTRICAL

ISO 500 D power supply: **120 V ac ~, 60 Hz**.
3 Amp Typical, 5 Amp Peak @ 120 V ac, 500 VA.

Fuses: **(four) 5 Amp Slow, Parks part # 865-2008-00**

The POWER cord must be plugged into a '**HOSPITAL ONLY**' or '**HOSPITAL GRADE**' alternating current power outlet.

18-BR Remote

Batteries: **3.6 Volt, 700 mAh, Ni-MH battery pack, Parks part # 854-0007-50.**

Charging Base Power Adapter: **7.5 Volt ⎓ (dc) 1.6 Amp, Parks part # 984-0025-00R.**

ENVIRONMENTAL CONDITIONS FOR TRANSPORT AND STORAGE

Ambient temperature: Range, -40° F to +158° F (-40° C to +70° C).
Relative humidity: 10% to 100%, condensing.
Atmospheric Pressure: Range, 500 hPa to 1060 hPa.

OPERATING CONDITIONS

IPXO rating: Degree of protection against ingress of water ..... none provided.
Temperature range: 50° F to 104° F (10° C to 40° C).
Heat generated: 1706 BTU per hour.

MAINTENANCE & CLEANING

Circuit diagrams, component part lists, descriptions, calibration instructions, and other information are supplied to assist qualified technical personnel to repair parts of equipment which are designated by the manufacturer as repairable.

Calibrate every 1000 hours or once a year.
See 'Calibration Procedure'.

For information on setting up, operating and servicing the computer and printer supplied with the Flo-Lab, see the **'Owners Manual'** or **'Users Guide'** supplied by the manufacturer of that equipment. These manuals or guides were included with the Flo-Lab when it was purchased.

Turn off power and unplug instrument from wall outlet before cleaning. Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or small paint brush. Dirt which remains can be removed with a soft cloth dampened in a mild solution of detergent and water. Abrasive cleaners should not be used.

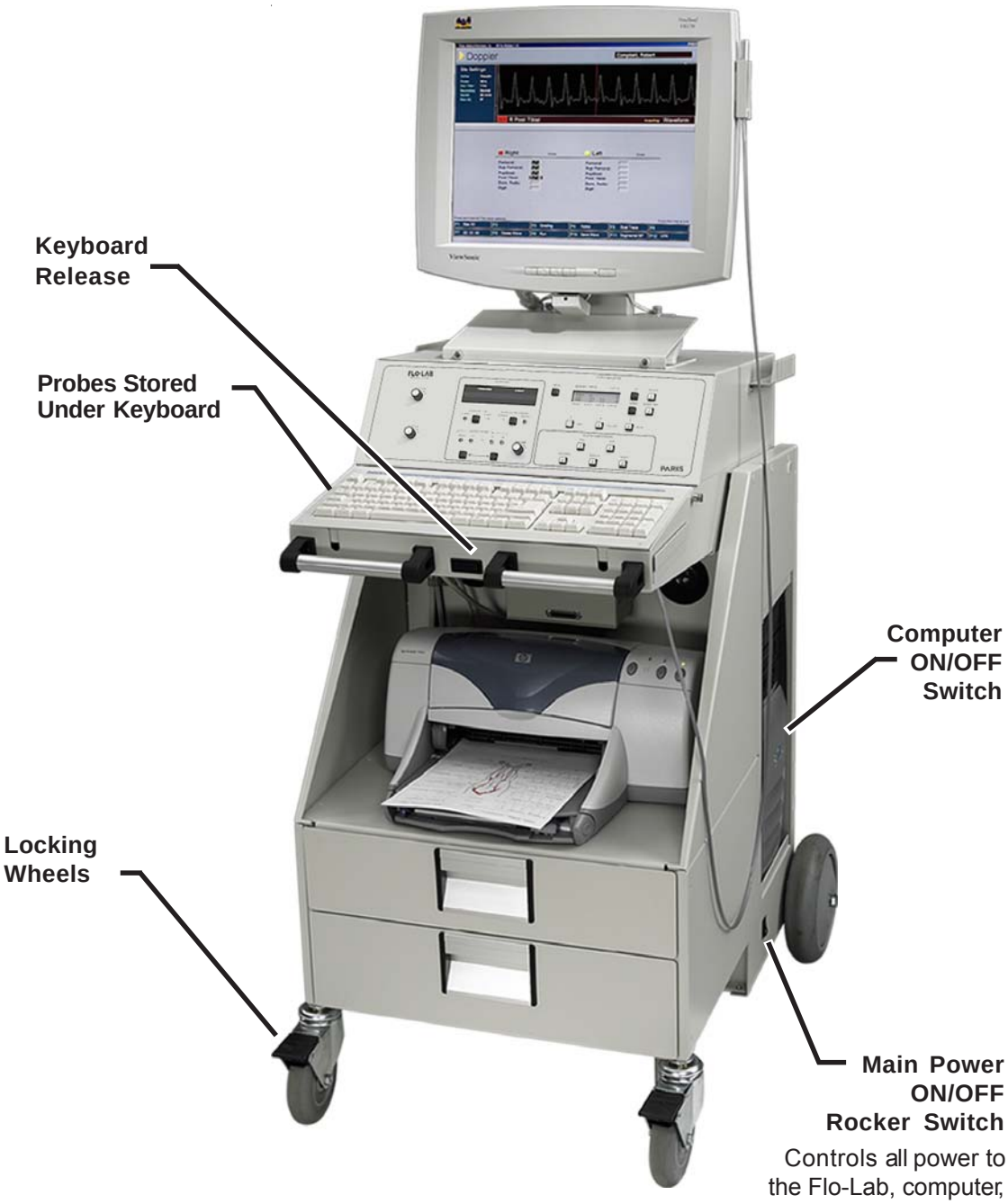
PARKS OPERATING MANUAL

PARKS FLO-LAB, OPERATING MANUAL is included with the Flo-Lab.

To best use the Flo-Lab an operator should underst and the rationale and the physics for noninvasive vascular testing. For an in depth explanation of vascular testing please refer to one of the excellent books devoted to the subject.

INSTRUMENT VIEWS

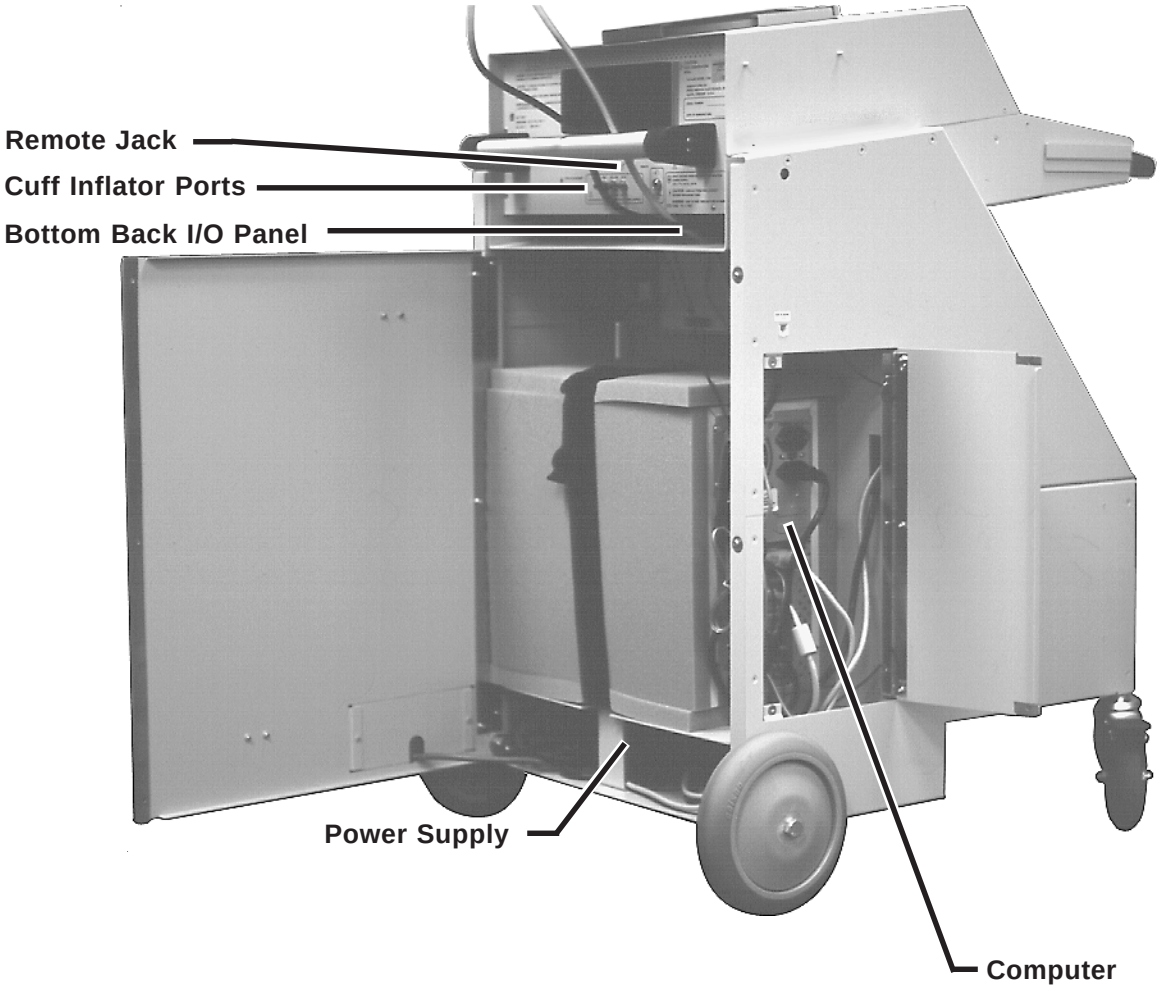
FRONT



The Flo-Lab is furnished with a built-in isolated medical grade power supply. It must be plugged into a **120 V ac ~ 60 Hz** 'HOSPITAL ONLY' or 'HOSPITAL GRADE' power outlet via the external power cord. All power for the equipment furnished with the system must be supplied via the medical grade power supply. Plugging any equipment furnished with the system directly to wall power will compromise electrical safety .

INSTRUMENT VIEWS

BACK



Computer Back Panel Access
Back Door Secured With Three Screws

SET-UP

With the system purchase, a representative of Parks Medical Electronics will visit your facility to assist in setting up the new Flo-Lab vascular system. Generally, it is preferred that the customer leave the instrument in its original shipping containers until the representative arrives on-site to perform the installation. With facility space limitations, this is not always practical.

The following steps outline the process your Parks representative will go through in preparing the Flo-Lab for patient studies, and may be helpful should the need ever arise to reship the Flo-Lab to a different facility.

A. UNPACKING THE FLO-LAB

The Flo-Lab is, for the most part, fully assembled at the factory and delivered nearly “ready to go”. Though thoroughly tested at the factory as a complete system, prior to shipment the display monitor and color printer are removed and repackaged in their original containers for shipment. The Flo-Lab is then crated in its custom container, with all accessories stored within the drawers of the Flo-Lab cart.

After the Flo-Lab, the display monitor, and printer are removed from their shipping cartons at the customer’s facility, these containers should be stored, if possible, for future use.

B. INSTALLING THE PRINTER

The printer power cord and the printer cable are pre-installed in the Flo-Lab cart to ease installation. Once the printer has been removed from its carton, it may be placed on the printer shelf below the Flo-Lab, and the cables attached. Locate the printer information packet (shipped in one of the cart drawers) if you would like detailed information about setting up the printer, paper loading, and loading/replacing ink cartridges.

C. MOUNTING / CONNECTING THE MONITOR

The Parks Flo-Lab has a custom mount bracket fixed to the top cover for securing/mounting the display monitor. This mount uses thumbscrews that secure a retaining bracket, preventing the monitor from slipping during movement. To install the monitor:

Loosen the thumbscrews and remove the retaining bracket.

Hold the monitor in place on top of the Flo-Lab, aligning the monitor base with the opening (facing forward) in the monitor base housing.

Slide the monitor/base rearward on the Flo-Lab until the base is held “captive” by the monitor base housing.

Replace the retaining bracket and secure it into place using the thumbscrews.

With the monitor physically mounted in place, the power and cable connections can now be made. To improve access to the back connection p anel of the computer , the Flo-Lab is equipped with a side “Computer Access Panel” on its left side (right hand side if viewed from the rear). This p anel should be opened now , by backing out the two captive screws, and swinging the door outward.

Thread the monitor cable through the cable cut-out in the cart (the monitor power cord is already installed in the cart, and should be run through the same cut-out, going outward). Continue to thread the monitor cable down around the back of the computer until it is visible though the side access panel.

Grasp the monitor cable through the opening of the side access panel, and plug the monitor connector into its corresponding (color coded) connection on the back of the computer .

Once the monitor/computer connection is made, the power cord (dangling from the back cable cut-out) may now be plugged into the back of the monitor . Any excess monitor cable and/or power cord may be pulled into the back of the cart and bundled. Close the back door , being careful not to pinch any cables, and reinsert the three Phillips screws to secure the door. The side access panel should now be closed as well, re-securing it with the captive screws.

D. MISCELLANEOUS

Included with the Flo-Lab are a few miscellaneous pieces that should be mounted.

HOSE HANGERS - On each side of the Flo-Lab there are two small (#6-32 x ½”) studs. Locate the two hose/cable hanger brackets, and secure them to these two studs with the hardware provided.

KEYBOARD DIVIDER - Locate the keyboard storage area divider, and secure it into place in the keyboard storage bin by peeling off the Velcro “sticky back” covers and pressing it firmly into place. This divider is to prevent small items from sliding underneath the Flo-Lab.

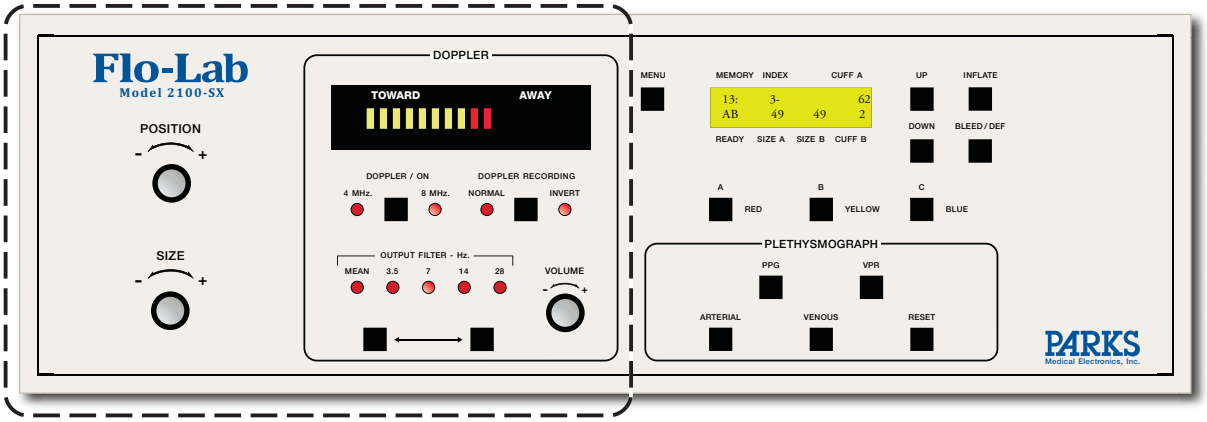
MOUSE TABLE - Locate and attach the Mouse Table, or tray by sliding it into the appropriate retaining groove (there are retaining grooves on both the right and left sides of the keyboard, to accommodate both right handed and left handed people).

GEL HOLDER - Locate and attach the gel holder by sliding it into the appropriate retaining groove (there are ret aining grooves on both the right and lef t sides of the keyboard).

DESCRIPTION OF CONTROLS

FRONT PANEL

DOPPLER SECTION



POSITION

This knob positions the waveform baseline up or down on the monitor. This is a speed sensitive control, with a rapid turn of the knob making large, coarse changes in baseline position, while slow rotation of the position knob serves to make small, or fine adjustments in baseline position.

SIZE

This knob changes the sensitivity , or gain of the instrument, allowing changes in waveform size (amplitude), or size, on the monitor . Size may be adjusted by the user at any time to increase or decrease the height of the waveforms, or may be adjusted to a “Preset” size factor prior to beginning testing (see Menu Display; Size Settings).

FLOW BAR GRAPH

Provides a display of Doppler signals, indicating both blood flow direction (relative to the probe) and relative blood flow velocities.

TOWARD

Display indicates flow Toward probe.

AWAY

Display indicates flow Away from probe.

DOPPLER / ON

If the Doppler is inactive, depressing this button activates the Doppler on the Flo-Lab with Doppler signal being displayed on the monitor (if in a waveform screen) the active Doppler frequency (4 MHz or 8 MHz) will default to the last setting used. Plethysmographic modalities (PPG & VPR), if active, are automatically turned off. Once the Doppler is active, each press of this button toggles the system back and forth between the available probe frequencies.

4 MHZ

Light indicates nominal 4 MHz. The lower frequency is for deep vessels.

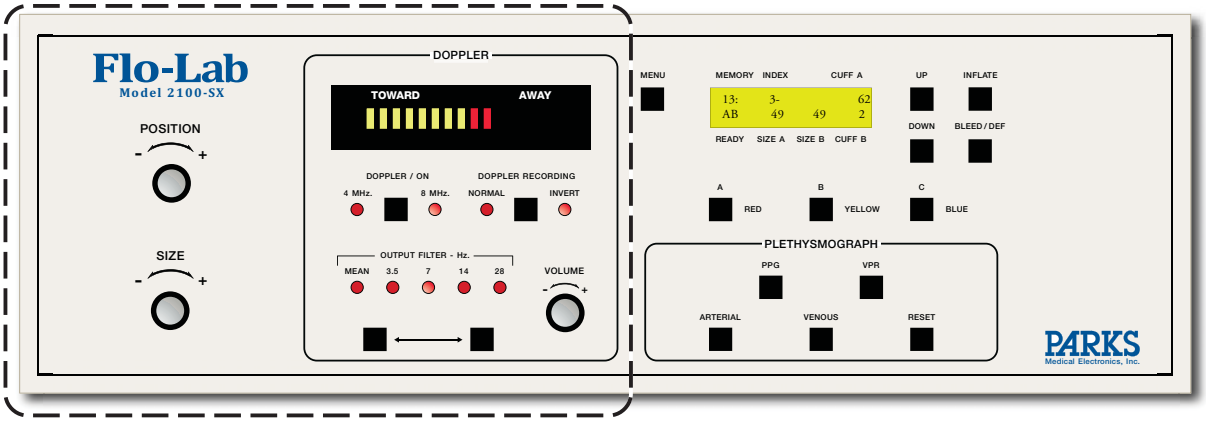
8 MHZ

Light indicates nominal 8 MHz. The higher frequency is for normal tests.

DESCRIPTION OF CONTROLS

FRONT PANEL

DOPPLER SECTION



DOPPLER RECORDING

Pressing this button toggles the recorder waveform to either normal or inverted orientation.

NORMAL

Flow toward the probe - Above
Flow away from probe - Below

INVERT

Flow toward the probe - Below
Flow away from probe - Above

OUTPUT FILTER - HZ

This control affects the smoothing of the recorded wave. It has no effect on what you hear. The numbers refer to the upper-frequency bandpass of a 4-pole active filter. Higher numbers mean less smoothing but a more accurate reproduction of velocity changes. As you smooth the waveform by going to lower numbers, you are throwing away information. **Most recording is done using 3.5 Hz or 7 Hz.** This will reduce most unwanted noises and still render a good recordable signal.

The Lowest setting (**MEAN FLOW**) is a very heavy filtering used to display mean velocity by an almost straight line above the zero flow line with no detail and maximum smoothing.

3.5 Hz - Some detail and very smooth. **7 Hz** - Smoothed and detailed.

14 Hz - Some smoothing with more detail. **28 Hz** - Maximum detail.

← Left arrow (Decrease frequency button) steps to **more smoothing** and less detail.

→ Right arrow (Increase frequency button) steps to **less smoothing** and more detail.

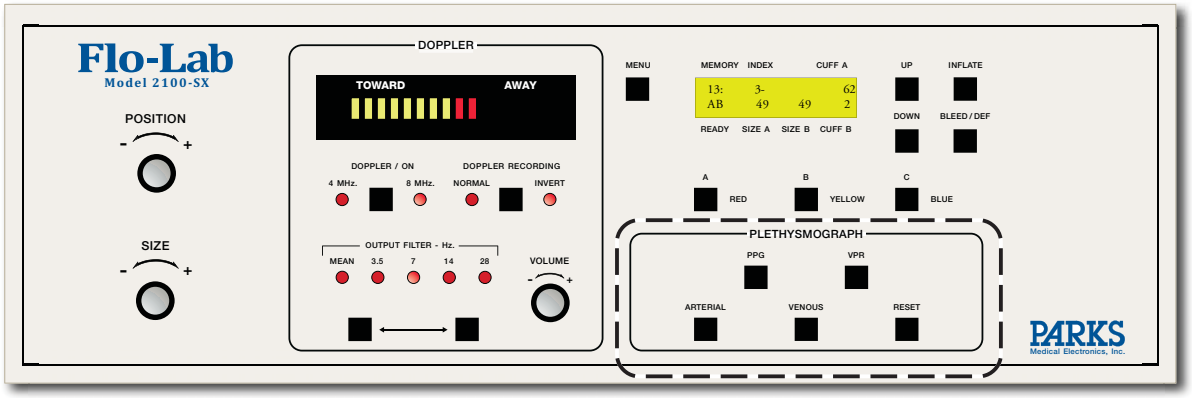
VOLUME

Knob adjusts loudness.

DESCRIPTION OF CONTROLS

FRONT PANEL

PLETHYSMOGRAPH SECTION



PPG

This button indicates, when illuminated, that the Photoplethysmograph is active, and that PPG signals will be displayed on the monitor and/or strip chart. Pressing this button activates the PPG, and automatically deactivates the Doppler or VPR (if active).

VPR

Indicates, when illuminated, that the Volume Pulse Recorder is active, and that VPR signals will be displayed on the monitor and/or strip chart. Pressing this button activates the VPR, and automatically deactivates Doppler or PPG (if active).

ARTERIAL

Indicates, when illuminated, that the instrument will display the plethysmographic (PPG or VPR) signals in Arterial, or “AC Coupled” mode. Pressing this button activates ARTERIAL mode and cancels VENOUS.

VENOUS

Indicates, when illuminated, that the instrument will display the plethysmographic (PPG or VPR) signals in Venous, or “DC Coupled” mode. Pressing this button activates VENOUS mode and cancels ARTERIAL.

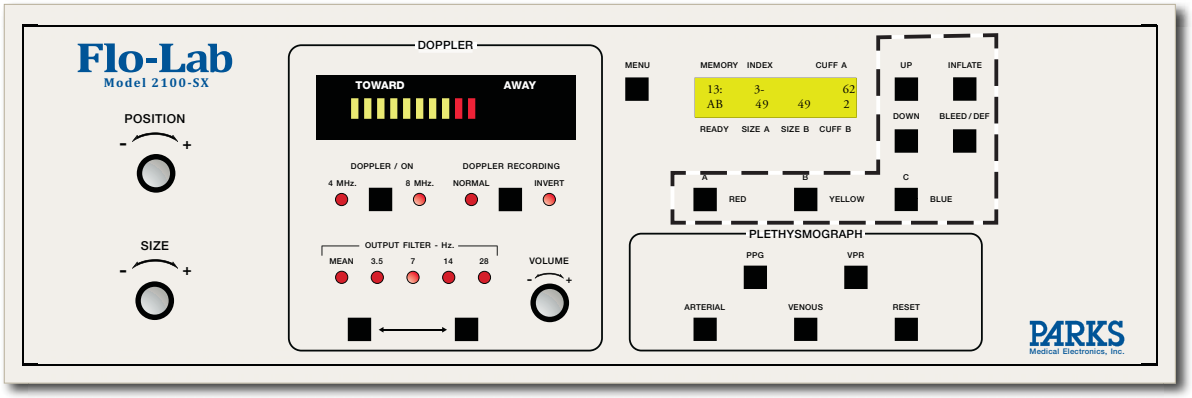
RESET

In Venous mode, pressing this button “zeros”, or “readies” PPG or VPR signal(s).

DESCRIPTION OF CONTROLS

FRONT PANEL

CUFF INFLATOR SECTION



A / RED

This cuff inflater hose button selects the A channel air source. This is used for all blood pressure measurements, and for right limb VPR recordings. Pressing this button alternately activates/deactivates this channel.

B / YELLOW

This hose button selects the B channel air source. This is used for left limb VPR recordings only. Pressing this button alternately activates/deactivates this channel.

C / BLUE

This hose button selects the C channel air source. This air source is used for occlusion cuffs and venous outflow studies. Pressing this button alternately activates/deactivates this channel.

INFLATE

The cuff inflator button is mode sensitive, with different operation depending upon the mode selected. If Doppler or PPG is active, the instrument defaults to “Blood Pressure” mode, with the cuff inflating (pumping) as long as the button is held depressed. In VPR mode, the function changes, with a single press of the button automatically filling the cuff(s) to the desired preset pressure (see, *‘Customizing your Flo-Lab; Multi-Mode Display; VPR Preset Pressures’*).

BLEED/DEF

This button is mode sensitive, with different operation depending upon the mode selected. In Doppler or PPG mode, with “Auto Bleed - OFF”, once the segmental or digit cuff is filled to the desired level, momentarily pressing the **BLEED/DEF** button activates a smooth, continuous bleed down of the pressure in the cuff at the selected bleed rate (see Customizing your Flo-Lab; Multi-Mode Display; Bleed Down Rate). While bleeding down, a second press of this button automatically rapidly deflates, or “dumps” the pressure in the cuff.

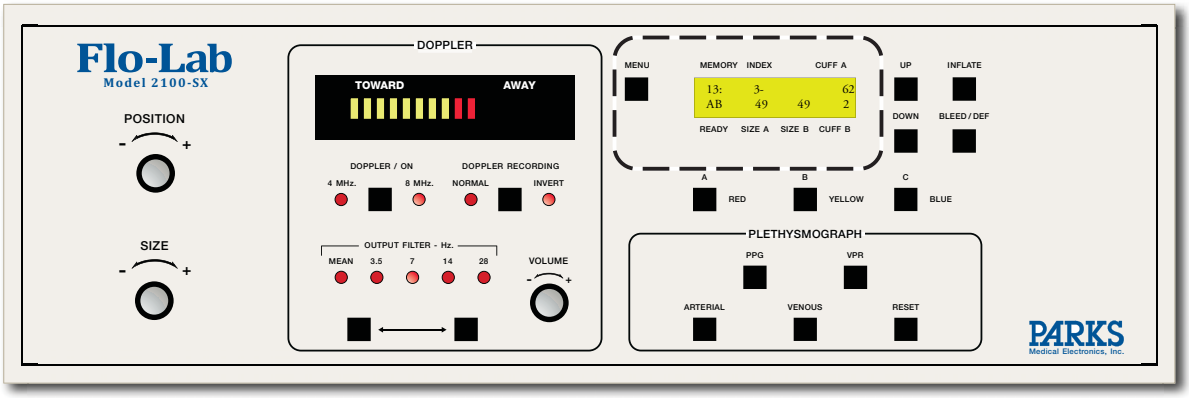
In “Auto Bleed - ON” mode (see, *‘Customizing your Flo-Lab; Multi-Mode Display; Auto Bleed’*), the cuff will automatically begin to bleed when the inflation is completed. There is no need to press bleed/deflate to begin the bleed down process. In this mode, pressing **BLEED/DEF** provides a rapid deflate, or “dump” of the cuff pressure.

NOTE: For optimum performance of your Flo-Lab, use only the hoses furnished with the system. The calibration of cuff volume and volume change is based on using nine foot hoses and adapters as furnished. Any other length or size of tubing or addition of an in-line air chamber will cause the reported cuff volume to be increased or decreased by increase/decrease in volume.

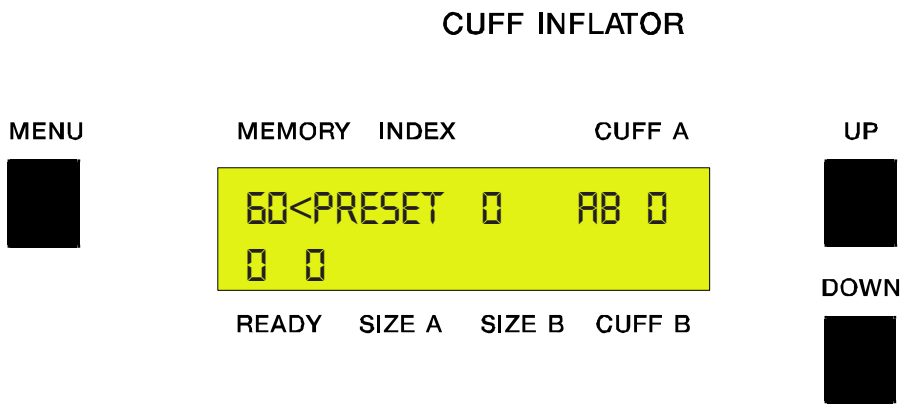
DESCRIPTION OF CONTROLS

FRONT PANEL

MULTI-MODE DISPLAY SECTION



The Multi-Mode display is a multiple menu screen, allowing the user to quickly change operational/functional settings on the Flo-Lab. Below is an explanation of the Multi-Mode display control buttons, followed by a description of what each menu screen does, and how displayed parameters/settings may be changed.



MENU

This button cycles, with each press, through each of different menu screens (14 screens).

UP

This button increases the displayed setting/p arameter, or “toggles” the selection if that selection is of a “YES/NO” or “ON/OFF” type.

DOWN

This button decreases the displayed setting/p arameter, or “toggles” the selection if that selection is of a “YES/NO” or “ON/OFF” type.

DESCRIPTION OF CONTROLS

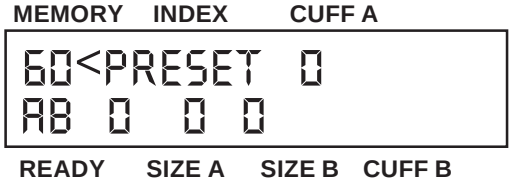
FRONT PANEL

1. DEFAULT SCREEN

The Main Screen

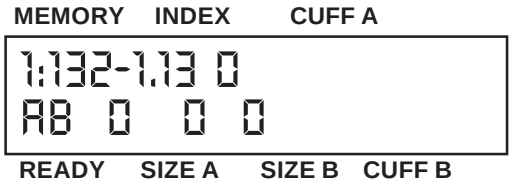
The Main Screen is a Mode sensitive screen, with the top line differing slightly depending upon if the instrument is in VPR mode, or in DOPPLER or PPG mode (the top line is the same for DOPPLER and PPG modes).

2. MAIN SCREEN - VPR MODE



When VPR is active, the top line displays the “Preset Pressure”, which is the pressure the instrument will automatically fill VPR sensing cuff to. The Preset Pressure may be increased/ decreased by pressing the UP/DOWN buttons respectively, with the preset pressure changing in 5 mm Hg increments.

3. MAIN SCREEN - DOPPLER OR PPG MODE



When either **DOPPLER** or **PPG** are selected, the top line displays Memory & Index. *Should the Flo-Lab be operated without a computer hookup*, the Flo-Lab has internal memory allowing the capture and saving of segmental blood pressures for later, and automatically calculates the corresponding “indices”, for manual transfer onto a form.

In this mode, the first position of the top line in the Multi-Mode Display is the Memory location label, with stored pressures and calculated indices appearing next to the location label.

The first two memory locations are labeled RB and LB (for storing the Right and Left Brachial systolic blood pressures respectively), followed by labels of “1-18”, for storage of up to 18 additional blood pressures. A s blood pressures are saved in memory slot s 1-18, the instrument calculates and displays the saved pressures “Index” (compared to the highest saved brachial pressure). The **UP** and **DOWN** buttons are used to cycle up and down through each memory location for review and/or transfer of data.

DESCRIPTION OF CONTROLS
FRONT PANEL

4. MAIN SCREEN - STANDARD FUNCTIONS

SIZE Readout

SIZE A and **SIZE B** section of the Multi-Mode display Main Menu provide a digital readout of the size setting in use for any (PPG, VPR or DOPPLER) recording. The Size scale in use is 0 - 100 (%). A setting of 40, for example, means the Flo-Lab is recording at 40% of maximum gain instrument gain. **SIZE A** is for the A channel (normally the Right channel), **SIZE B** is for the B channel (normally the left channel). **SIZE A** is normally used for all Doppler recordings, as well as Right Channel VPR and PPG recordings. **SIZE B** indicates the size setting for Left Channel VPR and PPG recordings.

SIZE A and **SIZE B** are typically adjusted together (set to equal values) when performing bilateral recording, but may be separately set. To set Size A & B individually:

Deactivate the channel you do *not* want to change by pressing the corresponding button (**A** / **RED** or **B** / **YELLOW**) so that its indicator light is off. Turning the size knob will now change only the active (lit) channel Size setting.

The second channel may be adjusted in the same way, by deactivating the channel already set, activating the channel to be adjusted, and turning the **SIZE** knob. When each channel has been set to the desired level, both may now be switched back to active, with the system maintaining each channels individual size setting.

NOTE: Once both channels are active, turning the size knob further will always switch the Size setting back to "equal" - the B channel matching / equalizing to the A channel.

READY indicators

Ready indicators (the letters A & B, for the Right and Left channels respectively) appear when a Plethysmographic signal has been "zeroed" for display on the Monitor In PPG, ARTERIAL mode, READY occurs automatically after the PPG sensor has been positioned on the patient. In VPR,Arterial mode, READY occurs automatically after the cuff pressure has stabilized/settled. When zero is achieved (usually within 5 seconds), the letters "A" and/or "B" will appear in the display window

In "Venous Mode" the zeroing of the waveform is not automatic, and requires pressing the **RESET** button. This is normally pressed after the PPG sensor has been positioned, or the VPR cuff has been filled to a stable level. When the zeroing sequence is complete, the "A" and/or "B" READY Indicators will appear in the display window

Cuff A & Cuff B Pressure

CUFF A and **CUFF B** displays the air pressure currently in each/either cuff channel. Blood pressure is always measured using channel A (either DOPPLER or PPG mode). Bilateral VPR recordings fill both the Right and Left channel cuff simultaneously, displaying each cuff pressure as **CUFF A** & **CUFF B** respectively.

DESCRIPTION OF CONTROLS
FRONT PANEL

5. DESCRIPTION OF MENU SCREENS

SCREEN #1: PLETHYSMOGRAPH SETTLE TIME

Plethysmograph settle time allows the user to select the AC Mode "Auto-Zero Rate" applied to the displayed VPR & PPG waveforms - labeled as F AST, MEDIUM & SLOW (corresponding to how quickly the wave will re-st abilize itself). F AST provides the most stable waveform, but can alter some slower changing elements of the wave, resulting in wave distortion. Slow provides the most UN-affected (distortion free) waveform, but also shows a great deal of unwanted waveform "drift", such as respiratory artifact. In general, where waveforms are being viewed but not recorded/analyzed (such as when viewing a PPG signal to determine a Digit blood pressure), the F AST works best. When recording VPR and PPG waveforms for analysis, SLOW or MEDIUM should be used to minimize the filtering effect on important waveform elements.

SCREEN #2: SIGNALS A & B ARE SWAPPED/NOT SWAPPED

There may be circumstances where it is desirable to display signals "swapped", with channel A displaying the Left side signal (PPG or VPR), and channel B displaying the Right. In those instances, from this menu screen, pressing **UP** or **DOWN** will toggle the selection.

SCREEN #3: CLEAR ALL INDICES

If the Flo-Lab memory locations built into the Multi-Mode Display have been used, pressing **UP** or **DOWN** from this screen will clear all stored pressures and indices.

SCREEN #4: DUAL WAVEFORMS/SINGLE WAVEFORM

PLEASE NOTE: ***The information contained in Screen #4 only pertains to your Flo-Lab if it came furnished with a strip chart recorder.***

This controls how the strip chart recorder displays information. When Single Waveform is selected, the strip chart recorder operates as a single, 40 mm wide strip chart. When Dual Waveform is selected, the recorder operates as a two-channel strip chart, with 20 mm wide charts. Pressing **UP** or **DOWN** toggles this selection.

SCREEN #5: EXTERNAL SIGNAL ON/OFF

The Flo-Lab provides an external input on the back panel to allow other compatible devices (such as Parks Penile VPR module) to be connected, and displays its output information on the computer monitor . Pressing **UP** or **DOWN** toggles between the selected active Flo-Lab signal (DOPPLER / VPR / PPG) and the external device signal.

SCREEN #6: BP SLOW FILL RATE

When taking blood pressure measurements, the Flo-Lab cuff inflator starts off at a preset inflation rate of 30 mm Hg/second. In an effort to minimize over-inflation (to reduce testing time and patient discomfort), the Flo-Lab may be set up to slow the cuff filling rate. This screen gives the user the option of having cuff filling slow down to any fill rate they desire. From this screen **UP** and **DOWN** may be used to select any Slow Fill Rate between 1 & 30 mm Hg/second. For most users, setting this rate between 12 - 15 mm Hg per second appears to be optimum.

SCREEN #7: BP SLOW FILL START

Though its possible to have the Slow Fill Rate setting affect the entire inflation range, it is far more efficient (time wise) to all let the inflator fill at the standard fast rate up to a certain point, and *then* slow down to the Slow Fill Rate. This screen allows the user to select the level at which the Slow Fill Rate will begin. From this screen, pressing **UP** and **DOWN** increases/decreases the slow fill Start Point, in 5 mm Hg increments. Best results seem to be with this point set between 90-100 mm Hg.

DESCRIPTION OF CONTROLS
FRONT PANEL

SCREEN #8: VPR CALIBRATION SEQUENCE ON/OFF

Users may elect to have the instrument calculate the pulse volume of VPR waveforms (in milliliters), or not. To choose to have the instrument make this calculation, turn VPR Calibration Sequence On, to not have the instrument calculate this information, choose VPR Calibration Sequence OFF . Pressing **UP** and **DOWN** toggles between these two options.

SCREEN #9: VPR CAL A FACTOR

The instrument is provided with a Calibration Volume Chamber to verify the instrument is correctly measuring the cuf f volume (a necessary component in the calculation of VPR waveform volume). This screen allows qualified personnel to adjust the displayed Channel A “calibration factor” until accurate volume measurement is achieved (Using the Calibration Volume Chamber). Refer to Bioengineering Manual.

SCREEN #10: VPR CAL B FACTOR

See Screen #9 above. This screen is used to adjust the Channel B calibration factor.

SCREEN #11: BLEED RATE

The user may select a bleed down rate that provides the best trade of f between measurement accuracy, and measurement time. The slower the bleed down rate, the more accurate and repeatable the pressure measurement will be. Too slow, however, may prove unnecessarily uncomfortable for the patient. Pressing the **UP** and **DOWN** keys will increase/decrease the bleed rate setting.

NOTE: AS A GENERAL RULE, the user should expect that there may be a blood pressure measurement error equal to the bleed rate setting (with a bleed rate setting of 3 mm Hg/sec, for example, blood pressure measurements may be off as much as 3 mm Hg). This error will be slightly less on patients with heart rates faster than 60, slightly more on patients with heart rates lower that 60. A setting of 2 - 4 mm Hg/sec is typically selected by users.

SCREEN #12: FIRMWARE VERSION

This screen displays the version of programming code used in the Multi-mode Display. It has no relation to the software version on the main computer system.

SCREEN #13: AUTO BLEED ON/OFF

When taking blood pressure measurements, the user may choose to have the Flo-Lab begin cuff pressure bleed-down only *after* the **BLEED/DEF** button is pressed (Auto Bleed - Off), or to have the Flo-Lab begin bleed-down automatically after the **INFLATE** button is released (Auto Bleed - On). Pressing **UP** and **DOWN** toggles between these options.

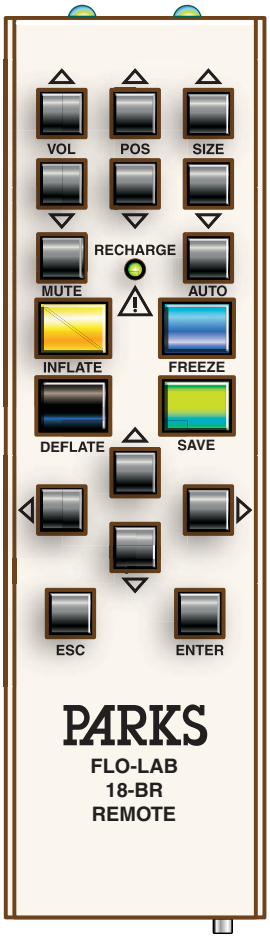
DESCRIPTION OF CONTROLS

RECHARGEABLE REMOTE CONTROL

The Flo-Lab is equipped with a multi-function remote control, designed to enhance usability by placing the most frequently used controls conveniently in your hand.

VOL △ ▽

Pressing the appropriate VOLUME button steps the audible Doppler sound higher or lower . Additionally, if the audible Doppler signal is "Muted", a press of **VOL** △ reactivates the Doppler audio (canceling MUTE).



POS △ ▽

The POSITION buttons change the position of the wave on the screen and on the chart recorder. Up moves the wave towards the top of the screen. Down moves the wave towards the bottom.

This button works the same as the **POSITION** knob on the front panel.

SIZE △ ▽

These buttons change the size of the wave form, either up or down, by increments of 10.

This button works the same as the **SIZE** knob on the front panel.

MUTE

Pressing this button turns off the Doppler audio until it is pressed a second time, or until the **VOL** △ button has been pressed. Pressing the **MUTE** button alternately turns the Doppler audio on and off without changing the Doppler volume setting.

AUTO

The AUTO SCALE button enables the user to change the waveform amplitude (DOPPLER, PPG, VPR). The **AUTO** button, when pressed, automatically adjusts the displayed waveform to fill 80% of the monitor and / or chart paper.

INFLATE

This button is mode sensitive, with different operation depending upon the mode selected. If Doppler or PPG is active, the instrument defaults to "Blood Pressure" mode, with the cuff inflating (pumping) as long as the button is held depressed. In VPR mode, the function changes, with a momentary press of the button automatically filling the cuff(s) to the desired preset pressure.

This is a duplicate of the **INFLATE** button on the Flo-Lab front panel.

DEFLATE

The BLEED/DEFLATE button is mode sensitive, with different operation depending upon the mode selected. In Doppler or PPG mode, with "Auto Bleed - OFF", once the segmental or digit cuff is filled to the desired level, momentarily pressing the **DEFLATE** button activates a smooth, continuous bleed down of the pressure in the cuff at the selected bleed rate (see Customizing your Flo-Lab; Multi-Mode Display; Bleed Down Rate). While bleeding down, a second press of this button automatically rapidly deflates, or "dumps" the pressure in the cuff.

In "Auto Bleed - ON" mode, the cuff will automatically begin to bleed when the inflation is completed. There is no need to press **DEFLATE** to begin the bleed down process. In this mode, pressing this button provides a rapid deflate, or "dump" of the cuff pressure.

This button on the remote is a duplicate of the **BLEED/DEF** button on the Flo-Lab front panel.

DESCRIPTION OF CONTROLS

RECHARGEABLE REMOTE CONTROL

FREEZE

The FREEZE/UNFREEZE button is used in acquiring waveform or blood pressure test data throughout the software.

This button on the remote is a duplicate of the F9 key on the keyboard.

SAVE

The SAVE WAVEFORM or SAVE PRESSURE DATA button works either in conjunction with waveform FREEZE/UNFREEZE, or by itself, to save waveform or blood pressure test data throughout the software.

This button on the remote is a duplicate of the F10 key on the keyboard.

ARROW BUTTONS 

In data acquisition screens, the UP, DOWN, LEFT, and RIGHT arrow buttons allow you to navigate from site to site in any order, or may be used to step back to review waves already saved. In addition, the Left and Right arrow keys may be used to move the waveform or blood pressure cursor using the software scroll function.

In data acquisition screens, the ARROW buttons on the remote are duplicates of , , , and on the keyboard.

ESC

The ESCAPE button allows you to exit out of the current menu screen.

This button on the remote is a duplicate of the ESC key on the keyboard.

ENTER

This button allows you to advance through the software program.

This button on the remote is a duplicate of the ENTER key on the keyboard.

PLEASE NOTE:

The Flo-Lab's IR remote receiver may respond to other IR equipment in the user's facility, which can interfere with the function of the Flo-Lab. If you suspect this is occurring, please contact Parks Technical Support at 1-888-356-9522. You may be provided with a corded remote to prevent further occurrences.

THE BATTERY IN THE 18-BR REMOTE:

The cordless, rechargeable, 18-BR remote uses a 3.6 Volt, 700 mAh, Ni-MH battery pack, Parks part # 854-0007-50. It can be accessed by removing the single screw on the back of the remote as well as the four screws on the side (two each side - five total).

RECHARGING THE 18-BR REMOTE BATTERY PACK:

Should the battery need to be recharged, the LED on the remote will flash rapidly when any button is pressed. If the flashing is ignored eventually the LED will stop flashing and the remote will cease to function.

Please note that the LED on the remote illuminates whenever any button is pushed. This is a visual indication for the operator since the infared output is beyond the visual range. This is normal and NOT an indication of the remote battery needing to be recharged.

It is best to keep the remote on its charging base when not in use. There is no danger of overcharging.

DESCRIPTION OF CONTROLS

RECHARGEABLE REMOTE CONTROL

CHARGING BASE / LED:

The charging base has an LED to indicate the state of charge.

1. GREEN - Illuminated when power is applied to the charger (and when powered and remote is not inserted fully).
2. ORANGE - When the remote is in place and charging normally
3. RED - If there is an overload condition.
4. RED - If there is a severe overload, the LED will illuminate red, then go out.

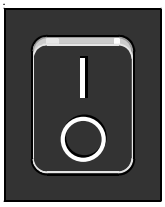
LOW VOLTAGE CHARGING ADAPTER

The supplied low voltage adaptor for the charging base may be plugged into a standard wall outlet or the charging base may be attached to any of several locations on the Flo-Lab cart with the sticky-back Velcro supplied with the unit.

Should you choose to attach the charging base to the 2100-SX cart, use the supplied adapter cable to connect the low voltage charging adapter to the cart isolation power supply

ADAPTER CABLE TO CONNECT CHARGING ADAPTER AND REMOTE CHARGING BASE TO THE 2100-SX ISOLATION POWER SUPPLY

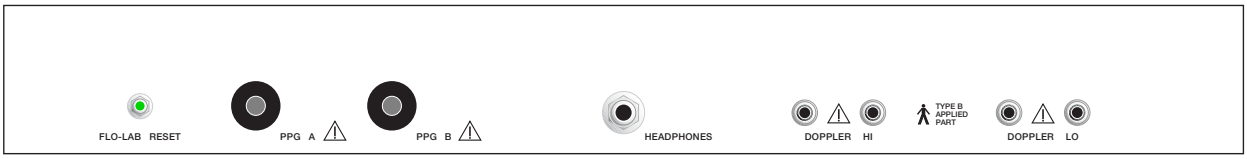
MAIN POWER ON/OFF SWITCH



PLEASE NOTE:
If the main power ON/OFF switch on the cart is turned off for storage, the charger **WILL NOT MAINTAIN THE 18-BR REMOTE BATTERY.**

DESCRIPTION OF CONTROLS

CABLE CONNECTION PANEL (UNDER KEYBOARD)



FLO-LAB RESET

Very infrequently, the Flo-Lab may refuse to start. Use this RESET to clear the Flo-Lab without shutting down the entire system. However , **DO NOT** do so without first calling Technical Support toll free at 1-888-356-9522.

⚠ PHOTOPLETHYSMOGRAPH JACKS

PPG A -- Photoplethysmograph probe jack (patient's right side).

PPG B -- Photoplethysmograph probe jack (patient's left side).

HEADPHONE JACK

This jack provides an output for low-impedance stereo headphones. When they are plugged in, the speaker is disconnected. You always hear more using headphones, especially when checking weak flow or veins.

Note: In some cases an adapter is used to connect the headphones to the system. When they are not in use, the user must be careful to remove both the headphone jack and the adapter, to restore audible Doppler signals.

⚠ DOPPLER JACKS

HI -- Nominal 8 MHz DOPPLER probe jack.

LO -- Nominal 4 MHz DOPPLER probe jack.

Connection of Doppler probes

Each probe is connected to two jacks. It does not matter which side of the probe is connected to which jack as long as both 8 MHz probe cables are plugged into the jacks marked HI and both 4 MHz cables are plugged into the jacks marked LO. The exact frequencies of the probes are indicated by labels attached to the probe cables. When ordering new probes, be sure to order these frequencies. **DO NOT** remove the labels attached to the probe cables.

The Doppler can be used with PARKS:

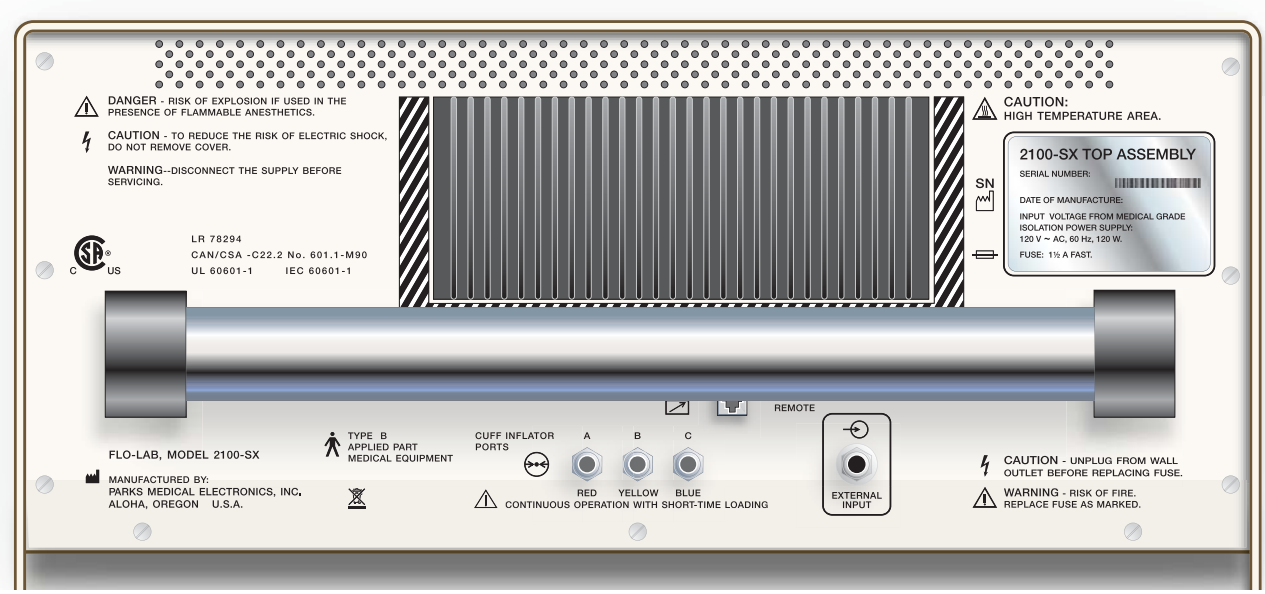
Standard high frequency (nominal 8 MHz) 3/8" (10 mm) diameter pencil probe.
Skinny high frequency (nominal 8 MHz) 1/4" (6.5 mm) diameter pencil probe.
Low frequency (nominal 4 MHz) 1/2" (12 mm) diameter pencil probe.

DO NOT POINT THE ULTRASONIC BEAM INTO THE RETINA OF THE EYE.

THIS INSTRUMENT IS DESIGNED ONLY FOR VASCULAR WORK, NOT OBSTETRICAL SERVICE.

DESCRIPTION OF CONTROLS

UPPER BACK PANEL



DANGER: RISK OF EXPLOSION IF USED IN THE PRESENCE OF FLAMMABLE ANESTHETICS.

Equipment is not suitable for use in the presence of a flammable anaesthetic mixture with air, oxygen or nitrous oxide.

CAUTION DANGEROUS VOLTAGE

Warning, no user serviceable parts inside. Refer servicing to qualified service personnel.

CAUTION HIGH TEMPERATURE AREA

Increasing temperature

TYPE B APPLIED PART MEDICAL EQUIPMENT

Defined as having adequate protection against electric shock; meets current leakage requirements. Suitable for external use, NOT suitable for direct cardiac applications.

MODE OF OPERATION: CONTINUOUS OPERATION WITH SHORT-TIME LOADING. The Air Pumps for the Blood Pressure Cufs shall be operated for a**maximum of four minutes continuously** and then allowed to cool to ambient temperature,which will take 1½ hours.

CUFF INFLATOR PORTS

RED / CUFF A

(RED) HOSE CONNECTION PORT

YELLOW / CUFF B

(YELLOW) HOSE CONNECTION PORT

BLUE / CUFF C

(BLUE) HOSE CONNECTION PORT

DESCRIPTION OF CONTROLS

REMOTE

Plug the infrared remote receiver into this jack.

EXTERNAL INPUT

Input jack for other devices, such as our mercury strain gage plethysmograph. Maximum input is about ± 4.5 V. Deflection factor is controlled by the **SIZE** knob. Maximum sensitivity is 500 mv full scale.

External Signal Input is controlled from the Front Panel by pressing the **MENU** button until the Multi-Mode Display reads MENU #5. Use the **UP** or **DOWN** buttons to turn it on or off. The signal is controlled by the **SIZE** and **POSITION** knobs.

SEPARATE COLLECTION FOR ELECTRICAL AND ELECTRONIC EQUIPMENT.

Old instruments should not be disposed of in land fills.

"ATTENTION, CONSULT ACCOMPANYING DOCUMENTS"

These statements on the back panel apply to the connections directly under them on the Bottom Back Panel.

SAFETY ISOLATING TRANSFORMER POWER SUPPLY

Built-in isolated medical grade transformer supplies power to the Flo-Lab when plugged into an appropriate "HOSPITAL GRADE" alternating current outlet.

ALTERNATING CURRENT

POWER INPUT must match the ratings printed on the POWER SUPPL Y PANEL and the MAIN POWER CORD PANEL.

120 V ac ~, 60 HZ, 120 W.

CAUTION DANGEROUS VOLTAGE

Unplug the unit from the wall outlet before replacing the FUSE.

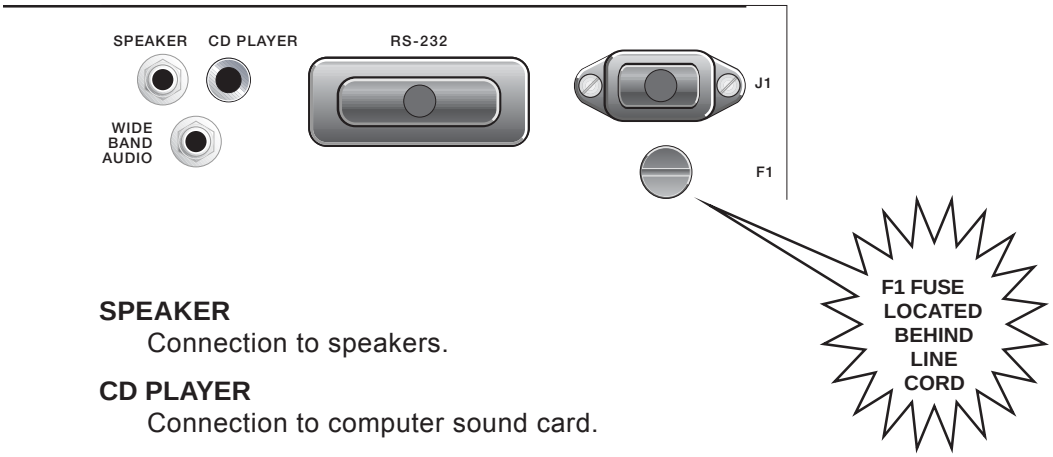
FUSE

Fuse, **1½** Amp Fast.

DESCRIPTION OF CONTROLS

BOTTOM BACK PANEL

I/O PANEL (Looking up at the bottom of the upper section of the Flo-Lab)



SPEAKER
Connection to speakers.

CD PLAYER
Connection to computer sound card.

WIDE BAND AUDIO
Connection to Spectrum Analyzer (optional).

RS-232
Connection to computer serial port.

J1
Input from built-in ISO 500 D isolated medical grade transformer.

F1
Fuse, **1½** Amp Fast.

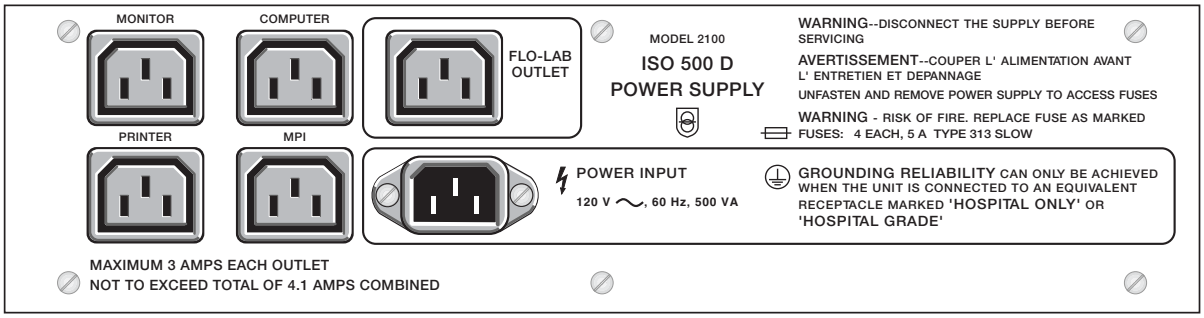
FUSE REPLACEMENT

YOU MUST UNPLUG THE FLO-LAB FROM THE WALL OUTLET BEFORE REPLACING THE FUSE.

The F1 replaceable **1½** amp fast fuse is accessible by opening the rear door of the cart and removing the main AC line cord from the underside of the Flo-Lab chassis. **The fuse is located directly behind the AC line cord on the right** (viewed from the rear). Insert a slotted head screwdriver up through the access hole in the cart and push in against the spring tension of the fuse holder, turning counter-clockwise about 1/8 turn until fuse and gray cap are free. Re-install only the specified size fuse. When properly installed, the gray fuse cap will be flush with the black holder.

DESCRIPTION OF CONTROLS

ISO 500 D POWER SUPPLY PANEL (LOCATED BEHIND MAIN POWER CORD PANEL)



The Flo-Lab must be plugged into the outlet marked “FLO-LAB OUTLET”. Usage for other outlets must not exceed what is specified on the panel.

POWER INPUT must match the ratings printed on the POWER SUPPL Y PANEL and MAIN POWER CORD PANEL.

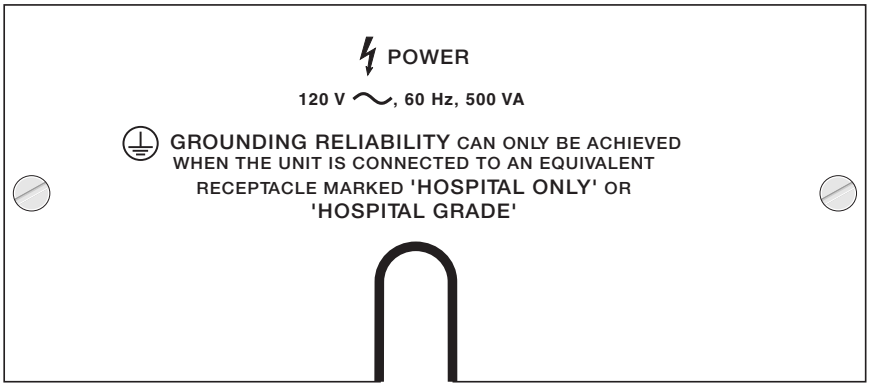
Safety isolating transformer

Dangerous voltage

Protective earth (ground)

Fuse, 4 each, 5 Amp TYPE 313 SLOW (internal).

MAIN POWER CORD PANEL



The Power cord must be plugged into a ‘HOSPITAL ONLY’ or HOSPITAL GRADE’ alternating current power outlet that fits the specifications printed on the MAIN POWER CORD PANEL.

Dangerous voltage

Alternating current, **120 V ac ~, 60 HZ, 120 W**.

Protective earth (Ground)

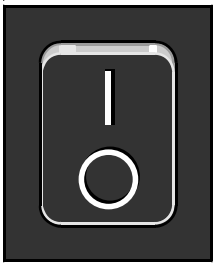
DESCRIPTION OF CONTROLS

RIGHT SIDE PANEL (FACING FLO-LAB)

COMPUTER ON/OFF SWITCH

Computer switch may be left in the on position to allow power to be controlled by the Flo-Lab's MAIN POWER ON/OFF SWITCH.

MAIN POWER ON/OFF SWITCH



The main power on/off switch for the Flo-Lab is located on the lower right side of the cart, directly under the access to the computer. This on/off rocker switch controls all power to the Flo-Lab, computer, printer and monitor, through the built-in isolated medical grade power supply .

| ON (POWER)

○ OFF (POWER)

FLO-LAB NETWORK RISK ADVISORY

AS OF THE 3.51 RELEASE, SONOVA SOFTWARE UTILIZES NETWORK FEATURES SUCH AS DICOM® COMPATIBILITY AND A SONOVA CLIENT/SERVER OPTION.

To provide the safest and most secure operating environment for the Parks Flo-Lab it is recommended that the Flo-Lab not be connected to any computer network. This is the only sure way to avoid the possibility of malicious attacks, infections from computer viruses and worms and to ensure complete privacy of the data contained on the Flo-Lab computer system.

If the networking of the Flo-Lab with a local area network is required then Parks highly recommends the implementation of a firewall and anti-virus software with the latest updates and up-to-date virus definitions. Parks does not assume any responsibility for loss of data or system failures due to network security violations.

The Flo-Lab Model 2100-SX runs on the current Windows operating system. Parks encourages each facility to install and maintain the virus protection software used by your facility.

NOTE: To ensure the SonovaE software runs optimally, do not run any virus scan or updates while in use on a patient.

* DICOM® is the registered trademark of the National Electrical ManufacturersAssociation for its standards publications relating to digital communications of medical information.

BASICS

In vascular testing the Doppler ef fect describes the change in frequency that occurs when a transmitted energy reflects from a moving object.

This formula describes the Doppler phenomenon:

$$\Delta F = \frac{2F_t V (\cos \theta)}{C}$$

Where:

Δ F = The difference between Doppler probe frequency transmitted and the frequency received.

$2F_t$ = Two times the transmitting frequency of the Doppler probe.

V = Velocity of insonated object (red blood cells).

θ (theta) = The angle of incidence between the ultrasound beam and the blood cells.

C = A constant which is equal to the velocity of ultrasound in tissue (1540 m/sec).

The formula appears intimidating but its principle is easy. It merely states that if you direct a sound beam at a moving object (here the Doppler ultrasound beam points at moving blood cells) that object's movement alters the frequency of the reflected sound beam. Blood cells moving toward the transmitter add their velocity to the signal causing the reflected signal to be a higher frequency than the transmitted frequency . Conversely, blood cells moving away from the transmitter subtract their velocity from the transmitted signal causing the reflected signal to be lower in frequency . The greater the velocity of the blood cells either toward or away from the transmitter the greater the frequency change that occurs. The signal that you listen to during Doppler testing is the dif ference between the transmitted and the received signal. The Doppler testing device comp ares the received signal' s frequency to the transmission frequency and then output s the dif ference between the two signals either to a recording device or to speakers or earphones.

Vascular testing uses two basic Doppler types: continuous wave (C.W.) and pulsed. Most C.W. Dopplers use two piezoelectric crystals (see note below), one continually transmitting and one continually receiving. Pulsed Dopplers use a single crystal which alternates between transmitting and receiving. Each type has unique advant ages. C.W . Dopplers provide greater signal resolution and frequency response. Pulsed Dopplers (because of signal timing) allow more accurate determination of vessel depth. Because signal quality is usually more important than vessel depth information in noninvasive vascular testing the Dopplers used on P ARKS equipment are continuous wave.

NOTE: Piezoelectric crystals change thickness rapidly when a high frequency electric current passes through them, resulting in the production of sound waves. When they are struck by sound waves reflected from the moving blood cells they convert the sound energy into electric current.

The Doppler unit transmits at a set frequency and "listens" for the returning echo. By comparing the frequency of the "echo" to the transmitted frequency , the Doppler determines forward or reverse flow, flow velocity (angle dependent) and the magnitude of the movement.

There are many elements that interplay to determine some of the values mentioned above but for everyday testing all you need to remember is that if the reflected signal is a higher frequency than the transmitted frequency it is usually associated with forward blood flow (flow towards the probe) and if it is a lower frequency it is reverse flow (flow away from the probe). On the strip chart recorder or on a scope forward flow usually appears as an upward deflection of the trace while reverse flow appears as a downward deflection.

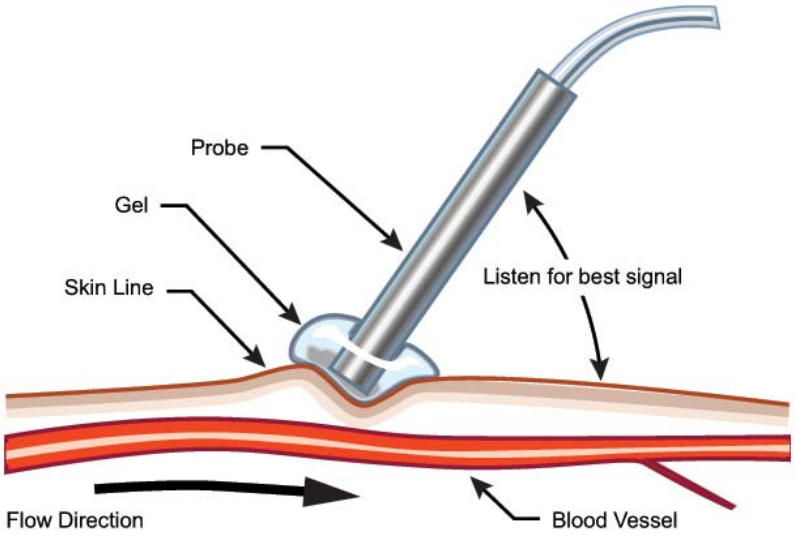
You can use Dopplers for both arterial and venous examinations. In arterial studies you compare the waveforms to known normals to establish a diagnosis. With venous studies, recording the Doppler signal yields little useful information. Venous Doppler studies rely heavily on the experience of the technologist to listen to and evaluate flow characteristics and they are the most subjective of the noninvasive examinations. In both arterial and venous tests the examination techniques are similar for the upper and lower extremities.

Normally you should use the high frequency Doppler probe for high flow , relatively shallow vessels. Use the low frequency probe for deeper vessels.

BASICS

PROBE POSITIONING

PROPER PROBE PLACEMENT AND PROPER USE OF GEL ARE VERY IMPORTANT!
In vascular testing the ideal Doppler angle would be to have the probe pointing right down the vessel lumen. Since such a practice is impractical in normal testing a compromise exists. Hold the probe at a **45** to **60 degree** angle from the skin line with the probe tip pointing cephalad (toward the head). As with all guidelines this is not a hard and fast rule. You must still search for the best quality signal.



Proper Doppler probe angle

Improper probe position alters waveform morphology. You cannot make an abnormal signal appear normal by repositioning the probe but you can make a normal signal appear abnormal by incorrect probe angle.

You must be very careful about probe pressure, because a slight amount of pressure against the skin can occlude the artery.

DO NOT point the ultrasonic beam into the retina of the eye.

THE RED PROTECTIVE COVER MUST BE REMOVED FROM THE PROBE BEFORE USE.

THE COUPLING GEL

You must use gel in front of the probe.

We recommend you use a coupling gel made especially for ultrasound. Don't use a gel that is too runny. You can use sterile jellies internally.

Ultrasound coupling gels are available from us, or will usually be available from one of your surgical supply dealers. These gels are available in bulk, sterile packets and bottles. Gel in a semi-rigid tube with a small extended tip is easier to use than that which is in collapsible tubes. Refilling from bulk is much less expensive than buying more bottles or packets. Some tubes can be autoclaved.

Please do not use ECG paste or cream. The probe crystals are covered by a material that is vulnerable to attack by heat, alcohol and ECG paste.

In an emergency use any sterile liquid or gel without excessive bubbles. Petroleum jelly or mineral oil can be used in emergencies, but they often do not transmit the sound well. Sensitivity may be reduced and bubbles in the gel can make a popping noise. Placing the pencil probe directly on wet tissue will also work.

MAINTENANCE

COMPUTER & PRINTER

For information on setting up, operating and servicing the computer and printer supplied with the Flo-Lab, see the **'Owners Manual'** or **'Users Guide'** supplied by the manufacturer of that equipment. These manuals or guides were included with the Flo-Lab when it was delivered.

CLEANING THE INSTRUMENT

TURN OFF POWER AND UNPLUG INSTRUMENT FROM WALL OUTLET BEFORE CLEANING.
Loose dust accumulated on the outside of the instrument can be removed with a clean, soft cloth. Dirt which remains can be removed with a soft cloth dampened in a mild solution of disinfectant and sterile water. Abrasive cleaners should not be used.

CLEANING THE PROBES

- Remove the gel with a soft tissue after each use.
- Wash any dried gel off the probe with warm running water.
- User may opt to wipe probe with alcohol, surface germicidal cloth, or liquid disinfectant (do not soak). Rinse probe with warm water to remove any residue after cleaning/germicidal agent dries. DO NOT USE BLEACH.

DO NOT AUTOCLAVE THE PROBES

Temperatures above **57.2** degrees Celsius (135 degrees Fahrenheit) destroy the crystal activity and cause the covering over the individual cables and the outer sheath to shrink and crack. With a raised temperature, a severe loss of sensitivity will occur. Autoclaving voids the probe warranty.

CLEANING THE CUFFS

If you need to wash the cuffs, remove the bladder first. The cuff covers are made of Nylon and Velcro, and may be washed by hand or washed in a washing machine using the gentle cycle. Hang the cuff on a line to dry.

CLEANING THE MANOMETER

Remove loose particles with a soft cloth or small brush. Wash with a soft cloth dampened in a mild solution of detergent and water. Never use abrasive cleaners. To disinfect surface, use a soft cloth dampened with liquid disinfectant or use a surface germicidal cloth. After cleaning/germicidal agent dries, remove any residue with a soft cloth dampened with water.

MAINTENANCE

REPLACEMENT OF INTERCHANGEABLE AND/OR DETACHABLE PARTS

Nominal 8 MHz probe

Nominal 4 MHz probe

PROBES

The Doppler probes are easily ruined through misunderstanding and neglect. Over 90% of the failures of the Doppler are due to failure of the probe in some way.

THE PROBE FREQUENCY MUST MATCH THE TUNING OF THE DOPPLER.

The exact frequencies of the instrument are indicated by labels attached to the probe cables. Be sure to reorder replacement probes by these frequencies. A variation of .1 MHz is not significant at around 5 or 10 MHz. But it is around 2 MHz.

The active part of the probe consists of two crystals. One for transmitting ultrasound waves and the other for receiving reflected waves. Each probe is connected to two jacks. It does not matter which side of the probe is connected to which jack as long as both 8 MHz probe cables are plugged into the jacks marked HI and both 4 MHz cables are plugged into the jacks marked LO.

DISCONNECTING THE PROBES from the instrument should be minimized.

Don't do it unless you need to, for two reasons. First the connectors wear and make erratic contact causing "static" after many disconnects. Second, people have a tendency to pull on the cable instead of the connectors themselves and they break the soldered connection inside the cable connector.

If the probe connectors or panel jacks are making poor contact and there is "static", the center pin wiping on the panel jack is usually at fault. A sharp tool can be used to bend the wiping sleeve inward and stop the noise.

THE DOPPLER CAN BE USED WITH:

Standard high frequency (nominal 8 MHz) 3/8" (10 mm) diameter pencil probe.

Skinny high frequency (nominal 8 MHz) 1/4" (6.5 mm) diameter pencil probe.

Low frequency (nominal 4 MHz) 1/2" (12 mm) diameter pencil probe.

The user should keep spare probes of the proper frequency on hand.

This instrument is designed only for vascular work, not obstetrical service.

STRANGE NOISES FROM THE DOPPLER

On occasion there are noises you might not expect from the Doppler when in fact the Doppler is working fine. The following are some common concerns and their causes.

CONCERN:	CAUSE:	REMEDY:
Popping scratchy noises when the probe is first placed on the skin.	Air bubbles in the gel are moving and/or popping. Hair movement can also cause these noises.	Use a new dab of gel that looks clear, push the probe down enough so hair is immobilized, and wait a few seconds for everything to settle. If the noise is not there when the probe is clean (no gel) and suspended in the air, the Doppler and/or probe are probably working fine.
Static when the dry probe is moved through the air.	Loose connectors where the probe connects to the instrument, broken shield wire in the cable either at the connector or as it comes out of the probe.	There is normally some static generated when the cable is flexed, but it isn't severe. Replace probe or get connectors fixed. If the problem persists contact your sales representative.
High pitched tone and flow indicators (if so equipped) go to the extreme.	Radio interference from a mobile service, police station nearby, even another Doppler working close by. Usually occurs near large open windows, rarely in the center of the building.	Move the Doppler to another location away from windows and toward the center of the building. If the problem persists contact your sales representative.
Buzzing noise that almost obliterates the Doppler signal.	Electrocautery or other sparking device, bad fluorescent light fixture or neon signs nearby.	Move the Doppler to another location away from the interference. If the problem persists contact your sales representative.
Howling noise when probe is held or laid on a table with gel on it.	Probe is acting as a microphone and you are getting acoustic feedback.	Wipe gel from probe, If the noise does not occur without gel on the probe, it is probably working fine.

ADDITIONAL TESTS:

1. Use the other frequency and see if you have the same or similar problems.
2. Try using headphones if you have a howling noise. If there is no howl using headphones but there is with a speaker , it is acoustic feedback.
3. Try a different probe, even if it is the wrong frequency it will let you know if the problem is noisy connectors in the instrument or frayed shielding near the probe body .

SUMMARY

The problem may simply be a probe or it may be peculiar to the environment in which it is used. If you have tried the tests and remedies mentioned and you still suspect a problem contact Technical Support toll free at 1-888-356-9522.

PARKS
Medical Electronics, Inc.

SonovaE

MODEL 2100-SX FLO-LAB

Calibration Test, Pressure Test,
Cuff Volume Calibration/Verification
and Computer Maintenance

Notice

This information has been provided to assist you in meeting accreditation standards set forth by the Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL).

Parks recommends that you perform the complete field calibration procedure on your Parks Flo-Lab after every 1000 hours of use or once a year.

To perform both the calibration test and the cuff volume verification/calibration test, it will be necessary to purchase the calibration test fixture (Parks part #80-2100) and the 1000 ml air chamber (Parks part #986-3003-26) from the factory.

To order the test fixture or air chamber call 1-800-547- 6427 option 0, M-F, 7:00 AM - 3:30 PM Pacific Time.

Parks Medical Electronics, Inc.
Mailing Address: PO Box 5669 Aloha OR 97006-0669 USA
Shipping Address: 19460 SW Shaw St Aloha OR 97078-1242 USA
Telephone: 503-649-7007 • *Flo-Lab Technical Support Toll Free:* 1-888-356-9522
Fax: 503-591-9753 • *e-mail*: info@parksmed.com • *Web Site:* www.parksmed.com

PARKS FLO-LAB

FIELD CALIBRATION

1. Position the Flo-Lab cart with the back next to a sturdy table or workbench.
2. TURN THE CART'S MAIN POWER SWITCH OFF (**O**) (located on the lower right-hand side of the cart). Unscrew and remove the monitor tie down, slide the monitor out of the bracket and set the monitor on the bench leaving its cable and connections intact. Remove the screws (6-8 depending on mfg. date) holding the Flo-Lab top cover. Set the cover aside.
3. Inside, in the right front corner of the Flo-Lab you will see a grey colored metal box enclosure. Remove the four (4) screws (2 top right & 2 lower left) and take off the box cover. Inside the enclosure there are five (5) plug-in circuit boards and one other board mounted behind at a right angle to the others.
4. Carefully remove the left most plug-in circuit card with the 8.3 marked near the front (it may be 9.7 if it has been re-frequenced). Replace it with the Model 80 calibration fixture card with the component side of the board facing to the left. Connect the cable that was furnished with the Model 80 card to the jack in the top of the card and to the ⊖ **EXTERNAL INPUT** jack on the back of the Flo-Lab.
5. Turn **ON (|)** the Flo-Lab cart and computer The computer will boot into Windows and automatically load the SonovaE software. From the opening menu choose NEW STUDY. Enter a last and first name and press ENTER. At the next menu select LOWER ARTERIAL. This will put you into the PATIENT & STUDY screen, press **(Esc)** ESCAPE. Now choose TEST SELECT, then choose DOPPLER. On the Model 80 calibration fixture, turn the POWER switch **ON**. Switch to either the **CAL A** or **CAL B** position.
6. On the Flo-Lab front panel, press the **DOPPLER/ON** button (if not already on). The **8** MHz LED (8.3 MHz) should be illuminated. Also verify that under the "**OUTPUT FILTER—Hz",** the **"28"** LED is illuminated. If needed, press the button below the "28" LED until it illuminates. Next press the **MENU** button (located directly to the left of the front panel LCD display) to advance to "5—EXTERNAL SIGNAL OFF". Press the **UP** button (to the right of this display) to turn the signal **ON**.
7. Use the **POSITION** knob on the front panel of the Flo-Lab to move the white cursor position to the 1st division from the bottom of the display. Turn the **SIZE** control clockwise until the signal is maximized (100). Should display an 8 division signal, ± 10%.
8. Press the **MENU** button to advance to "5—EXTERNAL SIGNAL ON". Press the **UP** button to turn the signal OFF. Press **DOPPLER/ON.** Switch the Model 80 calibration fixture power **OFF**. Remove the cable between the Model 80 calibration fixture and the ⊖ **EXTERNAL INPUT** jack. Please review the example in *Figure 1* on the next page.
9. On the left side of the Flo-Lab front panel, use the **POSITION** control to center the trace in the grid on the computer monitor. Turn the Flo-Lab **SIZE** control counter-clockwise to set SIZE A to 85.
10. Set the switches on the Model 80 calibration fixture to **"A"** and **"ON".** Verify there are 5 green LEDs under TOWARD on. After 2 or 3 seconds, set the Model 80 to **"B".** Verify there are 5 red LEDs under AWAY on (4-6 LEDs are acceptable on either side, if there are a lot more, say 10, call the factory; this is configured for 8.3 MHz, if the card is 9.7 MHz, there will be more). Switch back and forth from **"A"** to **"B"** several times. Press the **F9** key to "freeze" the trace on the computer monitor. Please review the example in *figure 2* on the next page.

FIELD CALIBRATION

11. The trace on the monitor will look like a square wave, 8 divisions in amplitude.

12. Press the **F9** key to re-start the trace on the computer monitor. Set the switch on the Model 80 calibration fixture to "**OSC"**.

13. After a few seconds, press the button below the **MEAN** LED under the "OUTPUT FILTER—Hz**"** on the Flo-Lab front panel. The "**14 Hz"** filter LED should illuminate and the signals should drop in amplitude. Repeat pressing the button below the **MEAN** LED to test the other filter settings. The signal should be very small at 3.5 and a smooth line in the MEAN setting. Please review the example in *figure 3* below.

14. Press **(Esc)** Escape all the way out to the starting page of the SonovaE software, **QUIT** SonovaE or click on the red X in the corner. Now exit Windows by clicking in the Start button in the lower left-hand corner of your screen. Choose **TURN OFF COMPUTER.** Wait until the computer shuts down then turn **OFF (O)** the Flo-Lab main power switch. Remove the Model 80 calibration fixture card and replace the original 8.3 MHz (or 9.7) RF circuit board card.

15. Replace the Doppler enclosure cover and its (4) screws.

Note: This test verifies the current calibration remains within factory specifications. If any major variations are noticed, please call Parks Medical Electronics, Inc. at 1-800-547-6427 option 3.

Scope Screen Examples

Figure 1

#8

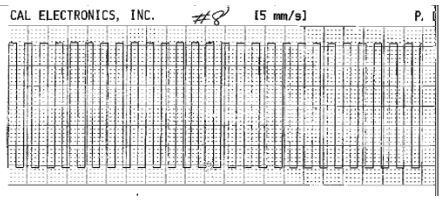
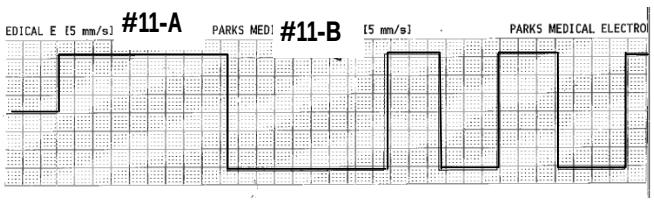


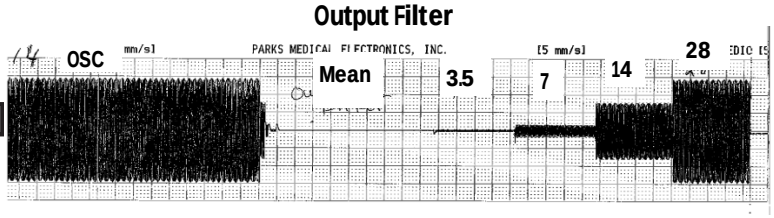
Figure 2



Output Filter

#14

Figure 3



PARKS FLO-LAB

PRESSURE VERIFICATION

NOTE: For optimum performance for your Flo-Lab system, **use only the hoses furnished with the system.** The calibration of cuff volume and volume change is based on using the **nine foot hoses** and adapters as furnished. Any other length or size of tubing or the addition of an in-line air chamber will cause the reported cuff volume to be increased or decreased by the increase/decrease in volume.

1. Connect a mercury column (may use electronic) and manometer to the **RED** hose (you will need to provide a 'T' type adapter to connect both instruments to one hose) which is connected to the channel **"A"** VPR input on the back of the Flo-Lab (NOT the MPI (Multi-Port Inflator)). Turn **ON (|)** the Flo-Lab. In SonovaE choose STUDYARCHIVES. Your current test patient should be at the top of the list, select it, then press ENTER or "F3 Retrieve". Answer "Yes" to the question "You are about to retrieve an archived study. Continue?" Now choose TEST SELECT then VPR.
2. Pump the manometer to 40 mm mercury as read on the mercury column. **DO NOT USE THE FLO-LAB'S INTERNAL INFLATOR FOR THIS PROCEDURE as the mercury column may be damaged. USE ONLY A HAND BULB TYPE OF MANOMETER.**
3. Take note of the reading under **"CUFF A"** on the front panel display of the Flo-Lab and also the reading in the upper left of the computer monitor. The only lights on the front panel will be "A Red," "VPR" and "Arterial." The readings must be within 5mm of the mercury column reading (if the measurement reads significantly greater, call the factory).
4. Pump the system pressure to 200mm on the mercury column. Again compare the readings on the computer monitor and the front panel on the Flo-Lab to the mercury column. The readings must be within 5mm of the mercury column reading.
5. Move the connections to the **YELLOW** hose which is connected to the channel **"B"** VPR input on the back of the Flo-Lab. On the front panel press **"A",** to turn A OFF and press **"B"**, to turn B ON. Use an arrow key to switch the active field from Right to Left. Repeat the tests as done in steps 2, 3 and 4.
6. Disconnect the mercury column from the Flo-Lab. Press **(Esc)** Escape all the way out to the start page of the SonovaE software, **QUIT** SonovaE. You will be at your Windows Desktop, wait for the BLACK FLASH. Now exit Windows by clicking in the "Start" button in the lower left-hand of your screen. Choose **SHUT DOWN** or **TURN OFF COMPUTER** (depends on the Windows version). Wait until the computer shuts down then turn **OFF (O)** the Flo-Lab main power switch.
7. Replace the Flo-Lab top cover and its six or eight screws. Slide the computer monitor back into the bracket then secure with the tie-downs two screws.
8. The calibration tests are now complete. For cuff volume calibration procedure, proceed to the next page.

Testing for Port C has been removed from the SonovaE software due to lack of use.

PARKS FLO-LAB

CUFF VOLUME VERIFICATION / CALIBRATION

Calibrate every 1000 hours or once a year.

The Flo-Lab is tot ally automated and requires no additional action by the technologist above and beyond what is normally required to acquire good pulse volume waveforms. Your Flo-Lab has been calibrated at the factory to accurately determine the cuff volume. However, since the goal of calibrated pulse volume waveforms is to provide accurate and repeatable results, the technologist should initially and occasionally verify that the system is performing properly and should also be aware of several factors which can affect the results. The following information is provided to help you obtain the most accurate and meaningful pulse volume amplitude information.

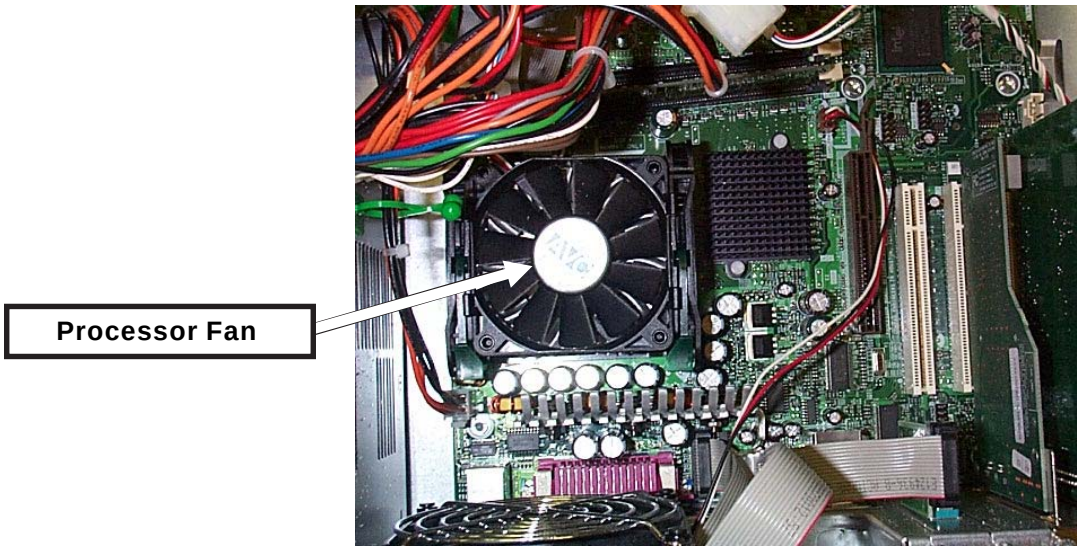
You must purchase the 1000 ml volume chamber from the factory (Parks part #986-3003-26) to perform the cuff volume verification/calibration test. Please call the factory at 1-800-547-6427, option 0.

1. Turn **ON (|)** the Flo-Lab and computer. The computer will boot into Windows and automatically load the SonovaE Software. From the opening menu choose NEW STUDY. Enter a last and first name and press ENTER. At the next menu select LOWER ARTERIAL. This will put you into the PATIENT & STUDY screen, press **(Esc)** Escape. Now choose TEST SELECT , then choose **VPR.**
2. On the Flo-Lab front panel, press the **MENU** button and advance to menu "8—VPR CAL. SEQUENCE OFF/ON". Press the **UP** to turn the **VPR CAL** sequence **ON**. Connect the 1000 ml chamber to the **RED** hose which is connected to the channel **"A"** VPR input on the back of the Flo-Lab (NOT the MPI; Multi-Port Inflator).
3. On the Flo-Lab front panel, press **"B"** to turn **B** OFF, then press "**INFLATE**". The Flo-Lab will inflate, deflate, then re-inflate the 1000 ml volume chamber (there could be a 40 second wait before the re-inflate occurs). As the second inflation starts, the calculated volume of the chamber will appear under the label "R Cuff (A):" on the left side of the graph on the computer monitor. The calculated volume should be within +/- **3%** of the value marked on the chamber. If not, press the **"MENU"** button to advance the menu to "9—VPR CAL.A FACTOR". If the calculated volume was high, press the **"UP"** button to increase the constant. If the volume was low, press the **"DOWN"** button to decrease the constant. Press **"DEFLATE"**, then **"INFLATE"** to repeat the test. Note that an exact match may not occur, since the calculated volume changes by about 10 ml for each digit that the CAL factor is changed. Record the A CAL factor for future reference.
4. Connect the **YELLOW** hose to the 1000 ml volume chamber, press **"A",** to turn A OFF and press **"B"**, to turn B ON. Use an arrow key to switch the active field from Right to Left. The calculated volume of the chamber will appear under the label "LCuff (B):" on the left side of the graph on the computer monitor. B CAL factor is verified in the same way that A was, except the B CAL factor is displayed in the menu "10—VPR CAL, B FACTOR". Please follow step #3 for cuff B volume verification.
5. The cuff volume calibration test is now complete. On the Flo-Lab front p anel, press the **MENU** button and advance to menu "8—VPR CAL. SEQUENCE OFF/ON". Press the **DOWN** button to turn the **VPR CAL** sequence **OFF.** Press **(Esc)** Escape all the way out to the start page of the SonovaE software, **QUIT** SonovaE. You will be at your Windows Desktop, wait for the BLACK FLASH. Now exit Windows by clicking in the "Start" button in the lower left-hand of your screen. Choose **TURN OFF COMPUTER** (depends on the Windows version). Wait until the computer shuts down then turn **OFF (O)** the Flo-Lab main power switch.

PREVENTIVE MAINTENANCE FOR COMPUTER

During regular usage of your Flo-Lab, dust can accumulate inside the computer Excess dust can cause the computer to run inefficiently or even prevent it from working at all. Dust in the computer has even been known to cause the PC to freeze up. It is recommended that the computer be removed from the Flo-Lab cart and cleaned every six months.

1. Unscrew the 3 phillips head screws that hold the back access door closed.
2. Disconnect the cables connected to the back of the computer (ie; printer , monitor etc…) and the strap that holds the computer in place.
3. Once the computer is out, remove the side panel.
4. Using compressed air or a vacuum hose, clean out the dust from the inside of the computer Pay extra attention to the fan mounted directly on top of the processor (see image below). You should inspect all fans to make sure they are operating correctly There is a fan in the power supply and sometimes a case fan mounted on the front or rear of the case. You will probably have either two or three fans in the computer.
5. When finished, replace the cover on the computer and put it back into the Flo-Lab cart. Replace all cables and the strap that holds the computer in place.
6. Once in Windows, run the system defrag. Click Start> All Programs> Accessories> System Tools> Disk Defragmenter. Click **Analyze**, when complete, click **Defragmenter**, if needed.



MICROSOFT WINDOWS UPDATES ON PARKS MEDICAL ELECTRONICS FLO-LABS

Parks Medical Electronics, Inc. encourages our customer to be up to date with all Microsoft Windows updates. This ensures that your system is running to its full potential.

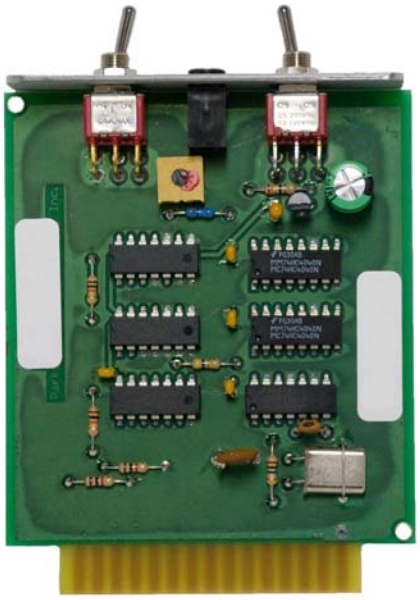
Please Remember to never download or perform an update while the machines is being used. Exit out of all programs properly before the update.

VIRUS PROTECTION

Parks Medical Electronics, Inc. recommends each facility install and update each machine with their virus protection software. We request software to not be scanning or updating while the Flo-Lab is being used.

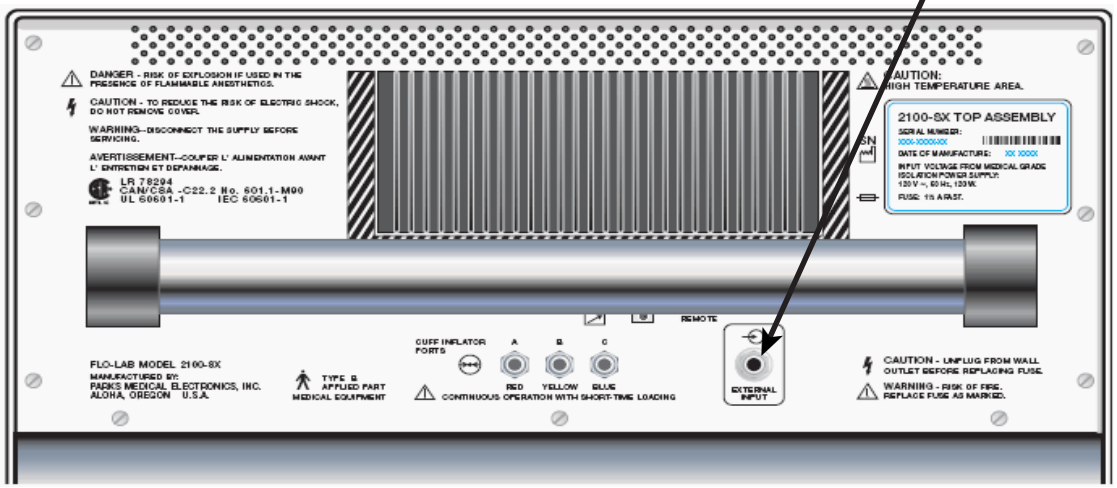
Model 80 Calibration Fixture
Parks Part #80-2100

You Will Also Need an Electronic Style Mercury Column, Not Shown Here.



Model 80 Calibration Fixture Front View

Cable Comes Furnished with the Model 80 Fixture



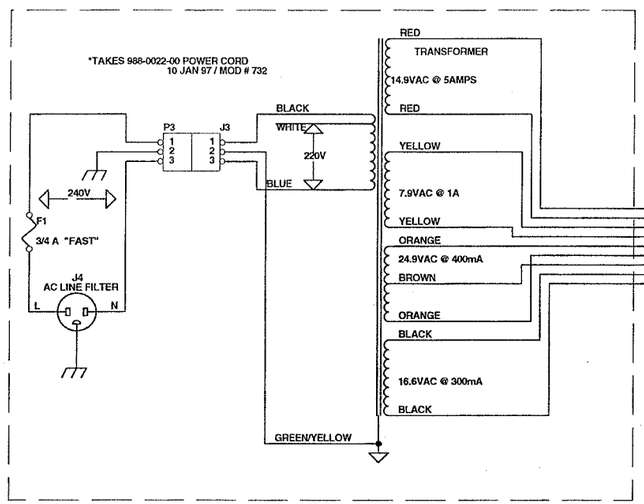
Model 2100-SX Rear View

1000 ml Air Chamber
Parks Part #986-3003-26

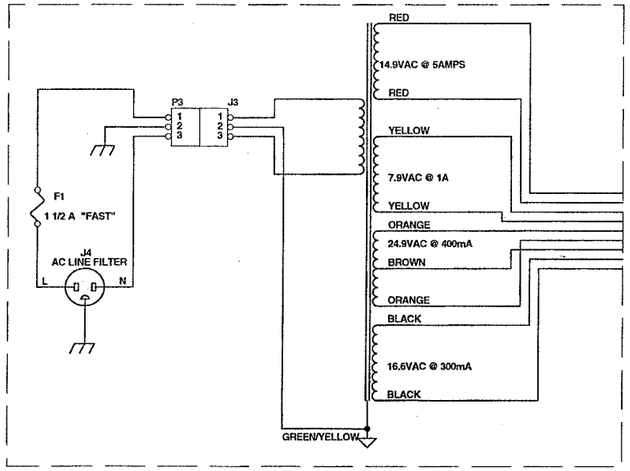
Sphygmomanometer
Parks Part #989-1104-10

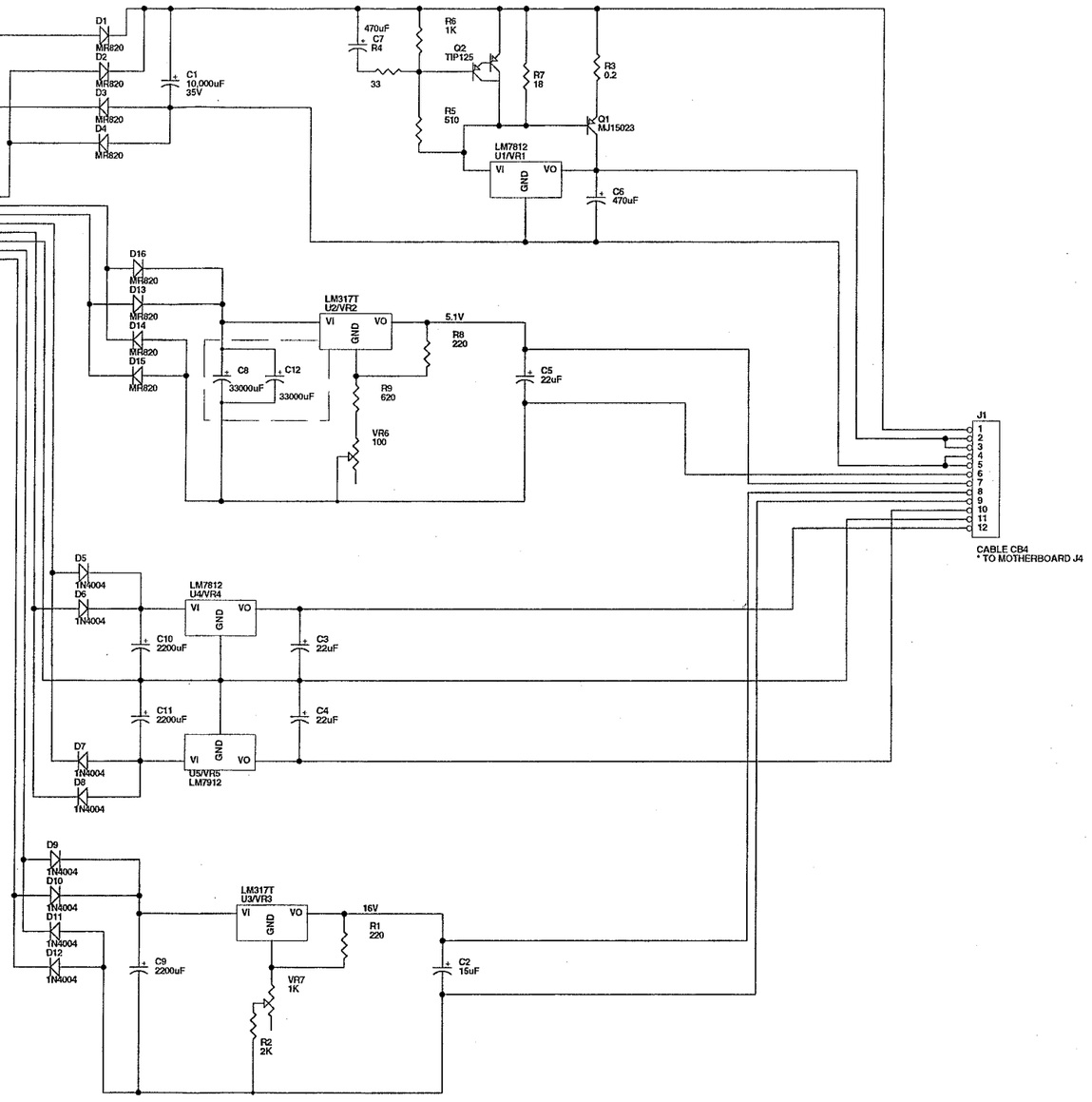
299-0266-25.00
2100 POWER SUPPLY - DOMESTIC & EXPORT

EXPORT POWER



DOMESTIC POWER
PANEL MOUNTED





17 MAY 06	DCN #50611	UPDATE ROHS COMPLIANT P/N'S, RENAME DOCUMENT TO NEW STANDARD.
30 NOV 04	DCN #040590	REMOVE J2 AND P2 FROM SCHEMATIC
29 SEP 04	DCN #040497	CHANGED VALUE OF R3 TO 0.2 OHM
10 AUG 02	NO MOD	CORRECTED WIRE COLORS FROM TRANSFORMER TO J3
26 JAN 2000	NO MOD	CORRECT P2/J2 WIRES
16 JUL 99	NO MOD	ADDED LINE FILTERS (J4)
29 DEC 97	NO MOD	CORRECTED DOMESTIC FUSE TO 1 1/2 AMP FAST
12 DEC 97	ECO-063	ADD THIS POWER SUPPLY TO DOMESTIC 2100
01 DEC 97	NO MOD	RE-ANNOTATE "J's" & "P's"
26 NOV 97	ECO-059	REPLACE C8, 2200uF, W/C8 & C12 > 33,000uF *(CAPS IN 332-0260-22 KIT)
13 APR 97	NO MOD	CORRECTED DRAWING; P2, #3 & 4
13 JAN 97	MOD # 732	CHANGE POWER CORD RE: ISO 9000
16 DEC 96	MOD # 727	NEW NUMBER FOR 240V / 220V EXPORT MODEL & FUSE TO 3/4 A FAST
07 NOV 96	ADDED NOTE	988-0013-00 POWER CORD / MOD # 705
08 OCT 96	NO MOD	CORRECTED F1 RATING

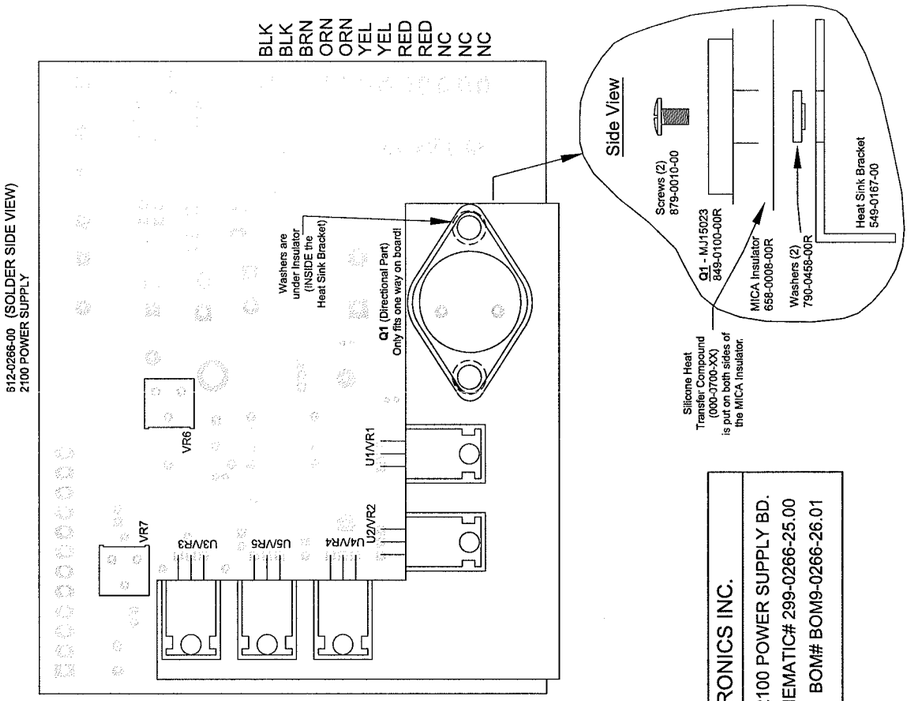
APPROVED: [signature]

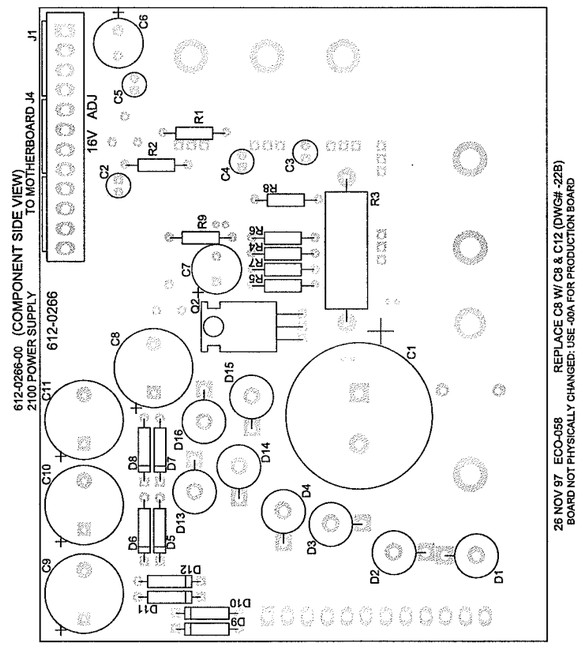
DATE: 5/17/06

PARKS MEDICAL ELECTRONICS
19460 S.W. SHAW ST.
BEAVERTON OR 97005
503-649-7007

2100 POWER SUPPLY - DOMESTIC & EXPORT

Size	FCSM No.	DWG No.	Rev
Orcad C		299-0266-25	00
Scale		17 MAY 2006	Sheet 1 of 1





PARKS MEDICAL ELECTRONICS INC.

2100 POWER SUPPLY BD.

SCHEMATIC# 299-0266-25.00

BOM# BOM9-0266-26.01

DOC# REFD0266-27.01

22 APR 2013

PCB# 612-0266-00

PARKS MEDICAL ELECTRONICS INC

22 APR 2013 BOM9-0266-26.01 M DCN# 52450

SINGLE LEVEL BILL OF MATERIALS

2100 Power Supply Domestic & Export

PARTS IN KIT 329-0266-23

DESIGNATOR	VALUE	COMMENT	P/N
PCB			612-0266-00
VR7	1K		689-0003-00
VR6	100		689-0051-00
R6	1K		690-0102-00R
R7	18		690-0180-00
R2	2K		690-0202-00R
R1, R8	220		690-0221-00R
R4	33		690-0330-00R
R5	510		690-0511-00R
R9	620		690-0621-00
R3	0.2		698-9200-00R
C1	10,000uF	35V	710-0109-00R
C2	15uF		710-1156-00R
C3, C4, C5	22uF		710-1226-00R
C6, C7	470uF		710-1477-00R
C9, C10, C11	2200uF		710-2228-00R
D1, D2, D3, D4, D13, D14, D15, D16			848-2004-00R
J1	12 HEADER		869-0155-01R

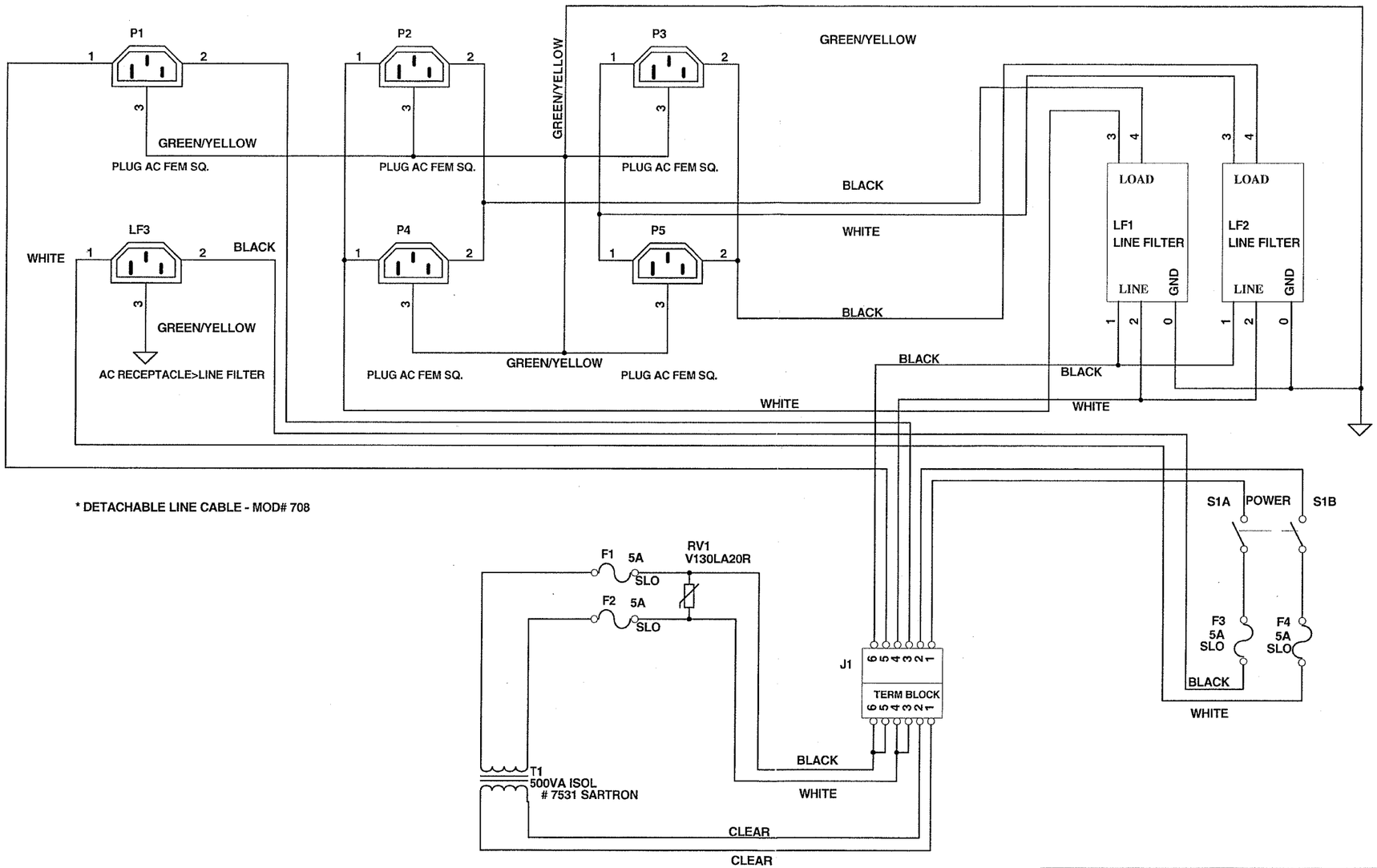
PARTS IN KIT 330-0266-26

DESIGNATOR	VALUE	COMMENT	P/N
Q - "X" REF	HEAT SINK	BRACKET	594-0167-00
Q1 REF		MICA INSULATOR	658-0008-00R
U1/VR1, U2/VR2, U3/VR3, U4/VR4, U5/VR5 REF	INSULATORS (5)		658-0006-00
U1/VR1, U2/VR2, U3/VR3, U4/VR4, U5/VR5, Q1, Q2 REF	SCREWS (8)	4-40 3/8"	789-0010-00
Q1 REF	WASHERS	SHOULDER (2)	790-0458-00R
U2/VR2, U3/VR3			844-0048-01R
U1/VR1, U4/VR4			844-0071-00R
U5/VR5			844-0072-00R
D5, D6, D7, D8, D9, D10, D11, D12			848-0010-00R
Q2			849-0039-00R
Q1			849-0100-00R

OFF THE BOARD, BUT ON THE SCHEMATIC:

DESIGNATOR	VALUE	COMMENT	P/N
C8, C12	33000uF		710-0333-35
F1	3/4 A FAST	EXPORT	865-1004-00
F1	1 1/2 A FAST	DOMESTIC	865-1013-00R
J4	PLUG AC MALE	LINE FILTER	869-0079-01R
P3 (REF) (QTY 3)	PINS	FEMALE	869-0097-00R
J3 (REF) (QTY 3)	PINS	MALE	869-0098-00
J3	MOLEX	MALE CONN.	869-0157-00
P3	MOLEX	FEMALE CONN.	869-0158-00
T1	TRANSFORMER	DOMESTIC 120V	880-0064-00
T1	TRANSFORMER	EXPORT 220V	880-0067-00

299-0131-16.00
ISO-500 D/2100



* DETACHABLE LINE CABLE - MOD# 708

ECO-044 12 SEP 97
TERMINAL BLOCK CHANGED

ECO-055 10 OCT 97
UPDATE TERMINAL BLOCK PARTS

NO MOD 30 DEC 97
CORRECTED PLUG DRAWINGS

NO MOD 23 JAN 98
ADJUSTED FUSE DISPLAY

NO MOD 13 JAN 99
NOTE RE: GLUEING RECEPTACLES

NOTE:
LABEL P/N 005-0318-00 REQUIRED
ECO-097

DCN# 50562 4/24/06 CHANGE P/N J1, P1 THRU P5, RV1 TO ROHS COMPLIANT P/N'S. RENAMED DOCUMENT TO NEW STANDARD.

* NOTE: ADD GLUE TO BACK SIDE OF EACH RECEPTACLE BEFORE INSTALLING THEM.
* LOCTITE "444" GLUE (000-0000-23)
* LOCTITE "7452" ACCELERATOR (000-0000-15)

APPROVED: Donald E Pratt
DATE: 4/24/06

Parks Medical Electronics Inc.
19460 S.W. Shaw
P.O. Box 5669
Aloha, Oregon 97007
(503) 649-7007

ISO 500 D/2100

Size	FCSM No.	DWG No.	Rev
Orcad B		299-0131-16	00
Scale	24 APR 06	Sheet 1 of 1	

PARKS MEDICAL ELECTRONICS INC.,

24 APR. 06 BOM9-0131-16.00 M DCN# 50562

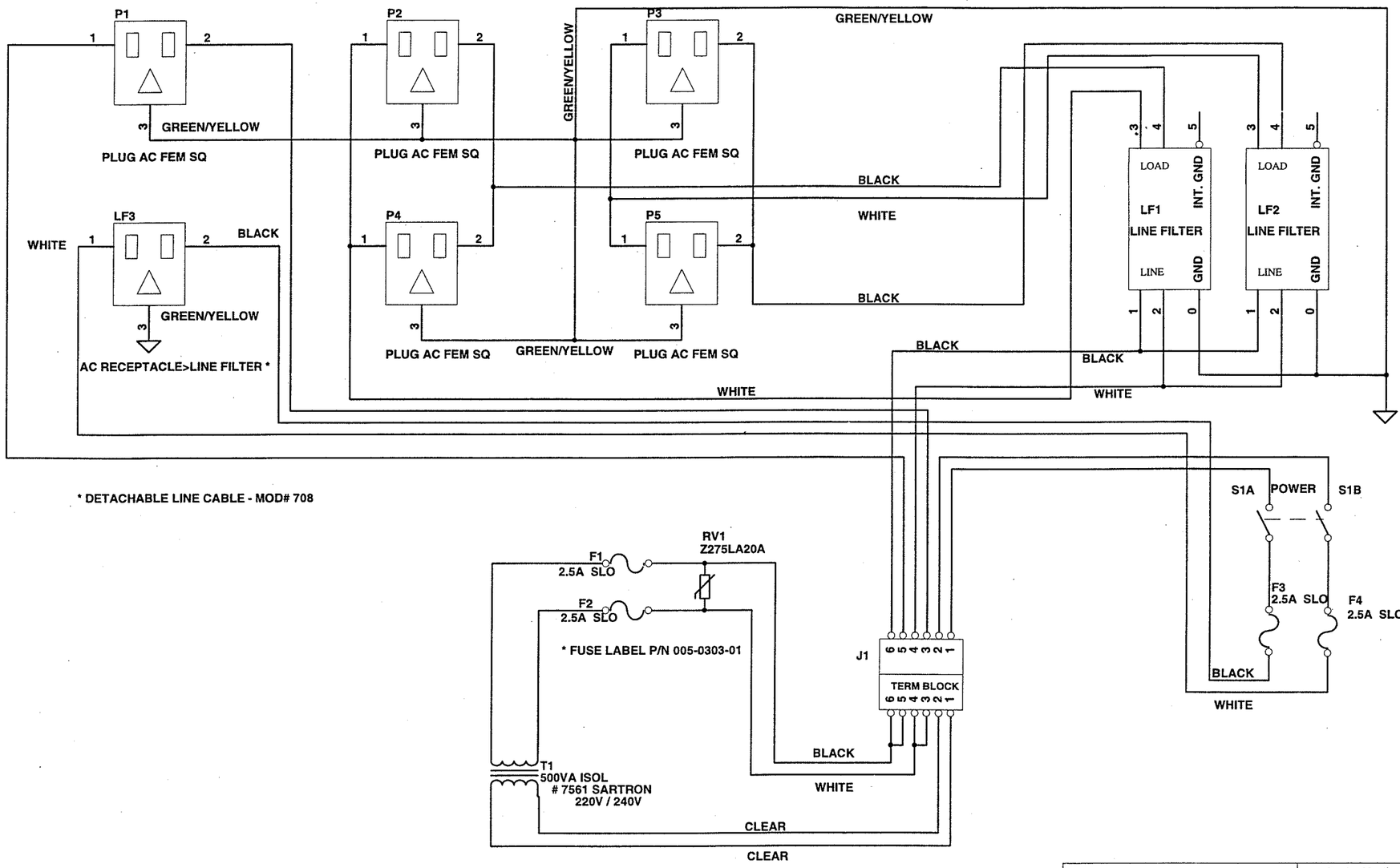
SINGLE LEVEL BILL OF MATERIAL,

ISO 500 D/2100

DESIGNATOR	VALUE	COMMENT	P/N
S1	POWER		740-0060-10R
RV1			848-3001-00R
F1, F2, F3, F4	5A	SLO	865-2008-00R
LF3	AC RECEPTACLE>LINE FILTER *		869-0079-02
LF1, LF2	LINE FILTER		869-0094-01
P1, P2, P3, P4, P5	PLUG AC FEM SQ		869-0162-00R
J1	TERM BLOCK	EUROSTRIP	876-0005-00R
T1		# 7531 SARTRON	880-0065-00
[BOM9-0131-16.00_M.xls]			

299-0131-22E

ISO-500 POWER SUPPLY - 2100 CART - 220VOLT



* DETACHABLE LINE CABLE - MOD# 708

ECO-039 25 AUG 97
FUSE LABEL > 005-0303-01

ECO-044 12 SEP 97
TERMINAL BLOCK CHANGED

ECO-055 10 OCT 97
UPDATE TERMINAL BLOCK PARTS

NO MOD 30 DEC 97
CORRECTED PLUG DRAWINGS

NO MOD 23 JAN 98
ADJUSTED FUSE DISPLAY

NO MOD 13 JAN 99
NOTE RE: GLUEING RECEPTACLES

NOTE: ECO-097
LABEL P/N 005-0318-00 REQUIRED

* NOTE: ADD GLUE TO BACK SIDE OF EACH RECEPTACLE BEFORE INSTALLING THEM.
* LOCTITE "444" GLUE (000-0000-23)
* LOCTITE "7452" ACCELERATOR (000-0000-15)

PART NO.: 332-0131-22	Parks Medical Electronics Inc. 19460 S.W. Shaw P.O. Box 5669 Aloha, Oregon 97007 (503) 649-7007
Gerald C Yard 13 JAN99	ISO 500 POWER SUPPLY - 2100 CART - 220 VOLT

Size	FCSM No.	DWG No.	Rev
Orcad B		299-0131-22	E
Scale	13 JAN 99	Sheet 1 of 1	

PARKS MEDICAL ELECTRONICS INC.,

12 JAN 99 299-0131-22E

SINGLE LEVEL BILL OF MATERIAL,

ISO 500 POWER SUPPLY - 2100 CART - 220V

Designator	Part Type	Description	Part Number
F1, F2, F3, F4	2.5A SLO		865-2007-00
J1, J1B	HEADER 6	TERM BLOCK	876-0005-00
LF1, LF2	LINE FILTER	*	869-0094-01
LF3	AC RECEPTACLE>LINE FILTER *	*	869-0079-02
P1, P2, P3, P4, P5	PLUG AC FEM SQ	*	869-0162-00
RV1	V130LA20R		848-3001-00
S1	POWER		740-0060-10
T1	500VA ISOL 220V / 240V	# 7561 SARTRON	880-0065-22
[0131-22E.XLS]			

299-0264-04.01
MODEL 2100 FRONT PANEL

QEP 3.3V Zone

Key Scan 3.3V Zone

See Note 1

ROW Pins are driven to GND by Open Drain Outputs

Column Pins are inputs with pull-ups

Key Pad Buffer

Meter-A <2>

Meter-B <2>

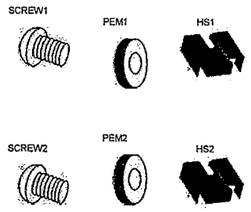
Approved:	Parks Medical Electronics PO Box 5669, Aloha, OR 97007 (503) 649-7007
Date: 6/25/2012	Title: 2100 Front Panel Board - Bus Info/Buttons/LED's
	Size: C — Document Number: 299-0264-04.01 — Rev: G
	Monday, June 18, 2012 — Sheet 1 of 3

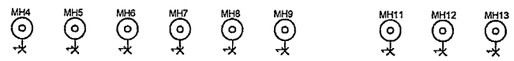
Change Log and Notes

ECO Number	PCA PN	PCA REV	PCB PN	PCB REV	DATE	Description of Changes	BY
	299-0264	04	612-0264	04	05/12/2012	Engineering Only Release - NOT released to production	
						This is a replacement for the 2100 Front Panel Board because the rotary encoders and the key scan/encoder chips have gone obsolete. At the same time, we romved the recorder and associated LED circuitry.	AJN

Notes:

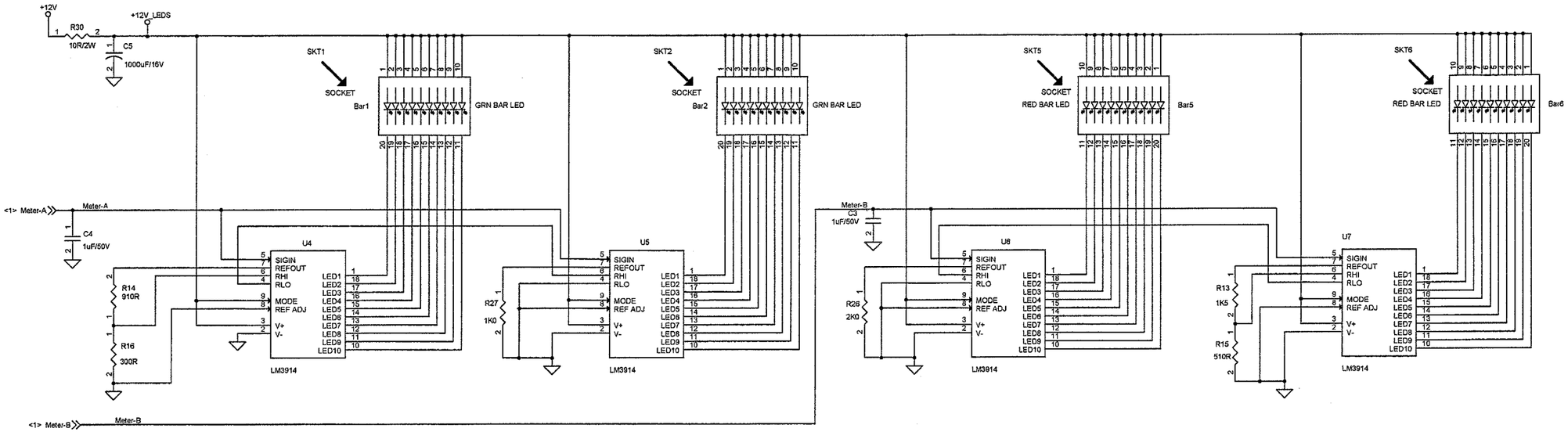
1) TO220 mounted secondary side. Land Pattern to include the following features.
    1. Heat Sink mounting tabs and oultine.
    2. 3/4" x 1" secondary side copper flood connected to pin 2
       (solder mask removed)

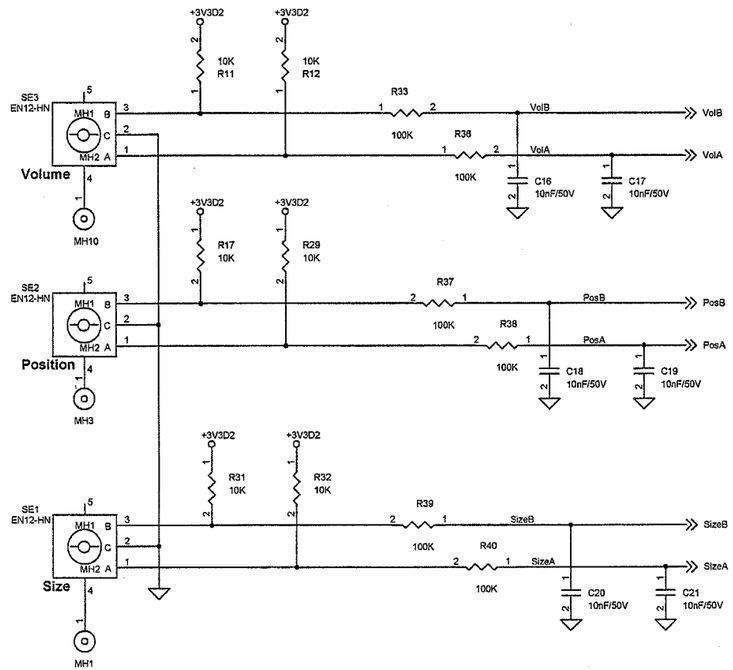




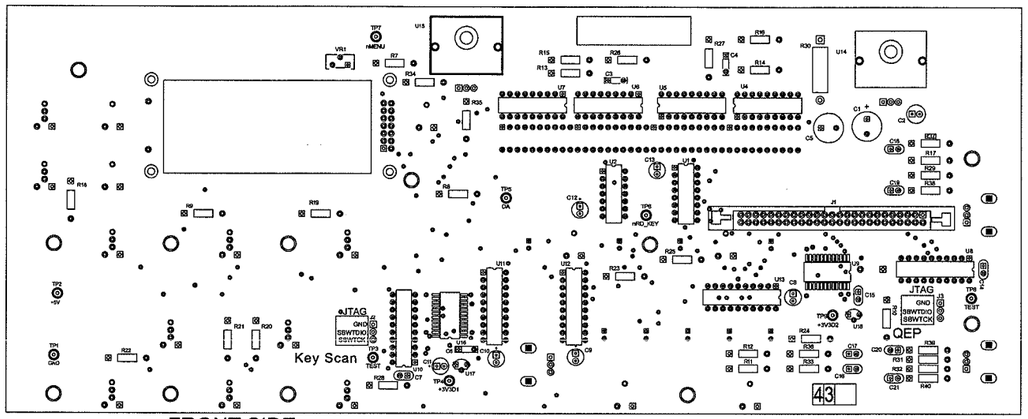
2) There are multiple part numbers associated with this PCB
    1) 299-0264-04: This Schematic, replaces 299-0264-03.01
    2) 612-0264-03: Raw PCB, replaces 612-0264-03
    3) 611-0264-03: Raw PCB + clinch nuts for the heatsinks, replaces 611-0264-02
    4) 329-0264-01: This is 611-0264-03 with passive components, washed.
    5) 330-0264-06: 329-0264-01 with non-washable parts and IC's added, Final Assembly

Parks Medical Electronics PO Box 5669, Aloha, OR 97007 (503) 649-7007		
Title: 2100 Front Panel Board - Change Log and Notes		
Size: C	Document Number: 299-0264-04.01	Rev: G
Date: Monday, June 25, 2012	Sheet 3 of 3	



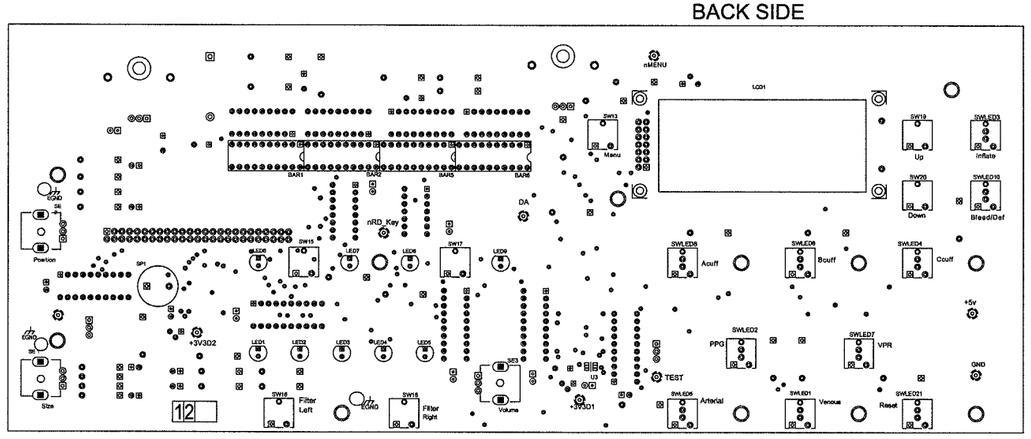


Parks Medical Electronics PO Box 5669, Aloha, OR 97007 (503) 649-7007		
Title: 2100 Front Panel Board - Bar Graph LED's		
Size: C	Document Number: 299-0264-04.01	Rev: G
Date: Monday, June 18, 2012	Sheet 2 of 3	



FRONT SIDE

BACK SIDE



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0264-05.05	2100 FRONT PANEL BD.
10 JULY 2012	SCHEMATIC# 299-0264-04.01 G
PCB# 612-0264-03	BOM# BOM9-0264-05.02

PARKS MEDICAL ELECTRONICS INC

10 JULY 2012 BOM9-0264-05.02 M DCN# 52239

SINGLE LEVEL BILL OF MATERIALS

2100 FRONT PANEL BOARD

PARTS IN KIT 329-0264-02

DESIGNATOR	VALUE	COMMENT	P/N
PCB			611-0264-03
VR1	10K	POTV	689-0025-00R
R35	10		690-0100-00R
R27	1K		690-0102-00R
R7, R11, R12, R17, R29, R31, R32	10K		690-0103-00R
R33, R36, R37, R38, R39, R40	100K		690-0104-00R
R13	1.5K		690-0152-00R
R26	2K		690-0202-00R
R10, R28	22K		690-0223-00R
R9, R16, R18, R19, R20, R21, R22, R23, R24, R25	300		690-0301-00R
R8, R34	4.7K		690-0472-00R
R15	510		690-0511-00R
R14	910		690-0911-00R
R30	10	1%	698-8100-00R
C5	1000uF		710-0108-05R
C2	100uF		710-1107-00R
C8, C9, C10, C11, C12, C13	22uF	22 TANT	710-1226-00R
C1	470uF		710-1477-00R
C16, C17, C18, C19, C20, C21	10nF		717-1103-01R
C7, C14, C15	100nF	50V MONO RD	717-1104-04R
C3, C4, C6	1uF		717-1105-00R
SP1	SPEAKER	AL-175	835-0014-00
BAR1, BAR2, BAR5, BAR6		IC SOCKET 20 PIN	864-0019-00R

PARTS IN KIT 330-0264-07

DESIGNATOR	VALUE	COMMENT	P/N
SW13, SW15, SW16, SW17, SW18, SW19, SW20		BLACK CAP	738-0028-00
SWLED1, SWLED2, SWLED3, SWLED4, SWLED5, SWLED6, SWLED7, SWLED8, SWLED10, SWLED21		WITH LED	738-0029-00R
SE1, SE2, SE3		POSITION / SIZE / VOLUME	740-0092-00R
U14, U15		SCREWS, 4/40 X 1/4"	789-0005-00
U14, U15		HEATSINK	792-0003-00
U14		TO-220H	844-0036-00R
U15		TO-220H	844-0048-01R
U4, U5, U6, U7		DIP18	844-0126-00R
U2		DIP14	844-0129-00R
U11, U12, U13		DIP20	844-0141-00R
U1		DIP16	844-0142-00R
U17, U18			844-0203-00R
U10, U8			844-0204-00R
U3			844-5008-00R
U16, U9			844-5009-00R
LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9			850-0004-05R
Bar5, Bar6		DIP20	850-0012-00R
Bar1, Bar2		DIP20	850-0015-00R
LCD1		LCD DISPLAY	850-1004-10R
J2, J3			869-0056-03
J1			869-0178-00R
BOM9-0264-04.01.xls			

299-0265-03-00
2100 MOTHERBOARD

NOTES:

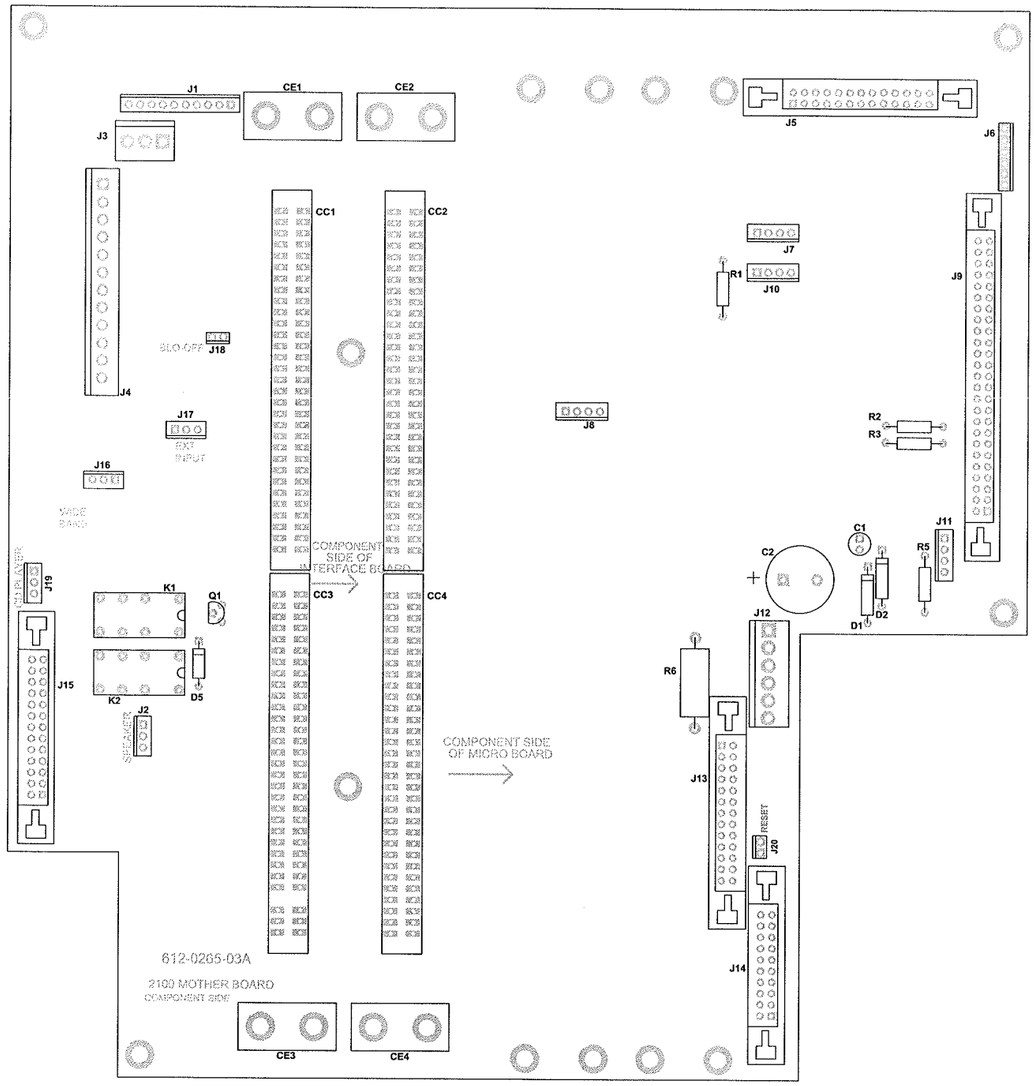
18 JUNE 2009 DCN# 51709 REMOVE PNEUMATIC CONNECTIVITY FROM SCHEMATIC
03 MAY 2005 DCN# 50592 CHANGE PIN'S D1,D2,Q1,R5, R2, 220 TO ROHS COMPLIANT PIN'S.
CHANGED 52 PIN TO 740-2001-00; RENAMED DOCUMENT TO NEW STANDARD.
07 APR 2005 DCN# 050135 ADD D5 AND D7 TO RESET SWITCH CIRCUIT
10 APR 2001 ECO-325 REV "H": ADD PRESSURE SWITCH TO PUMP SYSTEM (REF : 299-0211-05D)
10 FEB 2000 NO MOD REV "H": CHANGE RESET BUTTON FROM RED TO BLACK / PART NUMBER
JAN 2000 NO MOD REV "G": CORRECT PIN-1, LABELS (PUMP SYSTEM)
27 DEC 99 NO MOD REV "F" ; CORRECT CAL "A" / CAL "B" LABELS
09 DEC 99 ECO-193 REV "E": ADD RESET BUTTON, J13, J20
13 OCT 99 ECO-187 REV "D": CORRECTED CB12; CHANGED TO LOCKING HEADERS; CHANGED PADS / HOLE SIZES
21 APR 99 NO MOD ENHANCED AIR TUBING DRAWING (PR1 -> PR2)
13 APR 98 ECO-093 ADDED COMMENT RE: VALVES ADAPTERS
03 DEC 97 REV "D"; DELETE D1,D4,R4; RUN FROM CC4-01 > R4
(21 AUG 97) ECO-060
11-3-97 ECO-054 R6 ELEVATED MOUNTING (HEAT DISSIPATION)
22 JAN 97 NO MOD CORRECTED K2 > J3 WIRING
15 OCT 96 MOD# 697 ADDED FUSE & HOLDER, F1
28 AUG 96 NO MOD CORRECTIONS TO DRAWING
13 AUG 96 NO MOD CHANGED PN#, J5

S2 PRESSURE SWITCH PSI
OFF BOARD
F1 2A FAST
ON COMPRESSOR PANEL
M2 PUMP
M1 PUMP
V2 A CUFF VSO VALVE
V3 B CUFF VSO VALVE
V4 C CUFF
V5 CAL A VALVE
V6 CAL B VALVE
V1 BLO-OFF VALVE NC
VALVE, 986-1009-00 NEEDS ADAPTORS, P/N 986-0010-01 ECO#093: 13 APR 98
P18
BLO-OFF
J18
HEADER 16
HEADER 3 (BIG)
HEADER 12
TO POWER SUPPLY
DOPPLER BUS
AIR BUS
SIG BUS
SIG SELECT BUS
PUMP
DAISY BUS
F.P. BUS
RECORDER BUS
CE1A CARD EDGE GUIDE CC1
CE2A CARD EDGE GUIDE CC7
CE1D CARD EDGE GUIDE
CE2D CARD EDGE GUIDE CC3
CE3A CARD EDGE GUIDE
CE3D CARD EDGE GUIDE
CE4A CARD EDGE GUIDE CC4
CE4B CARD EDGE GUIDE
CE2B CARD EDGE GUIDE
Intfc Bd
uP Board
J10 HEADER 4
J7 HEADER 4
J8 HEADER 4
J11 HEADER 4
REMOTE
J13 2X13 LOCKING
TO CHART RECORDER
J20 HEADER 2
RESET (ECO-193)
S1
CB12 / 821-3212-01 RECORDER POWER CABLE
J12 HEADER 6
P2 2X4SQPIN FEM
2X4SQPIN MALE
J14
PLETH
2X10 LOCKING
TO PLETHYSMOGRAPH
TO FRONT PANEL
299-0265-XX 2100 MOTHER BOARD
2X25 LOCKING
2X13 LOCKING
DOPPLER BUS
MOUNTED ON BACK PANEL
CB15 / 821-3215-00
EXTERNAL INPUT
MOUNTED ON BASE PANEL
CB32 / 821-3207-00
CB30 / 821-2130-00
CB19 / 821-2119-00
CB31 / 821-3231-00
CB 32 / 821-3232-00
SPECTRUM CABLE
DB25 / SERIAL CABLE
DB37
JK6 HEADPHONES
JK17
JK16
JK2
JK3
SP1 LEFT SPEAKERS
SP2 RGT
CD / MULTI-MEDIA
HEADER 3
2X13 SQ
2X13 LOCKING

APPROVED: Donald Jarred
DATE: 6/19/2009

PARKS MEDICAL ELECTRONICS
19469 S.W. SHAW ST
P.O. BOX 5669
ALOHA OR 97007
503-646-7007
2100 MOTHER BOARD

Size	FCSM No.	DWG No	Rev
Orcad D		299-0265-03	00
Scale		18 JUNE 2009	Sheet 1 of 1



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0265-01.08	2100 MOTHER BOARD
10 JAN 2014	SCHEMATIC# 299-0265-03.00
PCB# 612-0264-02	BOM# BOM9-0265-05.02

PARKS MEDICAL ELECTRONICS INC

10 JAN 2014 BOM9-0265-05.02 M DCN# 52605

SINGLE LEVEL BILL OF MATERIALS

2100 MOTHER BOARD

PARTS IN KIT 329-0265-01:

DESIGNATOR	VALUE	COMMENT	P/N
PCB	BOARD	*DWG#: 0265-03C.PCB	612-0265-03
R1, R2, R3	10		690-0100-00R
R5	1K		690-0102-00R
R6	10		698-8100-00
C1	22uF		710-1226-00R
C2	4700uF		710-2478-00R
D5			848-0003-00R
J12	HEADER 6	RECORDER POWER	869-0050-00R
J2, J16, J17, J19	HEADER 3		869-0126-03R
J7, J8, J10, J11	HEADER 4		869-0126-04R
J6	HEADER 6	TO HEADPHONES	869-0126-06R
J1	HEADER 10		869-0126-10R
J3	HEADER 3 (BIG)	COMPRESSOR POWER	869-0128-00
J4	HEADER 12 X 156	TO POWER SUPPLY	869-0155-01R
J14	2 X 10 LOCKING	TO DAISY CHAIN	869-0176-00R
J5, J13, J15	2 X 13 LOCKING	TO DOPPLER MOTHER BOARD	869-0177-00R
J9	2 X 25 LOCKING	TO FRONT PANEL	869-0178-00R
J5, J9, J13, J14, J15	LATCH, EJECTOR	2 each	869-0178-10R
J18, J20	HEADER 2	BLO-OFF & RESET	869-0204-00R
CC1, CC2, CC3, CC4	CARD EDGE CONN.	2 X 31 SULLINS	869-0206-00R

PARTS IN KIT 330-0265-02:

DESIGNATOR	VALUE	COMMENT	P/N
K1, K2	RELAY DPDT		740-0051-00R
D1, D2		1A SCHOTT	848-0017-00R
Q1			849-2011-00R

PARTS IN KIT 332-0260-04:

DESIGNATOR	VALUE	COMMENT	P/N
CE1, CE2, CE3, CE4	CARD EDGE GUIDES		864-0033-10R

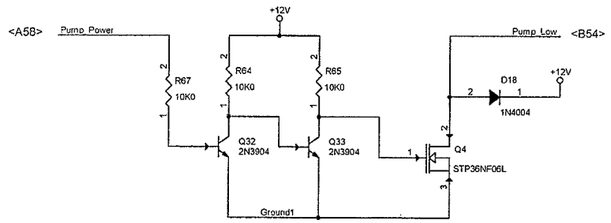
OFF THE BOARD, BUT ON THE SCHEMATIC:

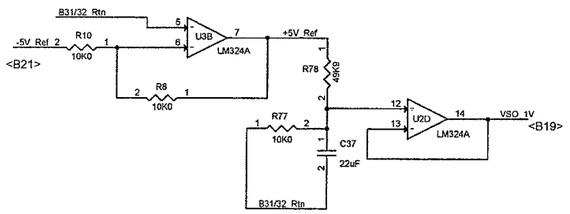
DESIGNATOR	VALUE	COMMENT	P/N
CB30	1/4 SLV" / 869-0033-00	TO SPEAKERS	321-2130-00
S1	PUSH BUTTON	RESET	740-0067-00R
S2	PRESSURE SWITCH	PSI	740-2001-00
S1 REF:	NUT		780-0023-00
S1 REF:	LOCK WASHER		790-0017-00
S1 REF:	WASHER		790-0439-00
CB19	869-0127-00	CD PLAYER / MULTIMEDIA	821-2119-00
CB12	RECORDER POWER CABLE	TO P2 (2 X 4 SQ PIN)	821-3212-01
CB15	DB25 PLUG	SERIAL CABLE	821-3215-00
CB31	869-0135-00	TO MULTIMEDIA	821-3231-00
CB2	HEADER 3 / 869-0069-00	SPEAKERS	821-3232-00
CB32	WIDE BAND AUDIO >	SPECTRUM CABLE	821-3232-00
SP1, SP2	SPEAKERS	PART OF CB30 / 866-0008-00	835-0015-00
D6, D7			848-0003-00R
F1	2A FAST		865-1006-00
JK2	(CB2) 869-0069-00	TO SPEAKERS (CB30)	869-0033-00R
P15	2 X 13 SQ	SERIAL CABLE	869-0073-00
P20	PANDUIT 2 PIN	RESET	869-0089-00R
P18	BLO-OFF	HEADER 2	869-0126-02R
P16	FROM J16 / TO JK16	WIDE BAND AUDIO - OUT	869-0126-03R
P17	TO JK17	EXT. INPUT	869-0126-03R
P6	FROM J6 / HEADER 6	TO HEADPHONES / (JK6)	869-0126-06R
P3	TO J3 / HEADER 3 "BIG"	COMPRESSOR POWER	869-0128-00
FL1, FL2, FL3, FL4	FILTER	IN-LINE	869-0900-00
M1, M2	PUMP		888-0004-00
V1	VALVE NC	BLO-OFF VALVE	986-1008-00
V5, V6	VALVE, SOLENOID	CAL VALVE	986-1008-10
V4	VALVE, SOLENOID	C-CUFF VALVE	986-1009-01
V2, V3	VALVE, SOLENOID	VSO VALVE	986-1011-00
PR1, PR2, PR3	VALVE, RELIEF		986-2013-00
JK6	TO J6 / P6	HEADPHONES	
JK16	P16 > CB32 / DB37 PLUG	WIDE BAND AUDIO / SPECTRUM	
JK17	FROM P17	EXT. INPUT	
P2	2 X 4 SQ PIN	RECORDER POWER	

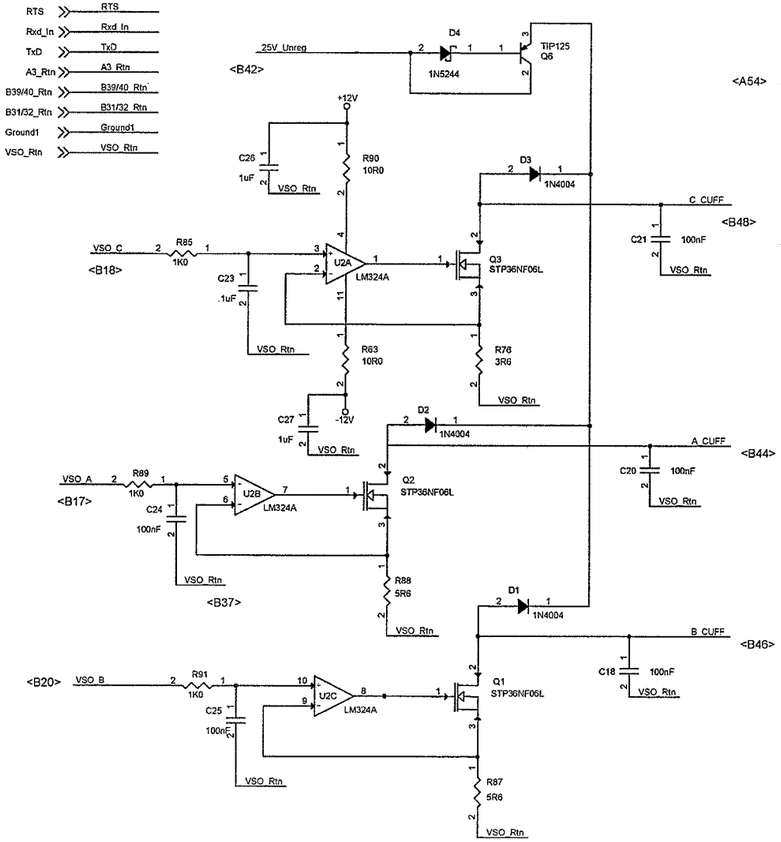
299-0263-04.04

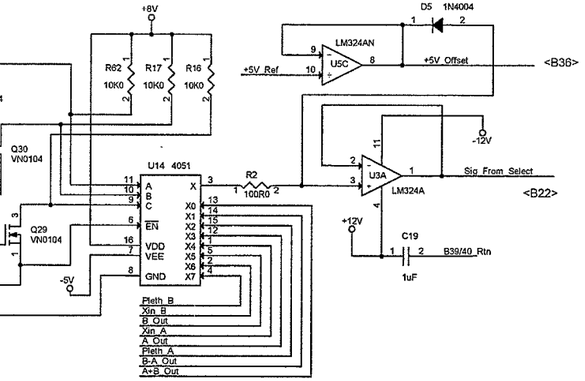
Signals coming on page

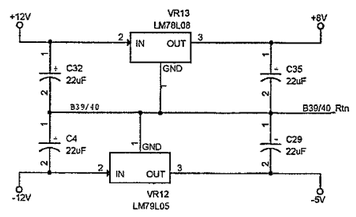
Pg #		
2	Pump_Power	Pump_Power
2	-5V_Ref	-5V_Ref
2	+5V_REF	+5V_REF
2	25V_Unreg	25V_Unreg
2	VSO_C	VSO_C
2	VSO_B	VSO_B
2	VSO_A	VSO_A
2	Data	Data
2	Clock	Clock
2	Strobe_Pleth	Strobe_Pleth
2	Sig_Select_A	Sig_Select_A
2	Sig_Select_B	Sig_Select_B
2	Sig_Select_C	Sig_Select_C
2	A_Out	A_Out
2	B_Out	B_Out
2	Xin_A	Xin_A
2	Xin_B	Xin_B
2	Pleth_B	Pleth_B
2	Pleth_A	Pleth_A
2	B-A_Out	B-A_Out
2	A+B_Out	A+B_Out
2	DTR	DTR
2	RTS	RTS
2	Rxd_In	Rxd_In
2	TxD	TxD
2	A3_Rtn	A3_Rtn
2	B39/40_Rtn	B39/40_Rtn
2	B31/32_Rtn	B31/32_Rtn
2	Ground1	Ground1
2	VSO_Rtn	VSO_Rtn

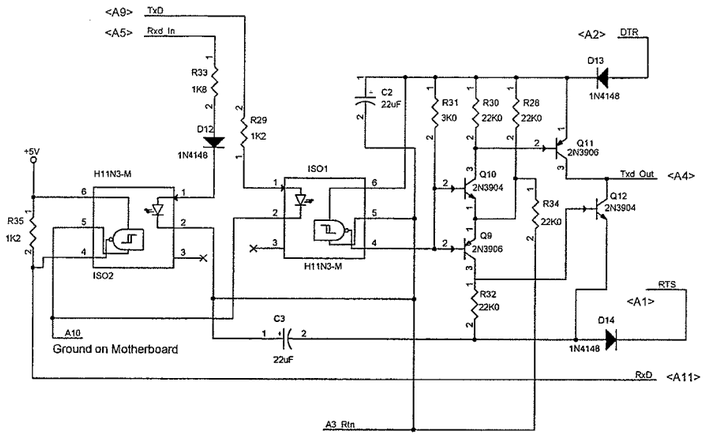


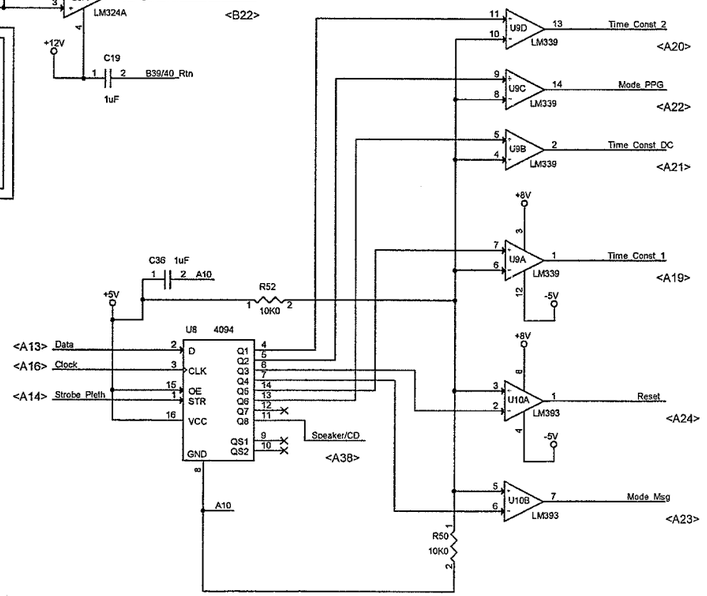












Signals going off page

		Pg #
-5V	-5V	2
+5V_Offset	+5V_Offset	2
VSO_1V	VSO_1V	2
RxD	RxD	2
Txd_Out	Txd_Out	2
Time_Const_2	Time_Const_2	2
Mode_PPG	Mode_PPG	2
Time_Const_DC	Time_Const_DC	2
Time_Const_1	Time_Const_1	2
Reset	Reset	2
Mode_Msg	Mode_Msg	2
Speaker/CD	Speaker/CD	2
Sig_From_Select	Sig_From_Select	2
A_CUFF	A_CUFF	2
B_CUFF	B_CUFF	2
C_CUFF	C_CUFF	2

Approved:
Donald C Yarnell

Date:
10/25/2012

Parks Medical Systems, Inc PO Box 5669 Aloha, OR 97006	
Title	2100 Interface Bd, Schematic Pg 1
Size C	Document Number 299-0263-04.04 Rev A
Date: Friday, October 19, 2012	Sheet 1 of 3

PARKS MEDICAL ELECTRONICS, INC.

2 JAN. 2013 BOM9-0263-06.02 M DCN# 52363

SINGLE LEVEL BILL OF MATERIAL

2100 INTERFACE

PARTS IN KIT 329-0263-02

DESIGNATOR	VALUE	COMMENT	PART NO.
PCB		CIRCUIT BD.	612-0263-02
R2	100	1%	679-1000-00
R3, R4, R6, R8, R9, R10, R21, R23, R25, R26, R38, R77, R80, R81, R82, R93	10K	1%	679-1002-00R
R1, R7	1 M		679-1004-00R
R11	1.3K	1%	679-1301-00R
R79	20K	1%	679-2002-00R
R12	249		679-2490-00R
R78	49.9K	1%	679-4992-00
VR4, VR5, VR6	20K		689-0053-00R
VR7, VR8, VR9	100		689-0058-00R
R63, R90	10		690-0100-00R
R13	100		690-0101-00R
R5, R37, R51, R85, R89, R91	1K		690-0102-00R
R16, R17, R20, R50, R52, R62, R64, R65, R66, R67, R69	10K		690-0103-00R
R42, R53	100K		690-0104-00R
R29, R35	1.2K		690-0122-00R
R33	1.8K		690-0182-00R
R36, R41	20K		690-0203-00R
R28, R30, R32, R34	22K		690-0223-00R
R31	3K		690-0302-00R
R43, R86	43K		690-0433-00R
R87, R88	5.6		690-0567-00
R61	7.5K	On Back Side	690-0752-00
R76	3.6 1/2 W		698-2367-00R
C2, C3, C4, C9, C10, C29, C32, C35, C37	22uf		710-1226-00R
C7, C17	0.0047uF		715-5472-00R
C1, C5, C6, C8	0.01		717-1103-01R
C18, C20, C21, C23, C24, C25, C38	0.1 uF		717-1104-03R
C19, C26, C27, C36	1uF		717-1105-00R
D6, D7, D8, D9, D12, D13, D14, D15, D16, D17			848-0003-00R
D4			848-0014-00R
P1, P2	1*6 PANDUIT		869-0146-00R

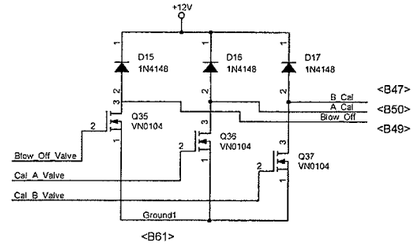
Continued →

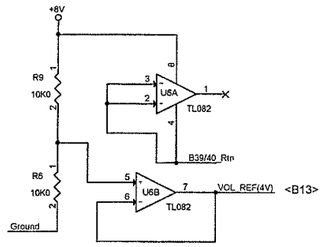
PARTS IN KIT 330-0263-10

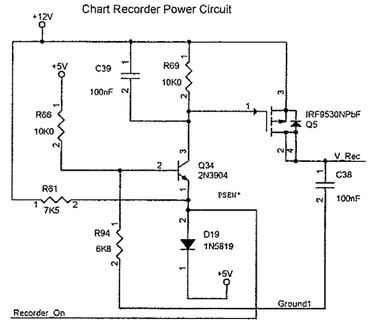
DESIGNATOR	VALUE	COMMENT	PART NO.
Q5	SPACER, UNTHREADED		639-0049-00
Q1, Q2, Q3, Q5, REF	THERMAL PAD		658-0006-00R
R94	6.8K	On Back Side	690-0682-00R
RTD1		THERMISTER	698-1502-00R
C39	0.1 uF		717-1104-04R
Q1, Q2, Q3, Q4, Q5, Q6, REG1, REF	SCREW, 4-40 (1/4")	(6 EA)	789-0005-00
Q5	SCREW, 4-40 (1/2")	(1 EA)	789-0015-00
Q1, Q2, Q3	WASHER		790-0437-00
Q5 REF	HEAT SINK	(1 EA)	792-0001-00
Q1, Q2, Q3 REF	HEAT SINKS	(3 EA)	792-0003-00
U2, U3, U5			844-0013-01R
U4			844-0019-00R
VR13			844-0038-00R
U6			844-0039-00R
U1			844-0044-00R
REG1			844-0048-01R
U10			844-0049-00R
U9			844-0063-00R
VR12			844-0070-00R
U14			844-0092-00R
U8			844-0176-00R
PR1, PR2, PR3			845-0001-00R
D1, D2, D3, D5, D18			848-0010-00R
D19			848-0017-00R
Q10, Q12, Q32, Q33, Q34			849-0005-00R
Q9, Q11			849-0023-00R
Q6			849-0039-00
Q29, Q30, Q31, Q35, Q36, Q37			849-2011-00R
Q1, Q2, Q3, Q4			849-2028-00R
Q5			849-2029-00R
ISO1, ISO2			850-2002-00R
[BOM9-0263-06.02.xls]			

Signals coming on page

Pg #		
1	Txd_Out	Txd_Out
1	RxD	RxD
1	Sig_From_Select	Sig_From_Select
1	-5V	-5V
1	VSO_1V	VSO_1V
1	+5V_Offset	+5V_Offset
1	Time_Const_2	Time_Const_2
1	Mode_PPG	Mode_PPG
1	Time_Const_DC	Time_Const_DC
1	Time_Const_1	Time_Const_1
1	Reset	Reset
1	Mode_Msg	Mode_Msg
1	Speaker/CD	Speaker/CD
1	A_CUFF	A_CUFF
1	B_CUFF	B_CUFF
1	C_CUFF	C_CUFF





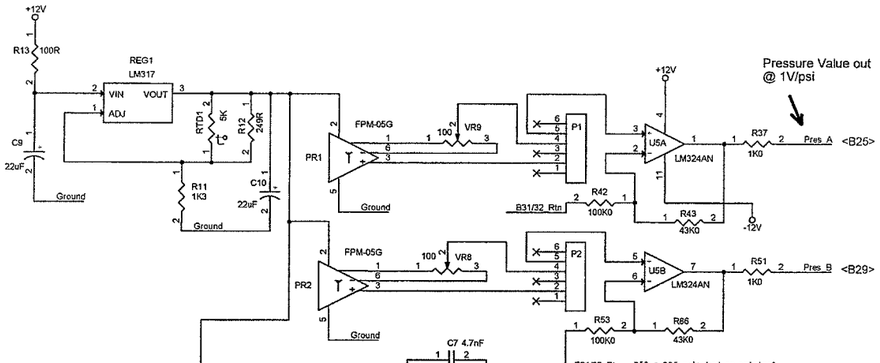


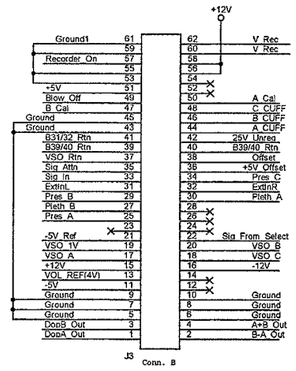
Signals going off page

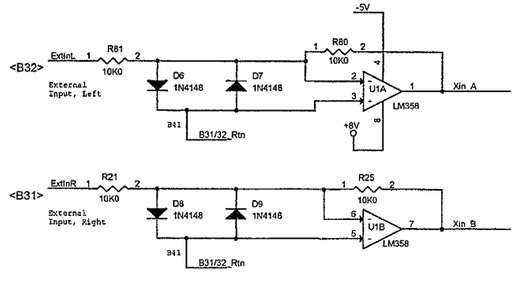
	Pg #
Pump_Power	1
25V_Unreg	1
VSO_C	1
VSO_B	1
VSO_A	1
VSO_Rtn	1
Sig_Select_A	1
Sig_Select_B	1
Sig_Select_C	1
Data	1
Clock	1
Strobe_Pleth	1
Pleth_B	1
Pleth_A	1
B_Out	1
A_Out	1
Xin_A	1
Xin_B	1
B-A_Out	1
A+B_Out	1
RTS	1
DTR	1
Rxd_In	1
TxD	1
A3_Rtn	1
-5V_Ref	1
+5V_Ref	1

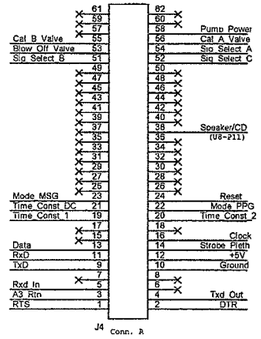
Grounds & Returns all connect to gnd on the uBoard

Ground1	1
B31/32_Rtn	1
B39/40_Rtn	1



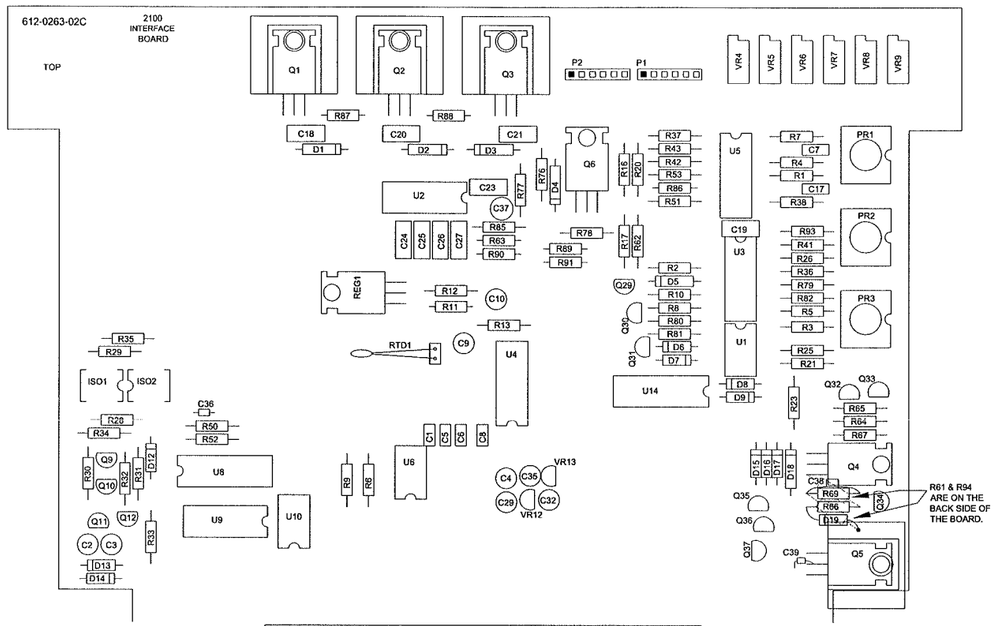






Parks Medical Systems, Inc
PO Box 5669
Aloha, OR 97006

Title	2100 Interface Bd, Schematic Sheet 2	
Size C	Document Number 299-0263-04.04	Rev A
Date: Friday, October 19, 2012	Sheet 2 of 3	



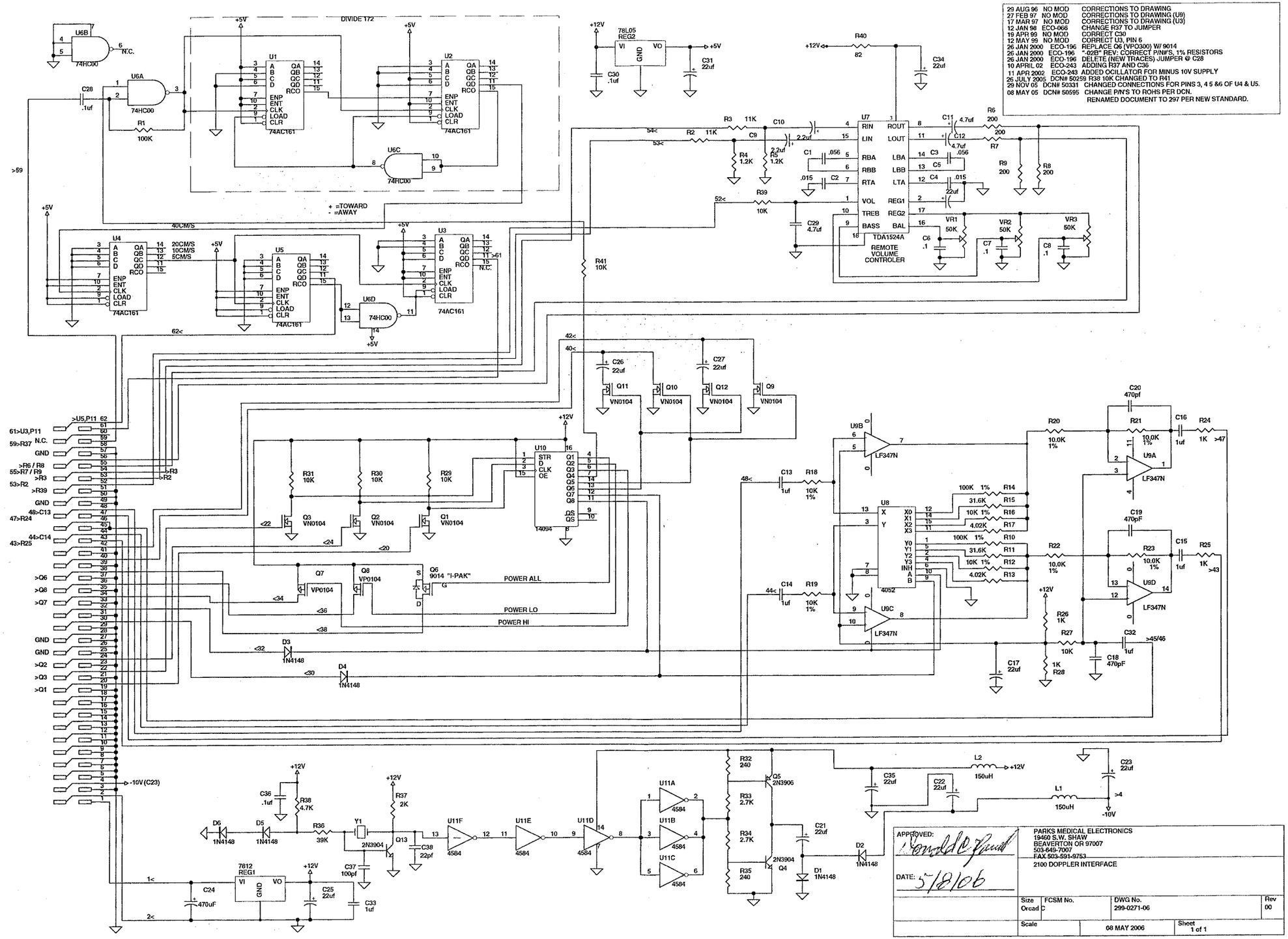
PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0263-07.07	2100 INTERFACE BD.
2 JAN 2013	BOM# BOM9-0263-06.02
PCB# 612-0263-02	SCHEMATIC# 299-0263-04.04

Change Log

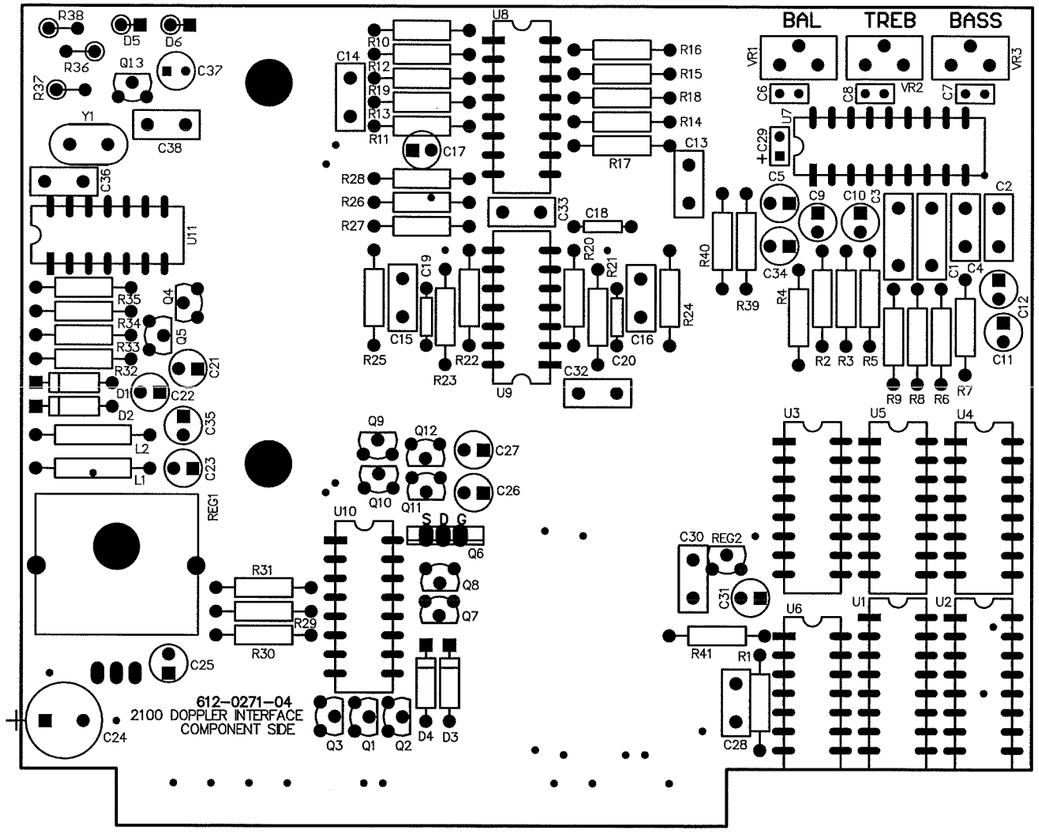
21 NOV 96	MOD#707	Added Thermister, RTD1, Etc
30 JAN 97	MOD#735	Change R21, R25, R80, R81 to 10K, 1%
17 MAR 97	MOD#747	Add PEM nuts for board
23 APR 97	ECO-006	Change LM324's to LM324AN's (#7 Each)
10 SEP 97	ECO-040	Change R76 to 2.0, 1/2W; Correct Cuff Ports
19 FEB 98	ECO-072	Change 849-2021-00 to 849-2021-10 (BUZ10 to BUZ101)
02 FEB 99	No Mod	"C" Rev: Corrected "A" & "B" Cuff Labels
21 APR 99	No Mod	"D" Rev: Added Missing Reg1, C9, C10, R11, R12, R13, RTD1
22 NOV 99	No Mod	"2A" Rev: Corrected Misc Values
27 DEC 99	No Mod	"2B" Rev: Corrected Cal "A" / "B" Labels
06 JAN 2000	No Mod	"2C" Rev: Corrected C99 Label to C36 & U8, P16 Ref
25 FEB 2000	No Mod	"2D" Rev: Corrected PR1, PR2, PR3 Layout
23 MAR 2001	ECO-226	Change 849-2021-10 to 849-2021-00 (BUZ101 to BUZ10)
15 NOV 2001	PAR#2159	Change R76 Pad holes to 41 mil (Changed supplier) - Drill file change only
12 SEP 2002	ECO-252	Added R61 and D19, Correct connection of R69
09 OCT 2002	ECO-252	Changed C38, C39, R94
09 MAR 2004	DCN# 040126	Changed R2 to 1%, R13 to 5%
21 FEB 2006	DCN# 50462	Renamed document to new standard
12 OCT 2006	DCN# 50755	Changed value of R76 to 3.6 Ohm 1/2 W.
04 JUN 2008	DCN# 51370	Swapped Signal designators B56/B58, B60/B62.
04 FEB 2009	DCN# 51543	Q1, Q2, Q3, Q4 Mfr P/N changed from BUZ10 to STP36NF06L
11 MAY 2011	DCN# 52078	Q5 MFR P/N changed to IRF9530NPbF
19 OCT 2012	DCN# 52297	Changed R33 from 4.7K to 1.8K

297-0271-06.00
2100 DOPPLER INTERFACE

29 AUG 96	NO MOD	CORRECTIONS TO DRAWING
27 FEB 97	NO MOD	CORRECTIONS TO DRAWING (U9)
17 MAR 97	NO MOD	CORRECTIONS TO DRAWING (U3)
12 JAN 98	ECO-066	CHANGE R37 TO JUMPER
19 APR 99	NO MOD	CORRECT C30
12 MAY 99	NO MOD	CORRECT U3, PIN 6
26 JAN 2000	ECO-196	REPLACE Q6 (VPO300) W/ 9014
26 JAN 2000	ECO-196	"-02B" REV: CORRECT P/N#'S, 1% RESISTORS
26 JAN 2000	ECO-196	DELETE (NEW TRACES) JUMPER @ C28
10 APRIL 02	ECO-243	ADDING R37 AND C36
11 APR 2002	ECO-243	ADDED OCILLATOR FOR MINUS 10V SUPPLY
26 JULY 2005	DCN# 50259	R38 10K CHANGED TO R41
29 NOV 05	DCN# 50331	CHANGED CONNECTIONS FOR PINS 3, 4 5 &6 OF U4 & U5.
08 MAY 05	DCN# 50595	CHANGE P/N'S TO ROHS PER DCN. RENAMED DOCUMENT TO 297 PER NEW STANDARD.



APPROVED:	PARKS MEDICAL ELECTRONICS 19460 S.W. SHAW BEAVERTON OR 97007 503-649-7007 FAX 503-591-9753
DATE: 5/8/06	2100 DOPPLER INTERFACE
	Size: Orcad C · FCSM No. · DWG No.: 299-0271-06 · Rev: 00
	Scale · 08 MAY 2006 · Sheet: 1 of 1



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0271-05.00	2100 DOPPLER INTERFACE
19 NOV. 2007	SCHEMATIC# 297-0271-06.00
PCB# 612-0271-04	BOM# BOM7-0271-05.04
ASSY0271-06.00	

PARKS MEDICAL ELECTRONICS INC.,
19 NOV. 2007 BOM7-0271-05.04 M DCN# 51209
SINGLE LEVEL BILL OF MATERIAL,
2100 DOPPLER INTERFACE

PARTS IN KIT 329-0271-01

DESIGNATOR	VALUE	COMMENT	P/N
PCB			611-0271-04
R12,R16,R18,R19,R20,R21,R22,R23	10K	1% R	679-1002-00R
R10,R14	100K	1% R	679-1003-00R
R11,R15	31.6K	1% R	679-3162-00R
R13,R17	4.02K	1% R	679-4021-00
VR1,VR2,VR3	50K		689-0038-00R
R24,R25,R26,R28	1K		690-0102-00R
R27,R29,R30,R31,R39,R41	10K		690-0103-00R
R01	100K		690-0104-00R
R02,R03	11K		690-0113-00R
R04,R05	1.2K		690-0122-00R
R06,R07,R08,R09	200		690-0201-00R
R37	2K		690-0202-00R
R32,R35	240		690-0241-00R
R33,R34	2.7K		690-0272-00R
R36	39K		690-0393-00
R38	4.7K		690-0472-00R
R40	82		690-0820-00R
C05,C17,C21,C22,C23,C25,C26,C27,C31,C34,C35	22uf		710-1226-00R
C24	470uF		710-1477-00R
C09,C10	2.2uf		710-2225-00R
C11,C12,C29	4.7uf		710-2475-00
C37	100pf		714-1101-00
C38	22pf		714-1220-00R
C18,C19,C20	470pF		714-1471-00
C02,C04	0.015		715-5153-00R
C01,C03	0.056		715-5563-00
C28,C30,C36	.1uf		717-1104-03R
C06,C07,C08	.1uf		717-1104-04R
C13,C14,C15,C16,C32,C33	1uf		717-1105-00R
D01,D02,D03,D04,D05,D06	1N4148		848-0003-00R
L01,L02	150uH		892-0001-00R

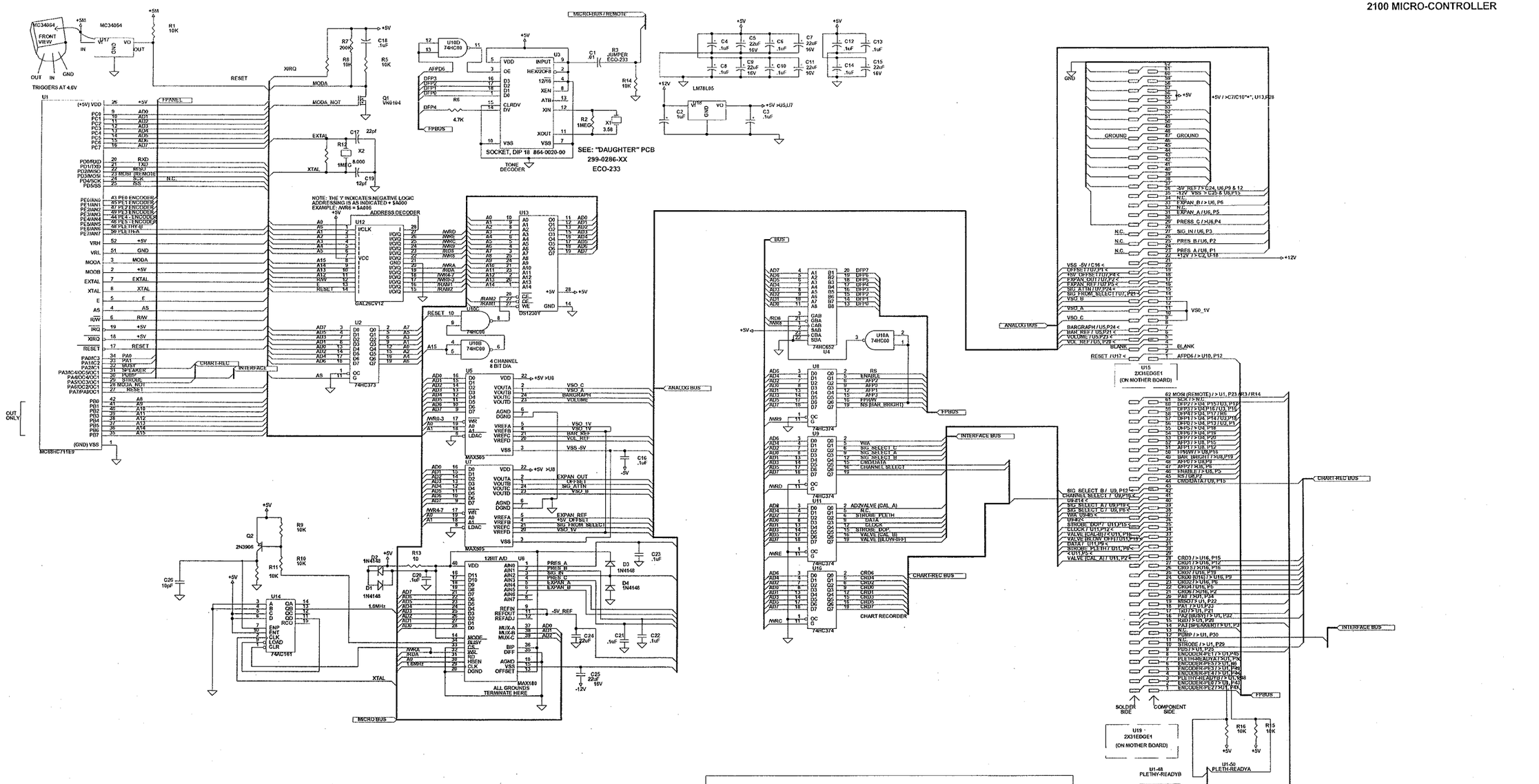
PARTS IN KIT 330-0271-05

DESIGNATOR	VALUE	COMMENT	P/N
XREG1		HEATSINK	792-0003-00R
Y1		CRYSTAL	842-0057-00R
U08			844-0041-00R
REG2			844-0054-00R
REG1			844-0071-00R
U11			844-0090-00R
U06			844-0129-00R
U07			844-0150-00R
U01,U02,U03,U04,U05			844-0173-00R
U10			844-0176-00R
U09			844-0178-00R
Q04,Q13			849-0005-00R
Q05			849-0023-00R
Q01,Q02,Q03,Q09,Q10,Q11,Q12			849-2011-00R
Q07,Q08			849-2013-00R
Q06			849-2024-00R

299-0268-03.01

2100 MICRO-CONTROLLER

TRIM TO 16”



24 MAR 2006	DCN# 50527	CHANGE P/N U8, U9, U11, U16 FOR ROHS COMPLIANCE. RENAME DOC# PER NEW STANDARD. ALL DIP SOCKETS REMOVED.
17 MAR 2005	DCN# 050110	CHANGE VALUE FOR C4, C6, C8, C10, C12, C13, C14 & C26, CHANGE U4 TO FAIRCHILD P/N.
16 JUL 2001	ECO-233	"F" REV: ADD "DAUGHTER" BOARD; USE HT9170B, REMOVE R4, R3 > JUMPER
10 JAN 2000	NO MOD	"E" REV: CORRECTED U6, U13 CONNECTIONS
27 DEC 99	NO MOD	"D" REV: CORRECTED U8, U9, U11, U16 GND, CAL "A" / "B" LABELS
17 DEC 99	NO MOD	"C" REV: CORRECTED U1, C2, C3, C16, C21, C22, C23 PART NUMBERS
04 DEC 97 (21 AUG 97)	ECO-060	DEL RUN FROM CHIP, PIN 24 (H-3) TO EDGE CONNECTOR
20 NOV 96	NO MOD	CORRECTED U11, U16 CONNECTIONS
15 MAY 2002	PAR 2217 PCB = 512-0268	CHANGE PART NUMBER OF Q2
08 OCT 2006	ECO# 233, DCN# 50774	REMOVED R4, ADD C26.
20 JAN. 2008	DCN# 51253	NO MOD, CORRECT TYPE ERRORS PER DCN.

NOTE: ECO-233

TO USE HT 9170 B:

1. REMOVE R4
2. REPLACE R3 WITH JUMPER WIRE
3. USE DAUGHTER PCB 330-0286

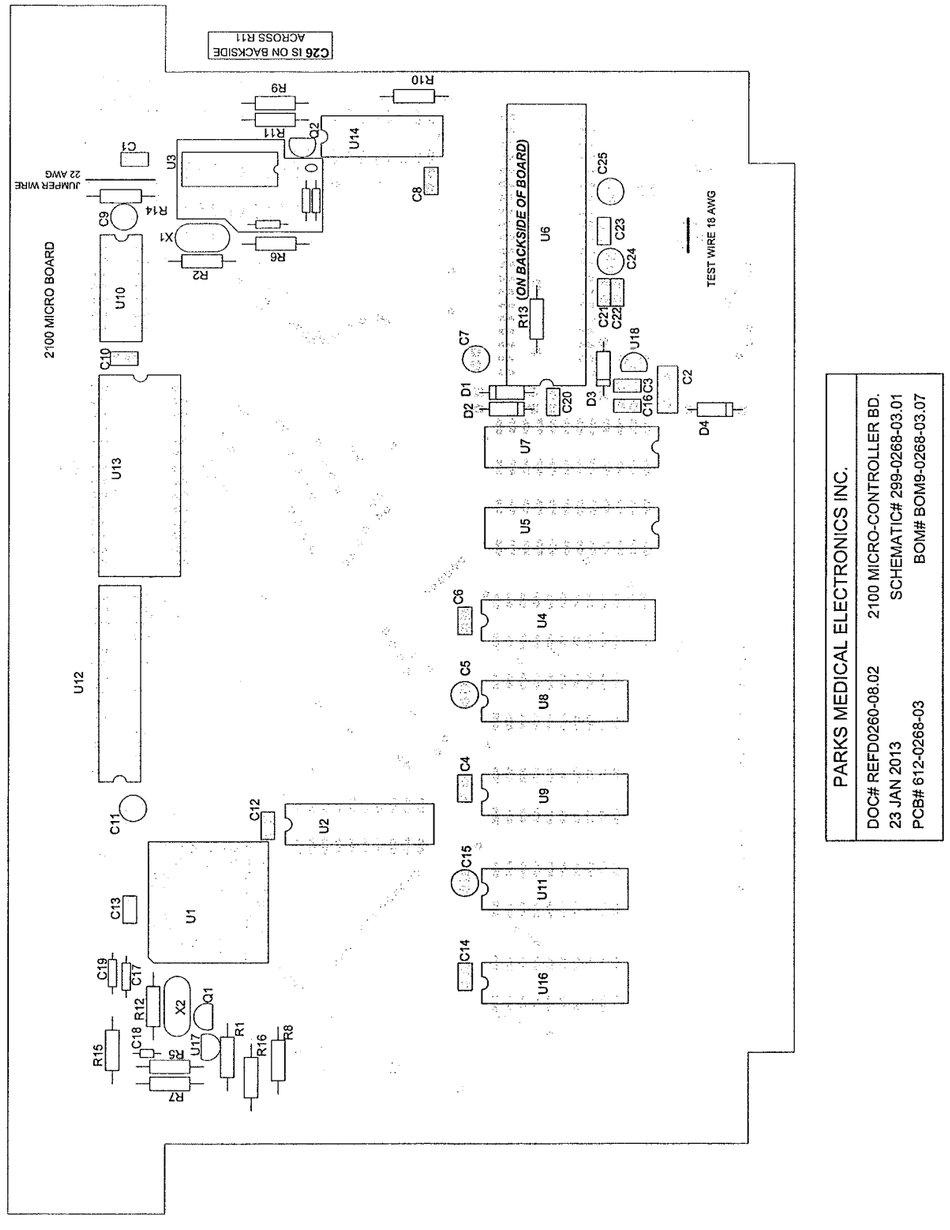
APPROVED:

DATE: 23 JAN 08

PARKS MEDICAL ELECTRONICS
19460 S.W. SHAW ST
P.O. BOX 5059
ALOHA OR 97007
503-649-7007

2100 MICROCONTROLER PLUG IN BOARD

Size	FCSM No.	DWG No.	Rev
Orcad D		299-0268-03	01
Scale		20 JAN. 2008	Sheet 1 of 1



PARKS MEDICAL ELECTRONICS INC.
2100 MICRO-CONTROLLER BD.
SCHEMATIC# 299-0268-03.01
BOM# BOM9-0268-03.07
DOC# REFD0260-08.02
23 JAN 2013
PCB# 612-0268-03

PARKS MEDICAL ELECTRONICS INC

23 JAN 2013 BOM9-0268-03.07 M DCN# 52370

SINGLE LEVEL BILL OF MATERIALS

2100 MICRO - CONTROLLER BOARD

PARTS IN KIT 329-0260-03

DESIGNATOR	VALUE	COMMENT	P/N
PCB			612-0268-03
R13	10	ON BACK	690-0100-00R
R01, R05, R08, R09, R10, R11, R14, R15, R16	10K		690-0103-00R
R02, R12	1MEG		690-0105-00R
R07	200K		690-0204-00
R06	4.7K		690-0472-00R
C05, C07, C09, C11, C15, C24, C25	22uF	16V	7101226-00R
C26	10pF	ON BACK	714-1100-00R
C17	22pF		714-1220-00R
C01	0.01		717-1103-01R
C18	.1uF		717-1104-03R
C03, C04, C06, C08, C10, C12, C13, C14, C16, C20, C21, C22, C23	.1uF		717-1104-04R
C02	1uF		717-1105-00R
C19	12pF		717-1120-00
Test Wire	18 AWG		824-0003-00
Jumper Wire	22 AWG		824-0006-00
D01, D02, D03, D04			848-0003-00R
U01 REF:	52 PIN	I.C. SOCKET	864-0028-20

PARTS IN KIT 330-0260-08

DESIGNATOR	VALUE	COMMENT	P/N
U3	DTMF ADAPTER	PCB	330-0286-00
X02	8		842-0012-00
X01	3.58		842-0057-00R
U18			844-0054-00R
U10			844-0129-00R
U17			844-0138-00R
U02			844-0141-00R
U12			844-0167-10
U13			844-0168-00R
U05, U07			844-0170-00R
U06			844-0171-00R
U08, U09, U11, U16			844-0172-00R
U14			844-0173-00R
U04			844-0192-00R
Q02			849-0023-00
Q01			849-2011-00R

PARTS IN KIT 330-0268-78

DESIGNATOR	VALUE	COMMENT	P/N
U01			844-0156-00R

OFF THE BOARD, BUT ON THE SCHEMATIC:

DESIGNATOR	VALUE	COMMENT	P/N
U15, U19	2X31 EDGE 1	ON M.B.	869-0151-00

299-0126-26.00
2100 PLETHYSMOGRAPH AMPLIFIER

TRIM

TO

16”

07 AUG. '07	DCN# 50999, 51111	NEW BOARD RELEASE AUG. 07 2007

APPROVED:

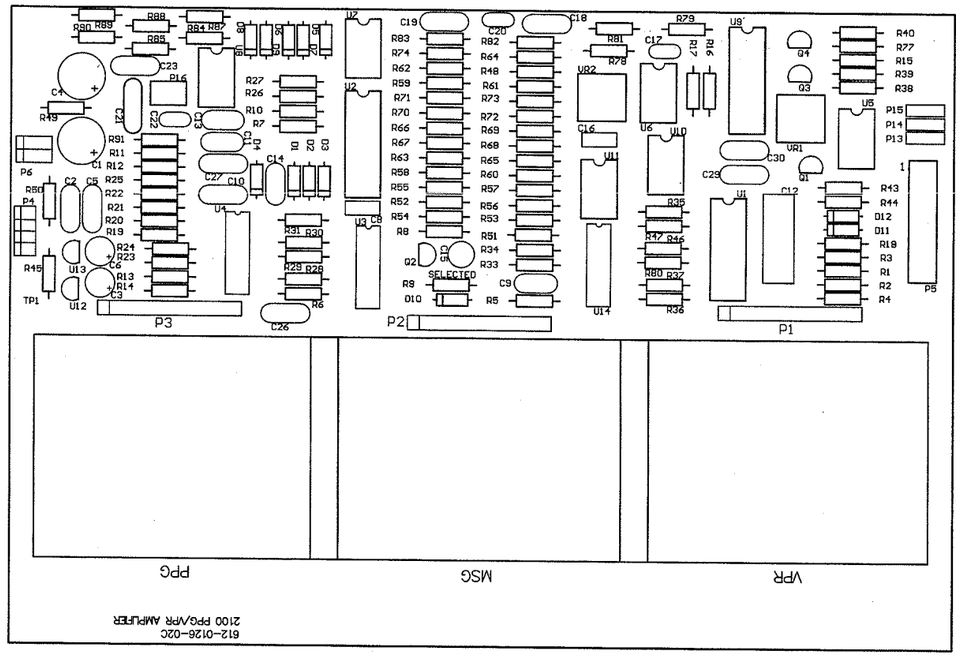
DATE: 8/7/07

Parks Medical Electronics
19400 SW Shaw Street
P.O. Box 6669
Aloha, Oregon 97007

2100 Plethysmograph Amplifier

Size	FCSM No.	DWG No.	Rev
D		299-0126-26	00

Scale: | 07 AUG., 2007 | Sheet 1 of 1



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0126-19.00	2100 PLETH. AMP BD.
08 AUG. 2007	SCHEMATIC# 299-0126-26.00
PCB# 612-0126-02	BOM# BOM9-0126-25.00
ASSY0126-26.00	

PARKS MEDICAL ELECTRONICS, INC.
07 AUG. 2007 [BOM9-0126-25.00] M DCN# 50990, 51111
SINGLE LEVEL BILL OF MATERIAL
2100 PLETHYSMOGRAPH AMPLIFIER

PARTS IN KIT 329-0126-15

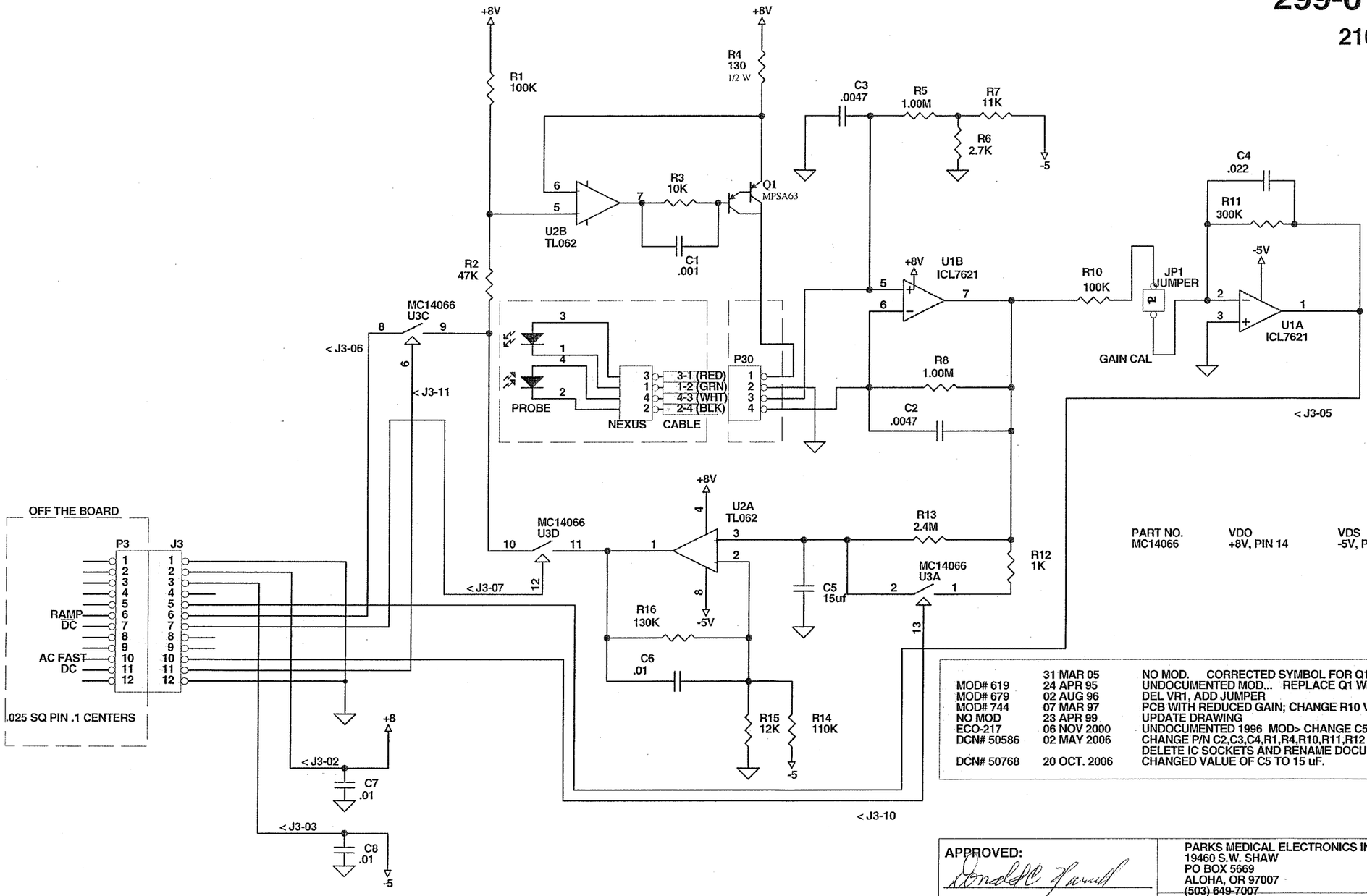
DESIGNATOR	VALUE	COMMENT	PART NO.
PCB		CIRCUIT BD.	612-0126-02
R53, R56, R57, R60, R61, R64, R65, R68, R69, R72, R73	100K		679-1003-00R
R81, R82, R83, R91	174K	1%	679-1743-00R
R51, R52, R54, R55, R58, R59, R62, R63, R66, R67, R70, R71,R74	200K		679-2003-00R
R78, R79	681K	1%	679-6813-00R
R84, R85	86.6K	1%	679-8662-00R
VR1, VR2	10K		689-0004-00R
R49, R50	10		690-0100-00R
R03, R90	1K		690-0102-00R
R28, R29, R35, R87	10K		690-0103-00R
R01, R2, R4, R6, R7, R10, R13, R25, R26, R27, R31, R43, R44	100K		690-0104-00R
R05, R8, R18, R30, R33, R34, R37, R45	1M		690-0105-00R
R40	1.1K		690-0112-00
R23	11K		690-0113-00R
R48	1.2M		690-0125-00
R21	13K		690-0133-00R
R77	20K		690-0203-00R
R19	22K		690-0223-00R
R22, R24	2.2M		690-0225-00
R12	300K		690-0304-00R
R36	33K		690-0333-00R
R17	330K		690-0334-00R
R80	36K		690-0363-00R
R88, R89	5.1K		690-0512-00R
R11, R38, R39, R46, R47	51K		690-0513-00R
R14	680		690-0681-00R
R20	82K		690-0823-00
R15	91K		690-0913-00
R16	3.3M		698-0335-00R
C01, C4	100uF		710-1107-01
C03, C6	22		710-1226-01R
C15	2.2uF		710-2225-00R
C12	3.3uF		715-1335-00R
C17, C22	0.01		715-5103-07
C21	0.12		715-5124-00
C16, C20	0.015		715-5153-00R
C08, C13	0.0022		715-5222-00R
C09, C18	0.047		715-5503-00
C19	0.068		715-5683-00R
C2, C5, C23, C26, C27, C29, C30	0.01		717-1103-00
C10, C11, C14	0.1		717-1104-03R
D01, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12			848-0003-00R
P13, P14, P15			869-0056-03
P04			869-0062-00R
P05			869-0070-00
P01, P3			869-0077-00
P16			869-0087-00R
P06			869-0126-02R

PARTS IN KIT 330-0126-19

DESIGNATOR	VALUE	COMMENT	PART NO.
U02			844-0009-00R
U14			844-0037-00R
U12			844-0038-00R
U01			844-0041-00R
U10			844-0049-00R
U03		NATIONAL	844-0051-00R
U04			844-0063-00R
U13			844-0070-00R
U09			844-0092-00R
U05, U6, U7, U8, U11			844-0113-00R
Q02, Q3, Q4			849-2011-00R
Q1	J176		849-2019-00R
SHUNTS, QTY 4			869-0061-00R

[BOM9-0126-25.00_M.xls]

299-0123-23.00
2100 PPG MODULE



PART NO.	VDO	VDS
MC14066	+8V, PIN 14	-5V, PIN 7, 5

	31 MAR 05	NO MOD. CORRECTED SYMBOL FOR Q1 FROM PNP TO DARLINGTON
MOD# 619	24 APR 95	UNDOCUMENTED MOD... REPLACE Q1 WITH 849-0040-00
MOD# 679	02 AUG 96	DEL VR1, ADD JUMPER
MOD# 744	07 MAR 97	PCB WITH REDUCED GAIN; CHANGE R10 VALUE FROM 24K
NO MOD	23 APR 99	UPDATE DRAWING
ECO-217	06 NOV 2000	UNDOCUMENTED 1996 MOD> CHANGE C5 VALUE TO 10uf NP
DCN# 50586	02 MAY 2006	CHANGE P/N C2,C3,C4,R1,R4,R10,R11,R12 AND U3 TO ROHS COMPLIANT P/N'S DELETE IC SOCKETS AND RENAME DOCUMENT PER NEW STANDARD.
DCN# 50768	20 OCT. 2006	CHANGED VALUE OF C5 TO 15 uF.

APPROVED: Donald C. Farrell

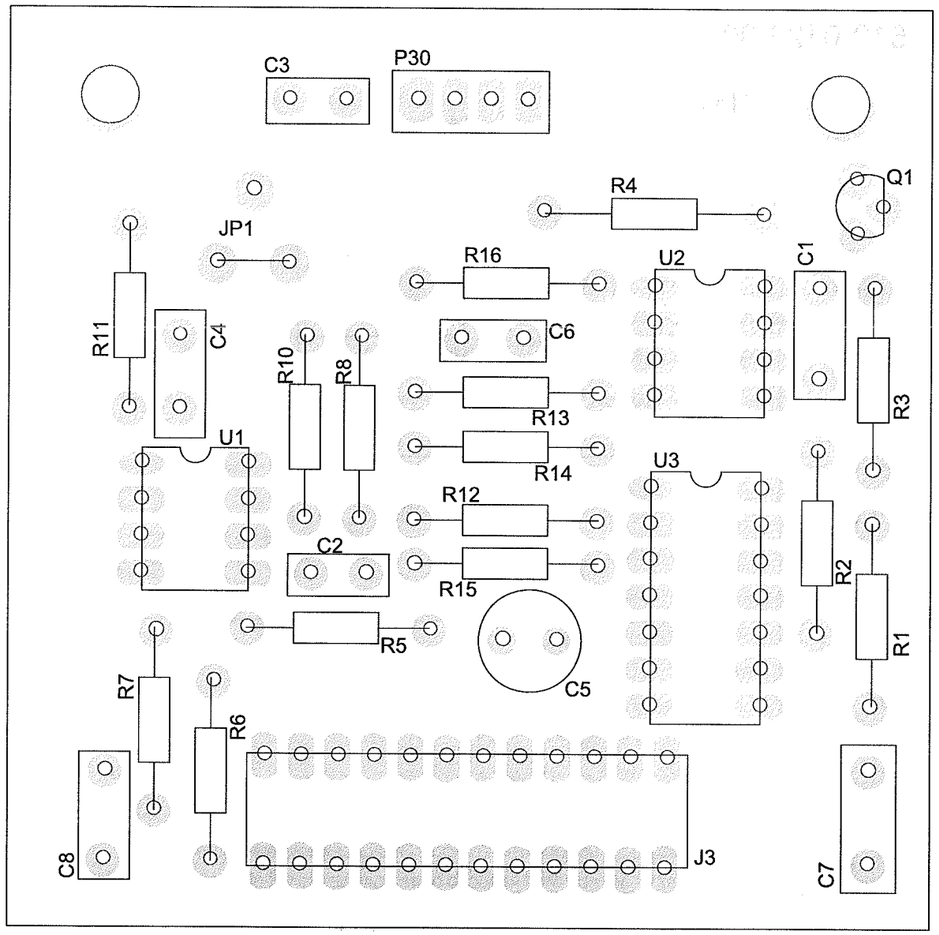
DATE: 10/20/06

PARKS MEDICAL ELECTRONICS INC.
19460 S.W. SHAW
PO BOX 5669
ALOHA, OR 97007
(503) 649-7007

2100 PPG MODULE

Size	FCSM No.	DWG No.	Rev
Orcad B		299-0123-23	00

Scale	20 OCT. 2006	Sheet
		1 of 1



PARKS MEDICAL ELECTRONICS, INC.	
DOC# REFD0123-23.02	2100 PPG MODULE
DATE: 22 APR 2014	SCHEMATIC# 299-0123-23.00
PCB# 612-0123-00	BOM# BOM9-0123-23.03

PARKS MEDICAL ELECTRONICS INC

22 APR 2014 BOM9-0123-23-03 M DCN# 52639

SINGLE LEVEL BILL OF MATERIALS

2100 PPG MODULE

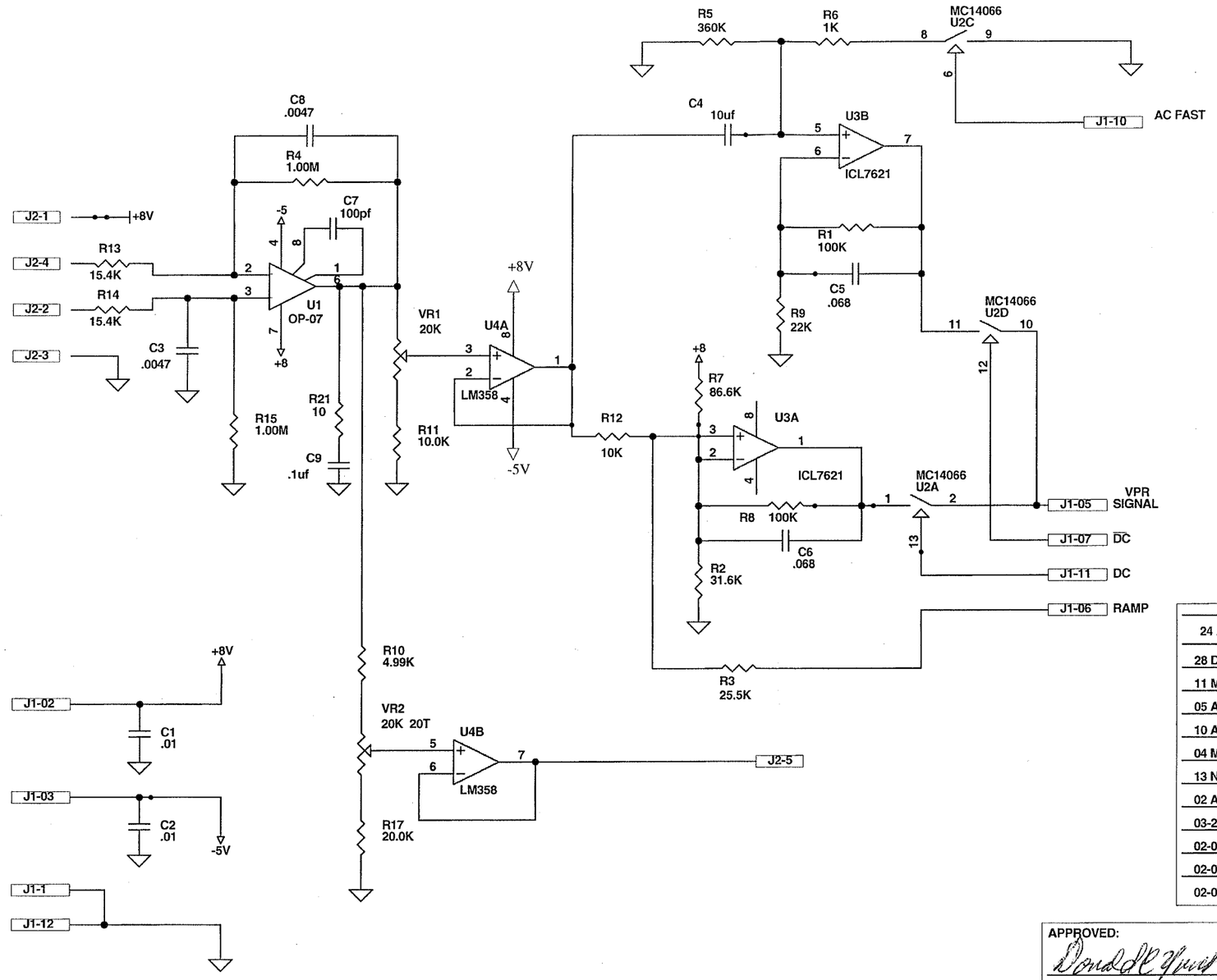
PARTS IN KIT 329-0123-00

DESIGNATOR	VALUE	COMMENT	P/N
PCB			612-0123-00
R5, R8	1.00M		679-1004-00R
R12	1K		690-0102-00R
R3	10K		690-0103-00R
R1, R10	100K		690-0104-00R
R7	11K		690-0113-00R
R14	110K		690-0114-00R
R15	12K		690-0123-00R
R16	130K		690-0134-00R
R13	2.4M		690-0245-00
R6	2.7K		690-0272-00R
R11	300K		690-0304-00R
R2	47K		690-0473-00R
R4	130	1/2 W	698-2131-00R
C5	15uf		710-0156-00R
C6	0.01		715-5103-07R
C2, C3	0.0047		715-5472-00R
C1	0.001		717-1102-01R
C7, C8	0.01		717-1103-00R
C4	0.022		717-1223-00R
JP1	JUMPER		824-0010-00
U3			844-0037-00R
U1			844-0053-00
U2			844-0065-00R
Q1			849-0040-00
J3	12 PIN SOCKET	.025SQ PIN	869-0078-00R
P30	HEADER 4		869-0145-00R

ON THE SCHEMATIC, BUT OFF THE BOARD:

DESIGNATOR	VALUE	COMMENT	P/N
PRB1	PPG PROBE		N/A
P30	12 PIN		N/A
J30	NEXUS.		N/A

297-0125-23.00
2100 VPR BOARD



24 APR. 06	DCN# 50571	CHANGE P/N C9, R1, R6, R8 TO ROHS COMPLIANT P/N. RENAMED DOCUMENT TO NEW STANDARD.
28 DEC 05	DCN# 50366	CHANGE U1 FROM LM308AN TO TYPE OP-07
11 MAY 05	DCN# 50202	CHANGE P/N FOR C9, CHANGE DOC NO. FROM 299 TO 297
05 APR 05	DCN# 050073	CHANGE J10 TO J2 TO MATCH PCB
10 AUG 02	NO MOD	CHANGE PN OF C4
04 MAY 99	MOD# 678	"C" REV: SEPARATE 2208 / 09 FROM 2100 BOARDS
13 NOV 97	NO MOD	CORRECT VR1/VR2 P/N#'S
02 AUG 96	MOD# 678	DEL VR3,R19,R18 (R15 > GND) (2100 ONLY)
03-27-95	MOD# 588	R13, R14 SELECTED FROM 10K > 20K RANGE
02-06-95	MOD# 588	CHANGED R13 & R14
02-02-95	MOD# 587	ADDED R21 & C9
02-02-95	NO MOD	CORRECTED ".10" ERRORS (1991), VR'S & J-10 LABELS

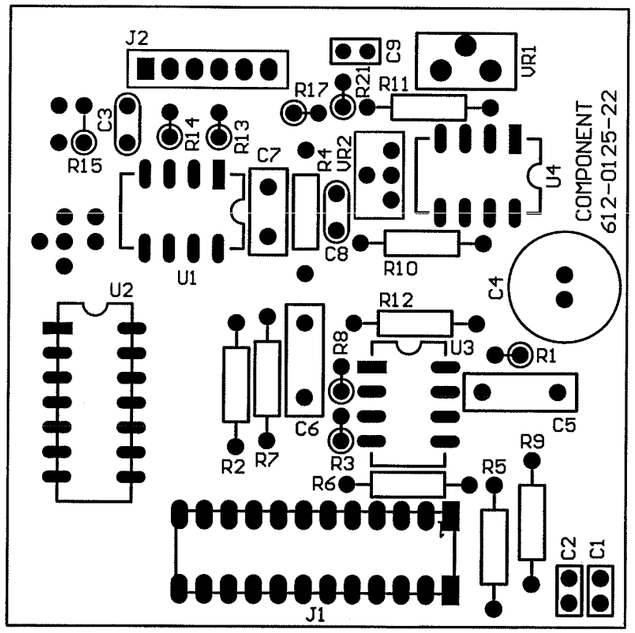
APPROVED: Donald E Yount

DATE: 4/24/06

PARKS MEDICAL ELECTRONICS INC.
19460 S.W. SHAW
PO BOX 5669
ALOHA, OR 97007
(503) 649-7007

2100 VPR BOARD

Size	FCSM No.	DWG No.	Rev
Orcad B		297-0125-23	00
Scale	24 APR 06	Sheet 1 of 1	



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0125-25.01	2100 VPR BD.
11 MAR. 2007	SCHEMATIC# 297-0125-23.00
PCB# 612-0125-22	BOM# BOM7-0125-23.03
ASSY0125-23.00	

PARKS MEDICAL ELECTRONICS INC.,

11 MAR. 2007 BOM7-0125-23.03 M DCN# 50916

SINGLE LEVEL BILL OF MATERIAL,

NEW VPR BOARD (2100 ONLY)

PARTS IN KIT 329-0125-24

DESIGNATOR	VALUE	COMMENT	PART NO.
PCB	PCB		612-0125-22
R11	10.0K		679-1002-00R
R4, R15	1.00M		679-1004-00
R17	20.0K		679-2002-00R
R3	25.5K		679-2552-00
R2	31.6K		679-3162-00R
R10	4.99K		679-4991-00
R7	86.6K		679-8662-00R
VR1	20K		689-0032-00R
VR2	20K 20T		689-0053-00R
R21	10		690-0100-00R
R6	1K		690-0102-00R
R12	10K		690-0103-00R
R1, R8	100K		690-0104-00R
R9	22K		690-0223-00R
R5	360K		690-0364-00
C4	10MF		710-0106-25
C5, C6	0.068		715-5683-00R
C3, C8	0.0047		715-6472-00
C7	100pf		717-1101-00R
C1, C2	0.01		717-1103-01R
C9	.1uf		717-1104-04R
J1		12 PIN CONN.	869-0078-00
J2		6 PIN HEADER	869-0146-00R

PARTS IN KIT 330-0125-25

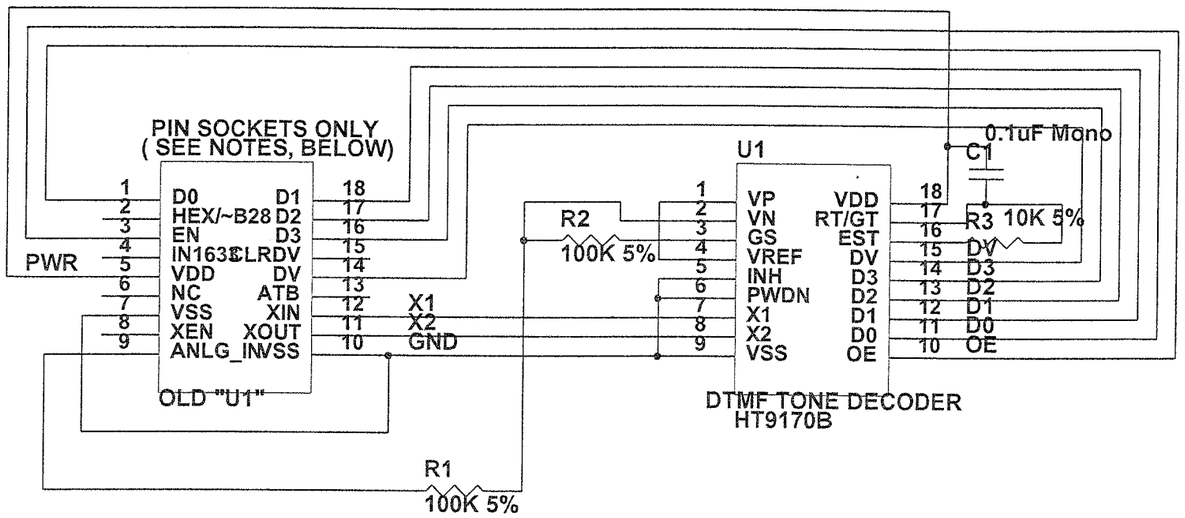
DESIGNATOR	VALUE	COMMENT	PART NO.
U1			844-0034-02R
U2			844-0037-00R
U4			844-0044-00R
U3			844-0053-00

PARTS SELECTED IN TEST

DESIGNATOR	VALUE	COMMENT	PART NO.
R13, R14	10K - 20K 1%	SELECT	

[BOM7-0125-23.03_M.xls]

299-0286-02
2100 DTMF ADAPTER



NOTES:

05 MAR 2001	REV: 01A	(PCB) ED PART NUMBERS
13 JUN 2001	REV: 01B	U1 IS PINS THAT GO INTO SOCKET# 864-0020-00 U3 (CD22202) ON 2100 MICRO CONTROLLER PCB - 330-0168-XX
10 OCT 2001	REV: 01C	CLARIFY OLD "U1" STATUS
12 June 2003	REV: 02	Change R3 from 300k to 10k

PCB1
PCB
612-0286

P2/P4
PINS
869-0179-00

P1/P3
SOCKET, 18 PIN DIP
864-0020-00

APPROVED: Jack McCutcheon

DATE: 6/18/03

AUTHORIZED FOR DISTRIBUTION:

DATE: 6/18/03

Parks Medical Electronics, Inc
19460 SW Shaw
Aloha, OR 97007

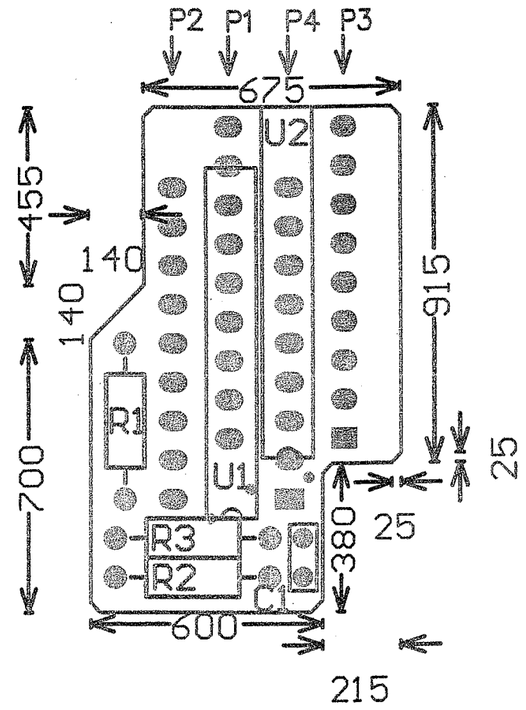
DTMF Adapter

Size	FCSM No.	DWG No.	Rev
A		299-0286-02	A

Scale | 17 June 2003 | Sheet 1 of 1

Trim to 16 Inches

6/19/03



Parks Medical Electronics, Inc.
DTMF Receiver Pinout Converter
(PCB) 612-0286-02

13 JUN 2001
-01B: CHANGED POLY CLEARANCES TO 25 MIL
CHANGED POLY CONNECT TO 20 MIL

06 SEP 2001: -01B REV = CURRENT PCB FILM
ADDED P/N# TO BOARD FOR NEXT FILM REV

12 June 2003: -02
Change R3 from 300k to 10k

PARKS MEDICAL ELECTRONICS INC.,			
12 JUNE 2003 [299-0286.02]			
SINGLE LEVEL BILL OF MATERIAL			
2100 DTMF DECODER / ADAPTER 612-0286-02			
Designator	Part Type	Description	Part Number
C1	0.1uF Mono		717-1104-04
P1, P3	SOCKET, I.C., 18 PIN	DIP	864-0020-00
P2, P4	HEADER, 9 PIN (2 PC, 9 PIN EA)	MIL MAX 64 X 18 MIL PINS	869-0179-00
PCB1	PCB		612-0286-01B
R1, R2	100K 5%		690-0104-00
R3	10K 5%		690-0103-00
U1	DTMF TONE DECODER	HT9170B	844-0184-00
[0286-02.XLS]			

PARKS MEDICAL ELECTRONICS INC.,

16 APR 99 [299-0269.02B]

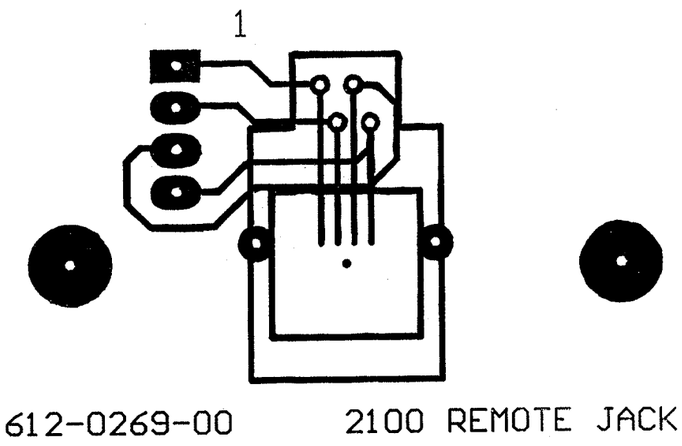
SINGLE LEVEL BILL OF MATERIAL,

2100 REMOTE PLUG

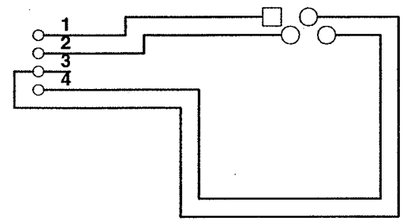
Designator	Part Type	Description	Part Number
J1	2100 REMOTE PLUG		869-0124-00
PCB	PLUG BOARD		612-0269-00
[0269-02B.XLS]			

299-0269-02B

2100 REMOTE PLUG



612-0269-00 2100 REMOTE JACK



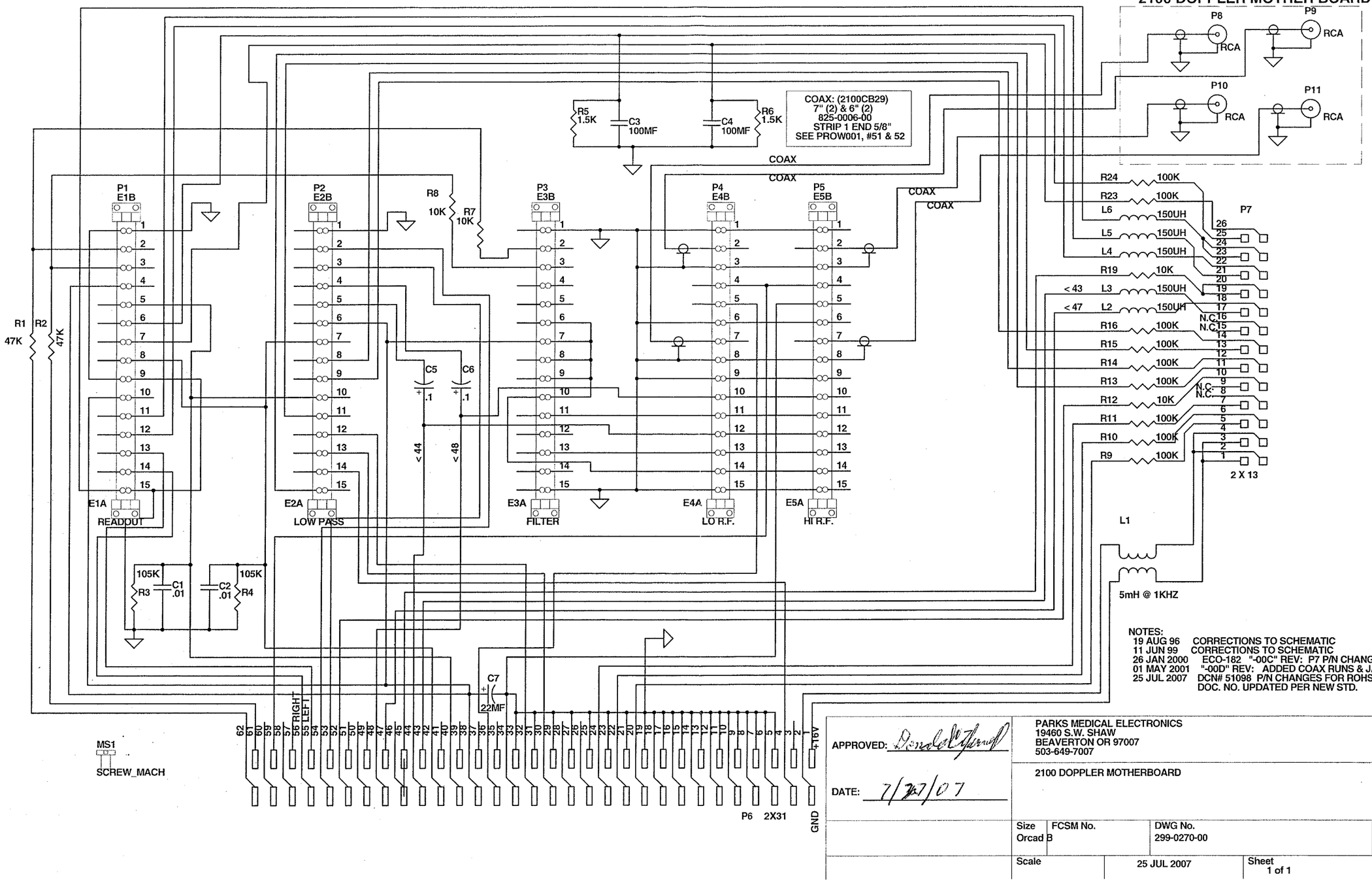
* WAS ENG# 9336

"B" REV: 16 APR 99 REMOVED REMOTE PLUG PHYSICAL OUTLINE

Donald C Yuen 19 APR 99	PARKS MEDICAL ELECTRONICS, INC			
	2100 REMOTE PLUG			
	Size Orcad A	FCSM No.	DWG No. 299-0269-02	Rev B
	Scale	16 APR 99	Sheet 1 of 1	

Trim to 16 Inches

299-0270-00.00
2100 DOPPLER MOTHER BOARD



NOTES:
- 19 AUG 96 CORRECTIONS TO SCHEMATIC
- 11 JUN 99 CORRECTIONS TO SCHEMATIC
- 26 JAN 2000 ECO-182 "-00C" REV: P7 P/N CHANGED
- 01 MAY 2001 "-00D" REV: ADDED COAX RUNS & JACKS
- 25 JUL 2007 DCN# 51098 P/N CHANGES FOR ROHS. DOC. NO. UPDATED PER NEW STD.

APPROVED: Donald Stafford

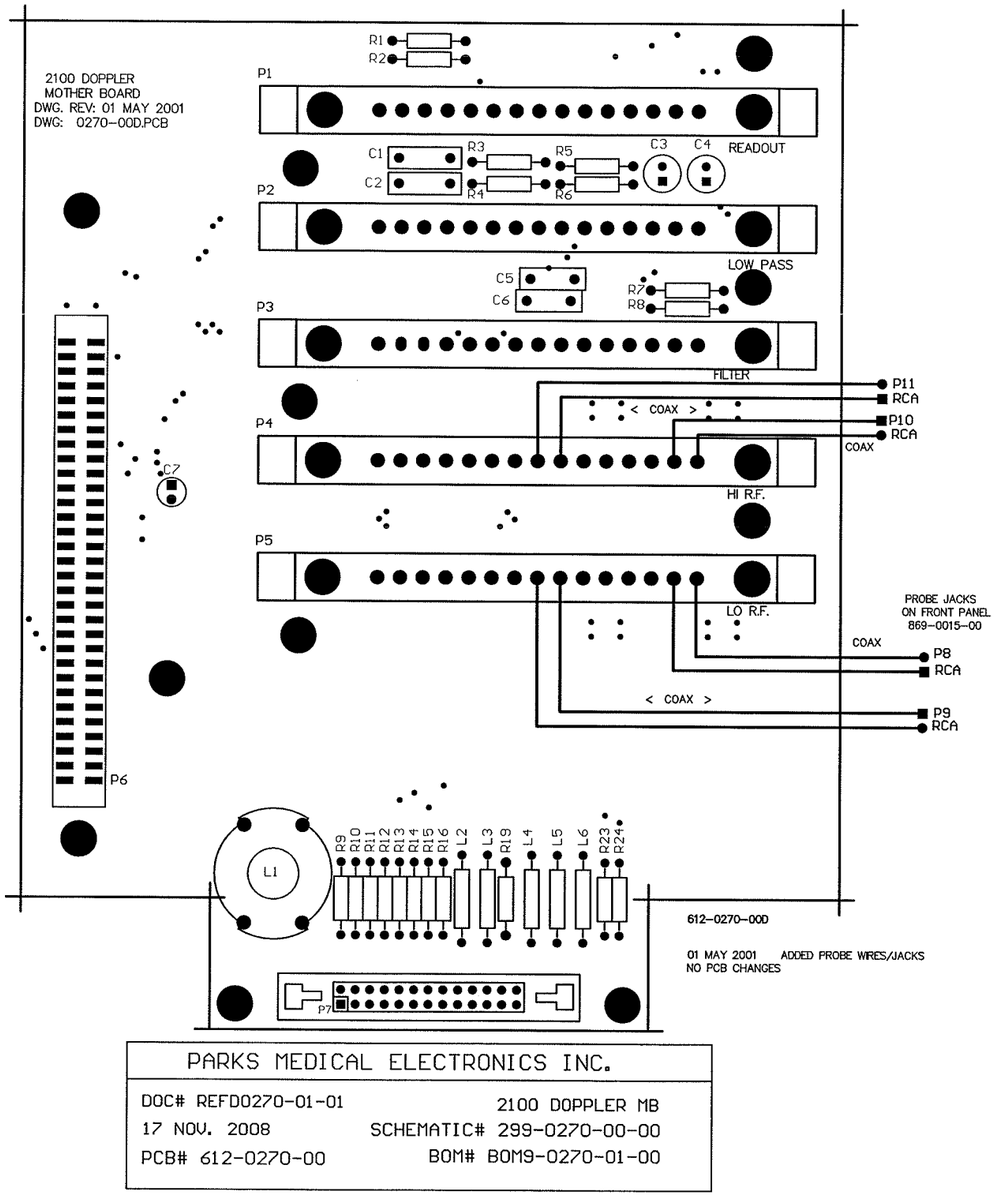
DATE: 7/27/07

PARKS MEDICAL ELECTRONICS
19460 S.W. SHAW
BEAVERTON OR 97007
503-649-7007

2100 DOPPLER MOTHERBOARD

Size	FCSM No.	DWG No.	Rev
Orcad B		299-0270-00	00
Scale	25 JUL 2007	Sheet 1 of 1	

TRIM TO 16”



PARKS MEDICAL ELECTRONICS INC.			
DOC# REFD0270-01-01			2100 DOPPLER MB
17 NOV. 2008		SCHEMATIC#	299-0270-00-00
PCB# 612-0270-00		BOM#	BOM9-0270-01-00

PARKS MEDICAL ELECTRONICS INC.

17 NOV. 2008 BOM9-0270-01-00 DCN# 51491

SINGLE LEVEL BILL OF MATERIAL,

2100 DOPPLER MOTHER BOARD

PARTS IN KIT 330-0270-02

DESIGNATOR	VALUE	COMMENT	P/N
PCB		CIRCUIT BOARD	612-0270-00
R03, R04	105K		679-1053-00R
R07, R08, R12, R19	10K		690-0103-00R
R09, R10, R11, R13, R14, R15, R16, R23, R24	100K		690-0104-00R
R05, R06	1.5K		690-0152-00
R01, R02	47K		690-0473-00R
C03, C04	100MF		710-1107-00R
C07	22MF		710-1226-00R
C01, C02	0.01		717-1103-00R
C05, C06	0.1		717-1104-03R
MS1 (10 ea.)	SCREW_MACH	FOR EDGE GUIDES	789-0013-00
P01, P2, P3, P4, P5	CARD EDGE HOLDER		864-0031-00
E1A/B, E2A/B, E3A/B, E4A/B, E5A/B	EDGE GUIDE		864-2000-00R
P06	2 X 31	DOPPLER INTERFACE BOARD	869-0206-00R
P07	2 X 13 LOCKING	TO 2100 MOTHERBOARD	869-0177-00R
L02, L03, L04, L05, L06	150UH	CHOKE	892-0001-00R
L01	5mH @ 1KHZ	CHOKE	892-0020-10
26P Connector			869-0178-10R

OFF THE BOARD,BUT ON THE SCHEMATIC

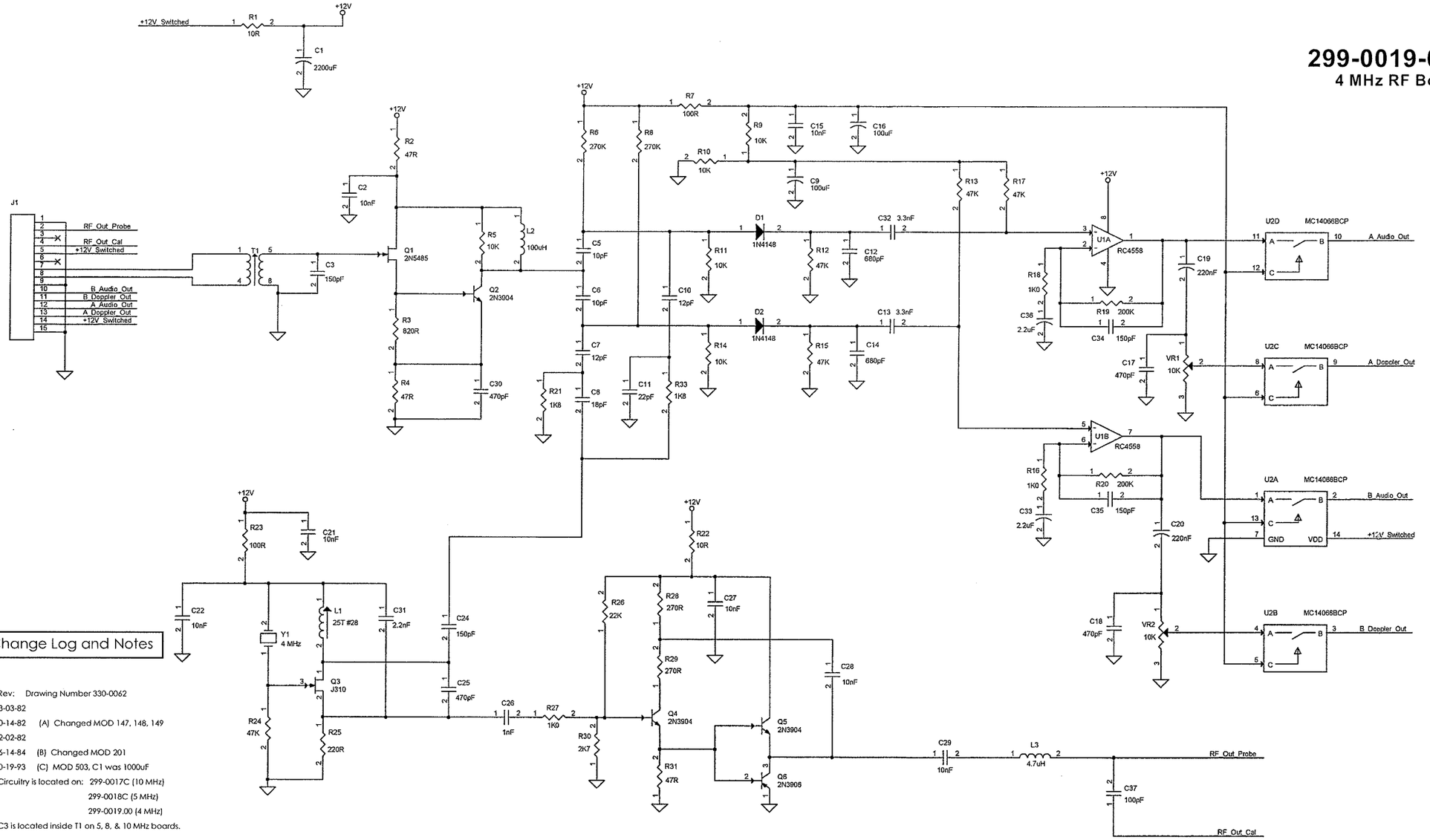
DESIGNATOR	VALUE	COMMENT	P/N
CX01, CX02, CX03, CX04	COAX	*SEE PROW001	825-0006-00
P08, P09, P10, P11	RCA	PROBE JACKS	869-0015-00R
BOM9-0270-01-00.xls			

299-0019-04.02

4 MHz R. F. BOARD

299-0019-04.02
4 MHz RF Board

TRIM TO 16”



Change Log and Notes

1: Rev: Drawing Number 330-0062
03-03-82
10-14-82 (A) Changed MOD 147, 148, 149
12-02-82
06-14-84 (B) Changed MOD 201
10-19-93 (C) MOD 503, C1 was 1000uF

2: Circuitry is located on: 299-0017C (10 MHz)
299-0018C (5 MHz)
299-0019.00 (4 MHz)

3: C3 is located inside T1 on 5, 8, & 10 MHz boards.

Mod # 617 04-20-95 (08-04-93) Increase bandwidth on Spectrum Equipped Units

* All VIP Units A>C12 & C14 Changed to 180pF
B>C34 & C35 Changed to 39pF

ECO-026	14 Aug 97	Add L3 Choke, Delete C23 & widen traces; Corrected U1
ECO-053	07 Nov 97	"C" Rev, Change R32 to C37
ECO-064	19 Dec 97	R24 > 4.7 (4 MHz only) <T1 > 40T-5T, C3 > 150pF, C8 > 18pF
No MOD	29 Dec 97	Clarified U2 Drawing
No MOD	08 Jan 98	Corrected Traces and Junctions
ECO-076	23 Feb 98	"D" Rev, Change R5 to 2.2K
ECO-091	27 Mar 98	Move Components away from edge of PCB
ECO-111	18 Jun 98	Change C9, C16 to 16V - Smaller Caps
No MOD	23 Feb 99	Corrected R5 Value to 2.2K
No MOD	24 May 99	"G" Rev: Corrected C3, R3, R5 Added Note
PAR #2153	16 Oct 2001	"H" Rev: Changed .22 Caps (C19, C20) to 717-1224-00
DCN# 50467	16 Feb 2006	Change Q2, Q4, Q5 P/N for RoHS Compliance. Renamed Document to new Std.
DCN# 52253	12 Jul 2012	Change C12 & C14 from 180pF to 680pF.

Approved: Donald C. Yurnell

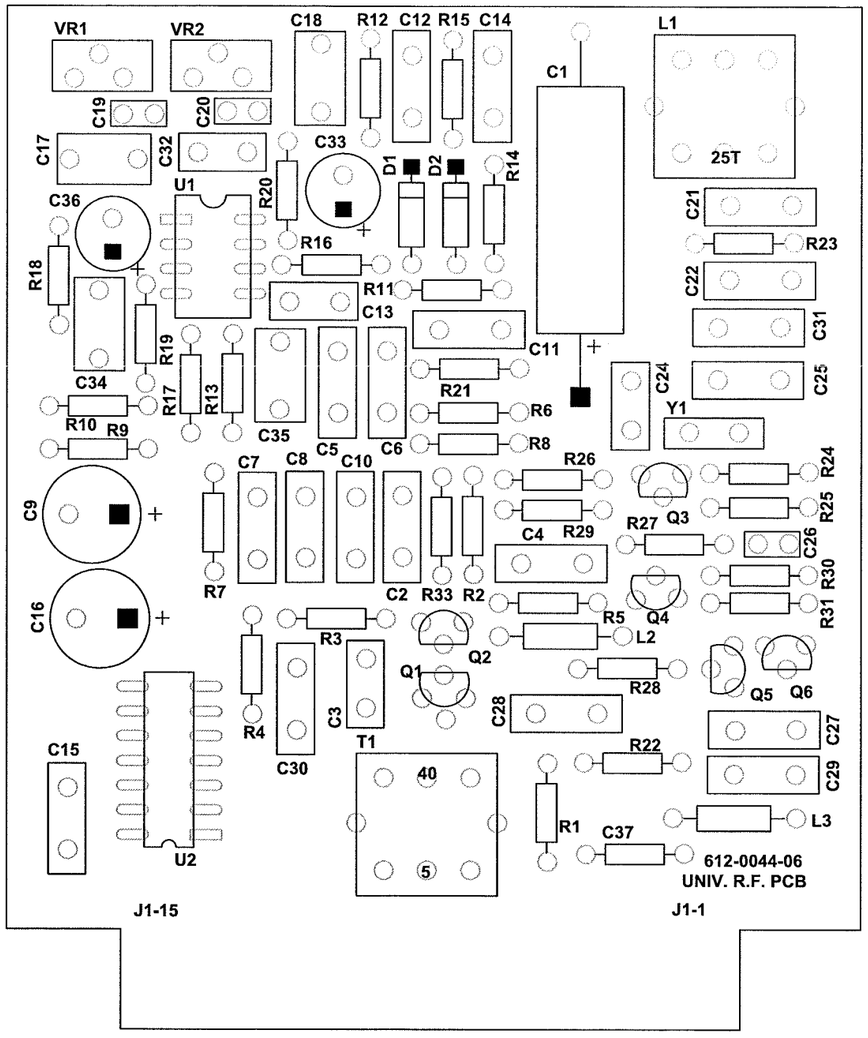
Date: 7/25/2012

Parks Medical Electronics
PO Box 5669, Aloha, OR 97007
(503) 649-7007

Title: 2100 4 MHz RF Card - Schematic

Size: C | Document Number: 299-0019-04 | Rev: 02

Date: Tuesday, July 24, 2012 | Sheet 1 of 2



PARKS MEDICAL ELECTRONICS, INC.	
DOC# REFD0070-05.05	MODEL # 4MHz RF
DATE: 24 JAN. 2012	BOM# BOM9-0019-06.05
PCB# 612-0044-06	SCHEMATIC# 299-0019-04.02
ASSY0019-06.04	

PARKS MEDICAL ELECTRONICS INC

24 JAN 2012 BOM9-0019-06.05 M DCN# 52179

SINGLE LEVEL BILL OF MATERIALS

4MHz RF BOARD

PARTS IN KIT 329-0061-03

DESIGNATOR	VALUE	COMMENT	P/N
PCB		CIRCUIT BD.	612-0044-06
VR1, VR2	10K		689-0025-00R
R1, R22	10		690-0100-00R
R7, R23	100		690-0101-00R
R16, R18	1K		690-0102-00R
R9, R10, R11, R14	10K		690-0103-00R
R21, R33	1.8K		690-0182-00R
R25	220		690-0221-00R
R28, R29	270		690-0271-00R
R6, R8	270K		690-0274-00
R2, R31	47		690-0470-00R
R24	4.7K		690-0472-00R
R12, R13, R15, R17	47K		690-0473-00R
C19, C20	.22uf		710-0224-00
C9, C16	100uf		710-1107-00R
C33, C36	2.2uf		710-2225-00R
C37	100pf		714-1101-00R
C26	.001uf		717-1102-00R
C2, C15, C21, C22, C27, C28, C29	.01uf		717-1103-00R
C17, C18	470pf		717-1471-00R
C12, C14	680pf		717-1681-00
D1, D2	1N4148		848-0003-00R
L1	25T #28 RED	CHOKE	886-0011-00

PARTS IN KIT 330-0070-05

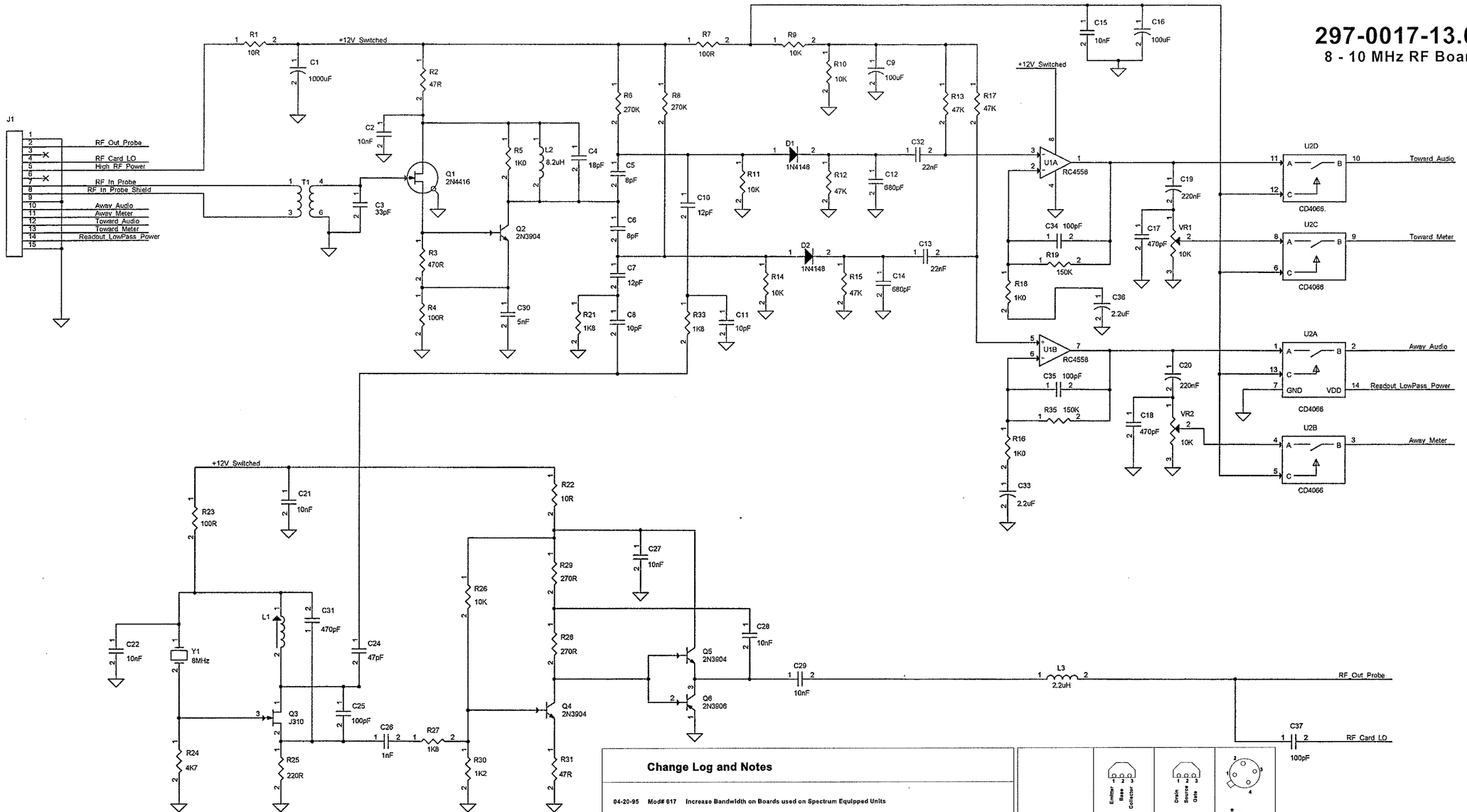
DESIGNATOR	VALUE	COMMENT	P/N
R27	1K		690-0102-00R
R5	10K*	SELECTED	690-0103-00R
R19, R20	200K		690-0204-00
R26	22K		690-0223-00R
R30	2.7K		690-0272-00
R4	47		690-0470-00R
R3	820		690-0821-00R
C1	2200uf		710-2228-10R
C31	.0022uf		715-5222-00R
C13, C32	.033uf		715-5333-00
C5, C6	10pf		714-1100-00R
C7, C10	12pf		717-1120-00R
C3, C24, C34, C35	150pf		717-1151-00R
C8	18pf		717-1180-00R
C11	22pf		717-1220-00R
C25, C30	470pf		717-1471-00R
U1			844-0003-00R
U2			844-0037-00R
Q2, Q4, Q5			849-0005-00R
Q6			849-0023-00R
Q1	* RECEIVER STRENGTH		849-2002-00R
Q3			849-2007-00R
T1	40T 5T		880-0010-00
L2	100uh	CHOKE	892-0012-00
L3	4.7uh	CHOKE	892-0016-00

PARTS IN KIT 330-9039-00 to 330-9044-00

Y1	903.9 to 904.4	To Be Determined	842-0014-00
BOM9-0019-06.05.xls			

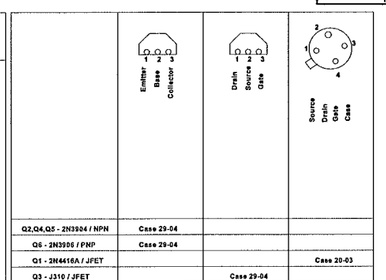
297-0017-13.01

8 - 10 MHz RF Board



Change Log and Notes

04-20-95	Mod# 617	Increase Bandwidth on Boards used on Spectrum Equipped Units
	All VIP Units:	C12 & C14 change to 180pF C34 & C35 change to 50pF
10-29-87	Mod# 292	R16, R18, R19, R20 & C33, C36, C34, C35
15 Sept 97	EMI Mod	Add L3, Delete C23, Corrected U1
03 Nov 97	No Mod	Corrected L3
07 Nov 97	ECO-053	"D" Rev: Change R32 to C37
19 Dec 97	ECO-064	Change R24 to 4.7
29 Dec 97	No Mod	Clarifying U2, Add Translstor Chart
08 Jan 98	No Mod	Corrected Traces, Junctions
27 Mar 98	ECO-090	Change C3 to 33pF
27 Mar 98	ECO-091	Change PCB Layout, move components away from edge
18 Jun 98	ECO-111	Change C9, C16 to 16V parts
11 Aug 98	No Mod	Corrected U2 Connections
01 Feb 99	No Mod	Corrected Misc. Labels
19 Apr 99	No Mod	Corrected 4066 Pin Layout
22 Jan 2002	Par 2149	"-10L" Rev: Change C8, C11 part numbers
13 Feb 2006	DCN 50467	Change Q2, Q4, Q5 and T1 to RoHS part numbers. Renamed document to new std.
25 Feb 2012	DCN 52251	Change C12, C14 from 180 pF to 680 pF.



Q2,Q4,Q5 - 2N3904 / NPN	Case 29-04		
Q6 - 2N3906 / PNP	Case 29-04		
Q1 - 2N4416A / JFET			Case 20-03
Q3 - J310 / JFET		Case 29-04	

Approved: Donald C Yarnell

Date: 7/24/2012

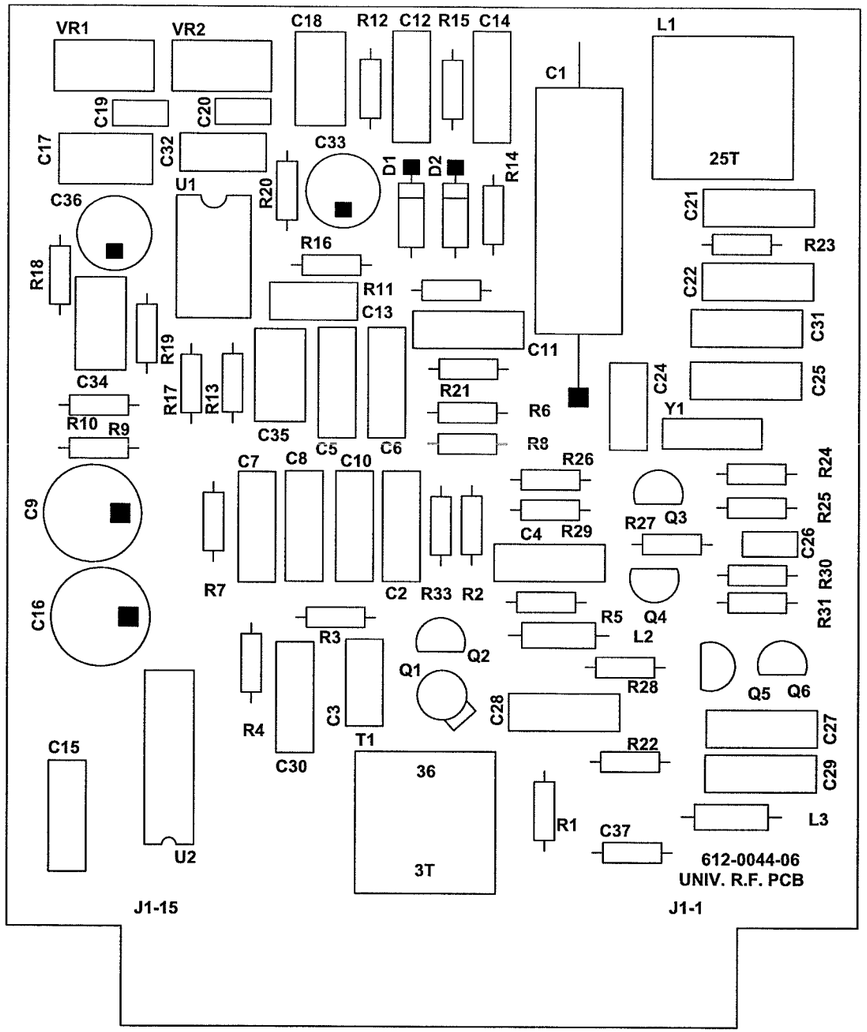
Parks Medical Electronics
PO Box 5669, Aloha, OR 97007
(503) 649-7007

Title: 8 MHz RF Card - Schematic

Size C | Document Number 297-0017-13 | Rev 01

Monday, July 23, 2012

TRIM TO 16”



PARKS MEDICAL ELECTRONICS, INC.	
DOC# REFD0061-06.01*	MODEL # 10MHz RF
20 JULY 2012	SCHEMATIC# 297-0017-13.01
PCB# 612-0044-06	BOM# BOM7-0017-13.01
	ASSY# ASSY0017-14.02

* THIS DOCUMENT WILL APPLY TO THE FOLLOWING:
330-9079-XX
330-9081 THRU 9084-XX
330-9088 THRU 9098-XX

PARKS MEDICAL ELECTRONICS INC

20 JULY 2012 BOM7-0017-13.01 M DCN# 52251

SINGLE LEVEL BILL OF MATERIALS

10MHz RF BOARD

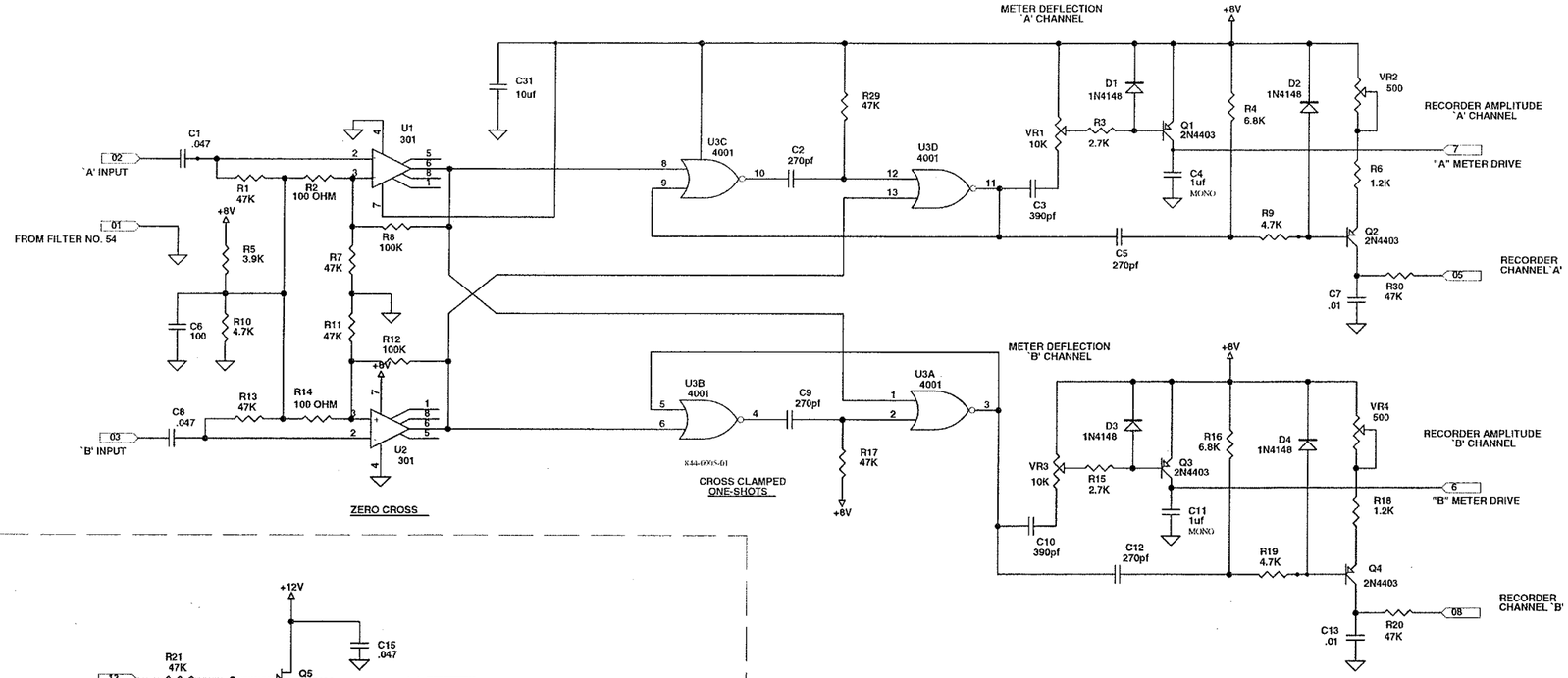
PARTS IN KIT 329-0061-03

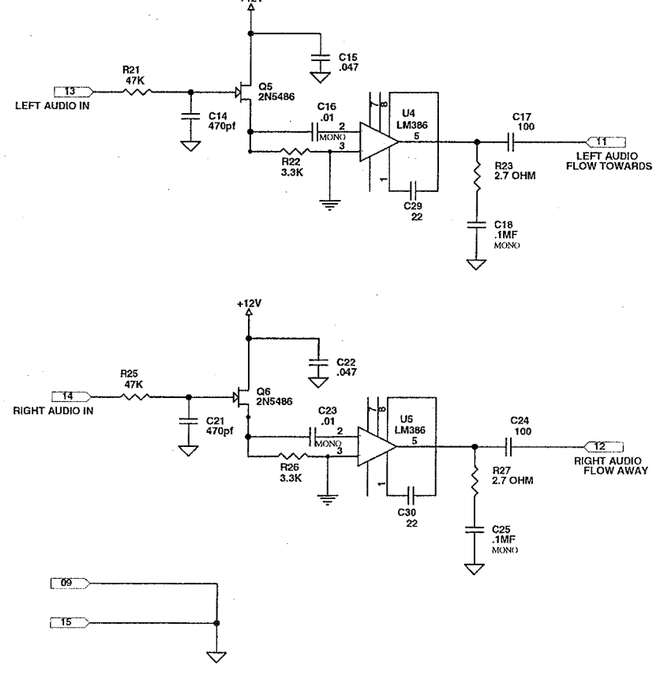
DESIGNATOR	VALUE	COMMENT	P/N
PCB		CIRCUIT BD.	612-0044-06
VR1, VR2	10K		689-0025-00R
R1, R22	10		690-0100-00R
R7, R23	100		690-0101-00R
R16, R18	1K		690-0102-00R
R9, R10, R11, R14	10K		690-0103-00R
R21, R33	1.8K		690-0182-00R
R25	220		690-0221-00R
R28, R29	270		690-0271-00R
R6, R8	270K		690-0274-00
R2, R31	47		690-0470-00R
R24	4.7K		690-0472-00R
R12, R13, R15, R17	47K		690-0473-00R
C9, C16	100		710-1107-00R
C33, C36	2.2uF		710-2225-00R
C37	100pF		714-1101-00
C26	0.001		717-1102-00R
C2, C15, C21, C22, C27, C28, C29	0.01		717-1103-00R
C19, C20	0.22	(PAR # 2153)	717-1224-00R
C17, C18	470pf		717-1471-00R
C12, C14	680pf		717-1681-00R
D1, D2	1N4148		848-0003-00R
L1	25T #28 RED	Coil	886-0011-00

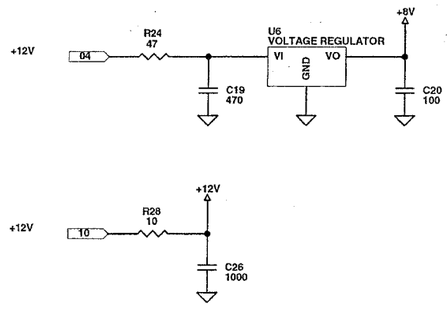
PARTS IN KIT 330-0061-06

DESIGNATOR	VALUE	COMMENT	P/N
R4	100		690-0101-00R
R5	1K		690-0102-00R
R26	10K		690-0103-00R
R30	1.2K		690-0122-00R
R19, R20	150K		690-0154-00R
R27	1.8K		690-0182-00R
R3	470		690-0471-00
C1	1000		710-0108-00
C8, C11	10pF		714-1100-00R
C3	33pF		714-1330-00
C13, C32	0.022		715-5223-01R
C5, C6	8.2pF		717-1082-00R
C25, C34, C35	100pF		717-1101-00R
C7, C10	12pF		717-1120-00R
C4	18pF		717-1180-00R
C24	47pF		717-1470-00R
C31	470pF		717-1471-00R
C30	0.005		717-1502-00
T1 REF	CAP, FERRITE	YELLOW	723-0003-00R
L1 Ref.	CAP, FERRITE	RED	723-0004-00R
T1, L1 Ref.	METAL CANS	2 Each	800-0002-00
Y1		CRYSTAL, SELECTED	FREQUENCY
U1			844-0003-00R
U2			844-0037-00R
Q1			847-0023-00
Q2, Q4, Q5			849-0005-00R
Q6			849-0023-00R
Q3			849-2007-00R
T1	3T-36T		880-0019-00
L2	8.2uH		892-0014-00
L3	2.2uH		892-0021-00
BOM7-0017-13.01.xls			

297-0060-06.00
1010 READOUT BOARD







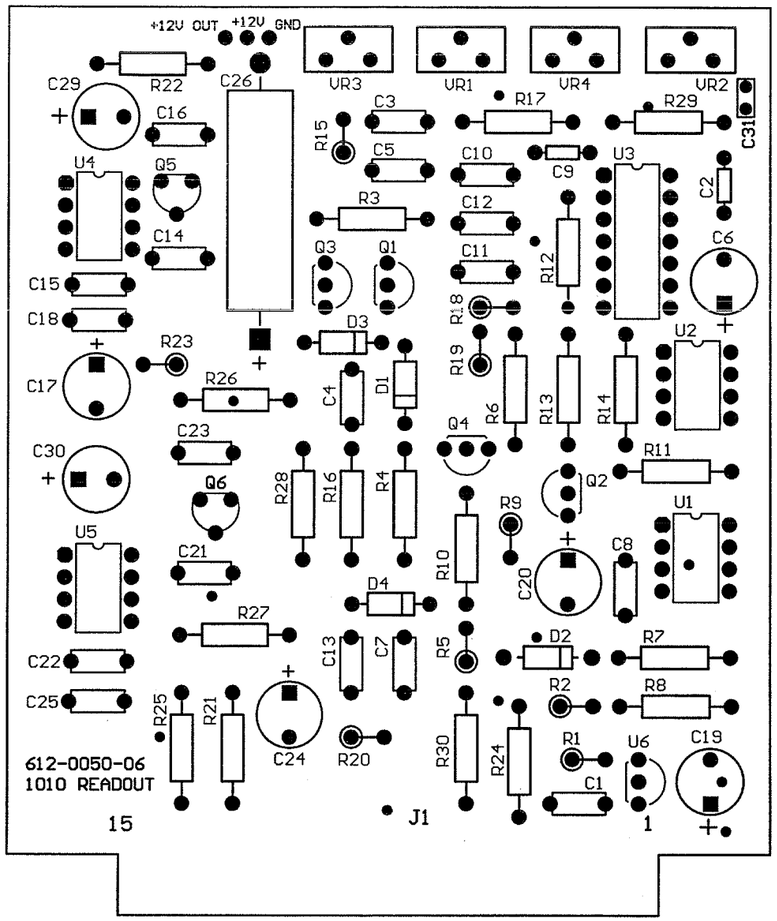
REV. .00 02-28-83 NOTES:

1) R442 AND R447 ARE SSLECTED FOR RECORDER AMPLITUDE RANGE: ADJUSTED FOR 600 Mv/Khz NOMINAL VALUE IS 1K
2) UNLESS OTHERWISE SPECIFIED, ALL CAPACITOR VALUES ARE IN MICROFARADS
3) PCB# 612-0050-04B
4) ASSY: 330-0060-01

REV. .01 11-09-94 NOTES:

1) MOD 40: REVISED 5086'S TO 2N4403'S
2) CHANGED R442 & R447 TO 1.2K
3) CHANGED C432, 437 TO 1uf Mono
4) MOD 163: CHANGED C455, C465 TO .1MF RD MONO
5) MOD 163: CHANGED R455, R465 TO 2.7 OHM
6) CHANGED C451, C461 TO Mono
7) CORRECTED C451 DUPLICATION, NAMED ONE C452
8) CORRECTED U420 DUPLICATION, NAMED 301> U400
9) CHANGED 2N5485'S TO 2N5486'S
10) 02-08-95 "A" REV: CORRECTED OMISSIONS
11) ECO-046 30 SEP 97 "C" REV: CHANGED C400, C405, C452, C462 > .047
12) 21 DEC 2000 NO MOD "D" REV: CORRECTED C452, C462 VALUES
13) 22 FEB 2006 DCN# 50497 RENAMED DOCUMENT TO NEW STANDARD.

APPROVED: Donald E Ford DATE: 3/22/06	PARKS MEDICAL ELECTRONICS INC. 19460 S.W. SHAW PO BOX 5069 ALOHA, OR 97007 (503) 649-7007 1010 READOUT BOARD		
	Size: Orcad C	FCSM No.	DWG No.: 299-0060-06 — Rev: 00
	Scale	21 FEB 2006	Sheet: 1 of 1



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0060-05.01	UNIV. READOUT
10 MAR. 2008	SCHEMATIC# 297-0060-06.00
PCB# 612-0050-06	BOM# BOM7-0060-06.06
ASSY0060-06.01	

PARKS MEDICAL ELECTRONICS, INC.

10 MAR. 2008 BOM7-0060-06.06 M DCN# 51317

SINGLE LEVEL BILL OF MATERIAL

UNIVERSAL READOUT BOARD

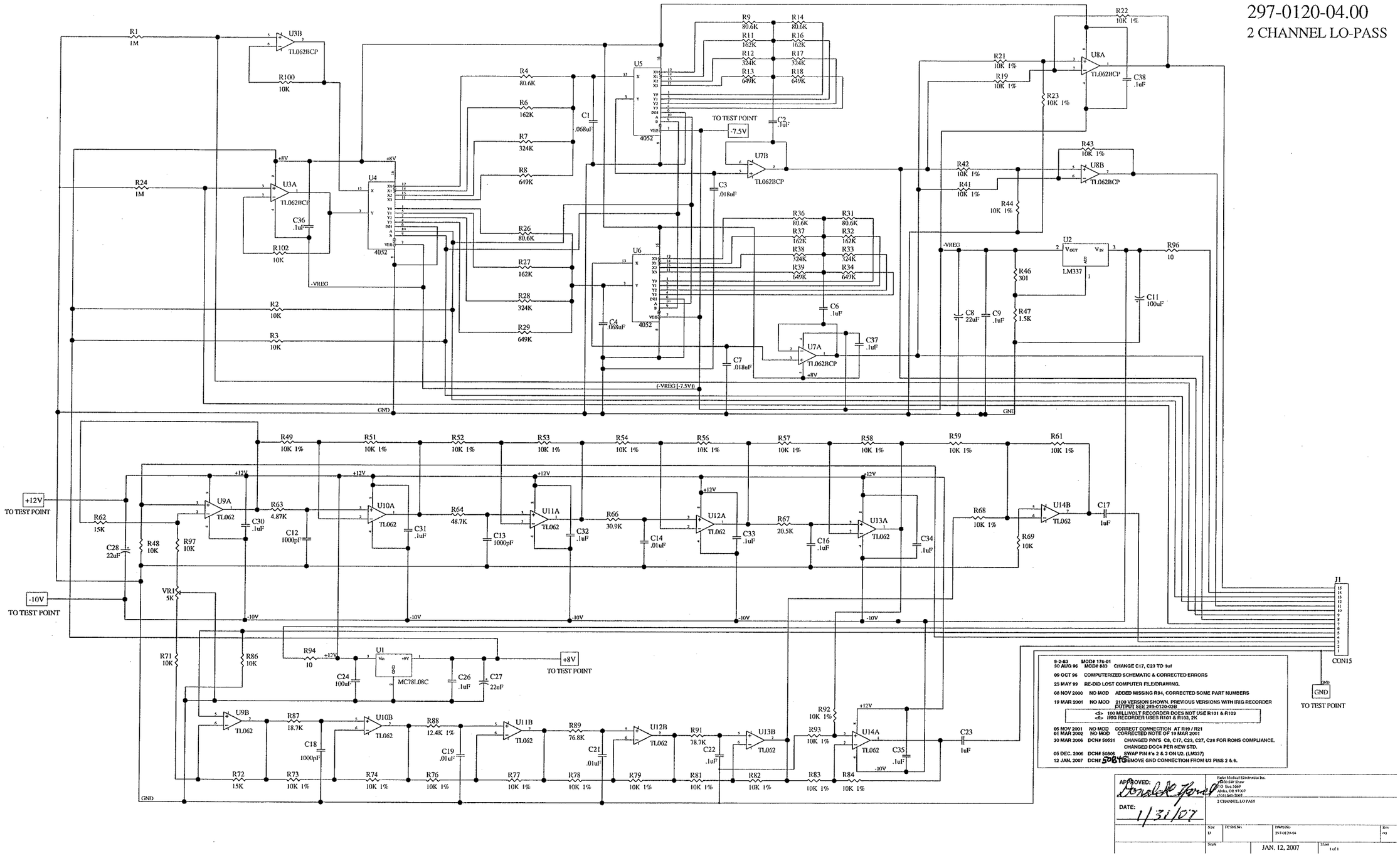
PARTS IN KIT 329-0060-02

DESIGNATOR	VALUE	COMMENT	PART NO.
PCB	BOARD		612-0050-06
VR2, VR4	500		689-0024-00R
VR1, VR3	10K		689-0025-00R
R28	10		690-0100-00R
R02, R14	100 OHM		690-0101-00R
R08, R12	100K		690-0104-00R
R06, R18	1.2K		690-0122-00R
R03, R15	2.7K		690-0272-00R
R23, R27	2.7 OHM		690-0277-00R
R22, R26	3.3K		690-0332-00R
R05	3.9K		690-0392-00R
R24	47		690-0470-00R
R09, R10, R19	4.7K		690-0472-00R
R01, R07, R11, R13, R17, R20, R21, R25, R29, R30	47K		690-0473-00R
R04, R16	6.8K		690-0682-00R
C26	1000		710-0108-00
C06, C17, C20, C24	100		710-1107-01R
C29, C30	22		710-1226-01R
C19	470		710-1477-00R
C31	10uF		710-2106-00R
C02, C05, C09, C12	270pf		714-1271-00
C07, C13	0.01		715-5103-07
C16, C23	0.01	MONO	717-1103-02R
C18, C25	.1MF	MONO	717-1104-03R
C04, C11	1uf	MONO	717-1105-00R
C03, C10	390pf		717-1391-00
C14, C21	470pf		717-1471-00R
C01, C08, C15, C22	0.047		717-1473-00R
D01, D02, D03, D04	1N4148		848-0003-00R

PARTS IN KIT 330-0060-05

DESIGNATOR	VALUE	COMMENT	PART NO.
U04, U05			844-0002-00R
U03			844-0005-01R
U01, U02			844-0006-00R
U06			844-0038-00R
Q01, Q02, Q03, Q04			849-0046-00R
Q05, Q06			849-2001-00R
[BOM7-0060-06.06_M.xls]			

297-0120-04.00
2 CHANNEL LO-PASS

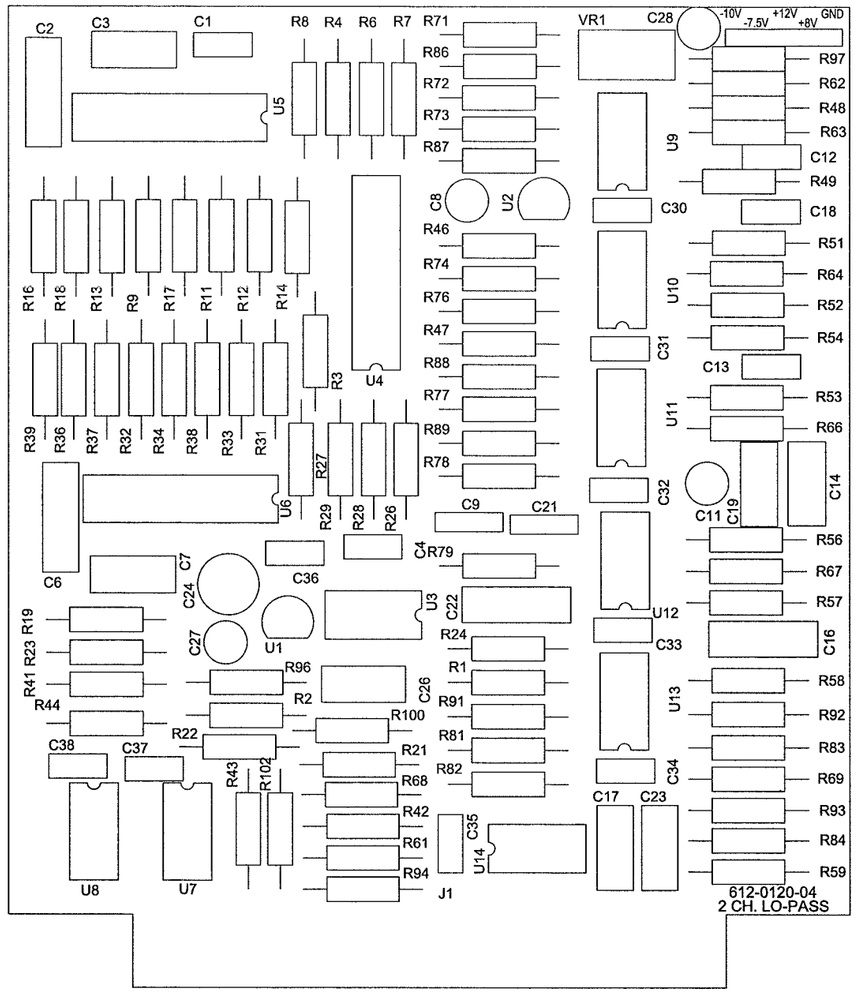


9-2-83	MOD# 176-01
30 AUG 96	MOD# 883 CHANGE C17, C23 TO 1uf
09 OCT 96	COMPUTERIZED SCHEMATIC & CORRECTED ERRORS
25 MAY 99	RE-DID LOST COMPUTER FILE/DRAWING.
08 NOV 2000	NO MOD ADDED MISSING R94, CORRECTED SOME PART NUMBERS
19 MAR 2001	NO MOD 2100 VERSION SHOWN. PREVIOUS VERSIONS WITH IRIG RECORDER OUTPUT SEE 299-0120-02E
	<5> 100 MILLIVOLT RECORDER DOES NOT USE R101 & R103
	<6> IRIG RECORDER USES R101 & R103, 2K
05 NOV 2001	NO MOD CORRECT CONNECTION AT R19 / R21
01 MAR 2002	NO MOD CORRECTED NOTE OF 19 MAR 2001
30 MAR 2006	DCN# 50931 CHANGED P/N'S C8, C17, C23, C27, C28 FOR ROHS COMPLIANCE. CHANGED DOC# PER NEW STD.
05 DEC. 2006	DCN# 50506 SWAP PIN #'s 2 & 3 ON U2. (LM337)
12 JAN. 2007	DCN# 50613 REMOVE GND CONNECTION FROM U3 PINS 2 & 6.

APPROVED: Donald Tyrrell
DATE: 1/31/07

Parks Medical Electronics Inc.
1500 SW Shaw
P.O. Box 5669
Aloha, OR 97007
(503)645-2001
2 CHANNEL LO PASS

Size	FCSM No.	DWG No	Rev
D		297-0120-04	03
Scale		JAN. 12, 2007	Sheet 1 of 1



PARKS MEDICAL ELECTRONICS, INC.	
DOC# REFD0120-05.07	2 CHANNEL LO-PASS
DATE: 20 SEPT 2013	SCHEMATIC# 297-0120-04.00
PCB# 612-0120-04	BOM# BOM7-0120-05.00

PARKS MEDICAL ELECTRONICS INC

20 SEPT 2013 BOM7-0120-05.00 M DCN# 52568

SINGLE LEVEL BILL OF MATERIALS

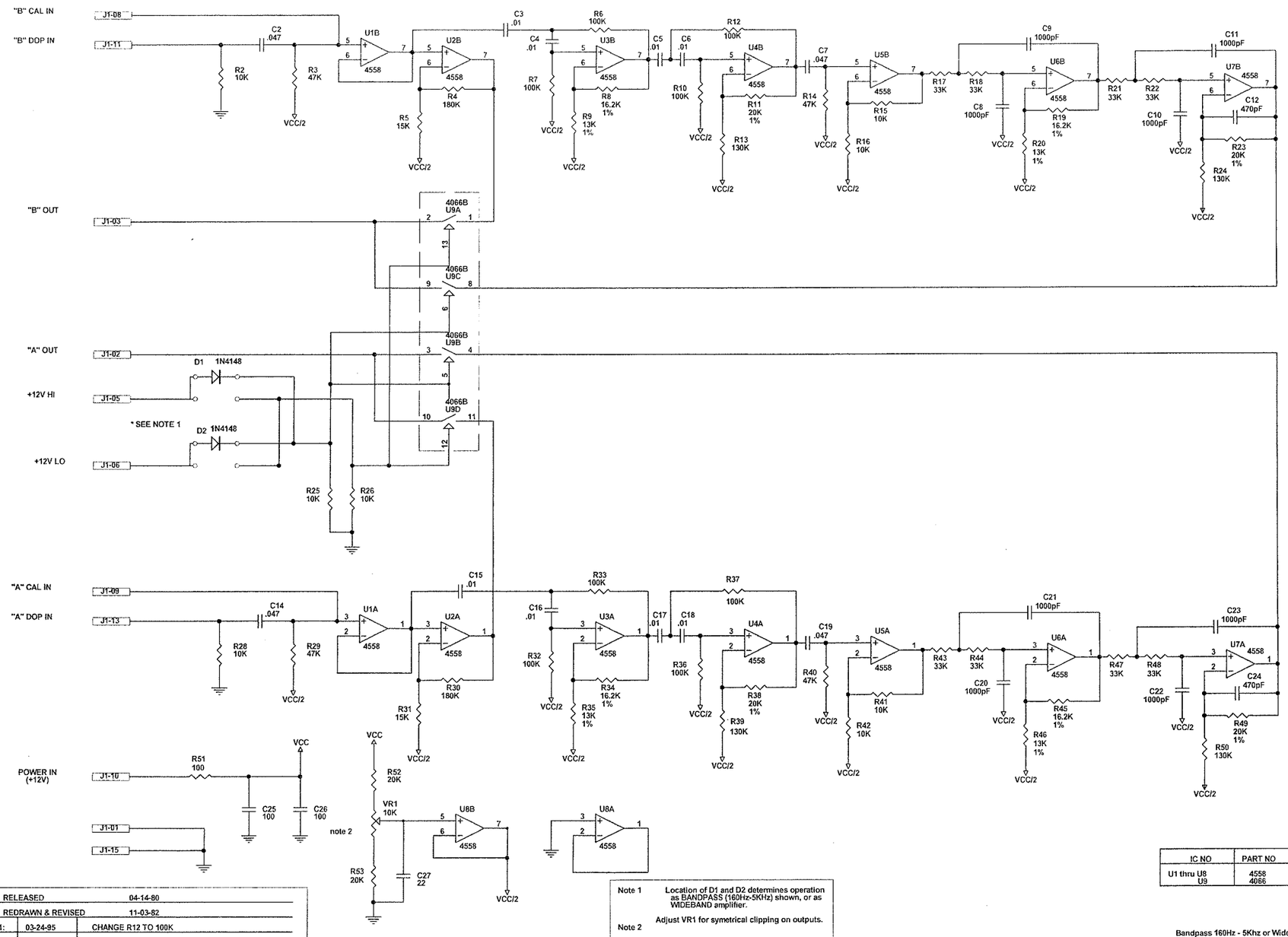
2-CHANNEL LO-PASS

PARTS IN KIT 329-0120-08

DESIGNATOR	VALUE	COMMENT	P/N
PCB			612-0120-04
R19, R21, R22, R23, R41, R42, R43, R44, R49, R51, R52, R54, R56, R57, R58, R59, R61, R68, R69, R73, R74, R76, R77, R78, R79, R81, R82, R83, R84, R92, R93	10K 1%		679-1002-00R
R88	12.4K		679-1242-00
R6, R11, R16, R27, R32, R37	162K		679-1623-00R
R87	18.7K		679-1872-00R
R67	20.5K		679-2052-00R
R46	301		679-3010-00R
R66	30.9K		679-3092-00
R7, R12, R17, R28, R33, R38	324K		679-3243-00R
R63	4.87K		679-4871-00
R64	48.7K		679-4872-00R
R08, R13, R18, R29, R34, R39	649K		679-6493-00R
R89	76.8K		679-7682-00
R91	78.7K		679-7872-00
R4, R9, R14, R26, R31, R36	80.6K		679-8062-00R
VR1	5K		689-0041-00R
R94, R96	10		690-0100-00R
R2, R3, R48, R71, R86, R97, R100, R102	10K 1%		690-0103-00R
R01, R24	1 MEG		690-0105-00R
R47	1.5K		690-0152-00R
R62, R72	15K		690-0153-00R
C11, C24	100		710-1107-00R
C8, C27, C28	22		710-1226-01R
C14, C19, C21	0.01		715-5103-02
C3, C7	0.018		715-5183-01R
C12, C13, C18	1000pf		717-1102-02R
C9, C26, C30, C31, C32, C33, C34, C35, C36, C37, C38	0.1		717-1104-03R
C17, C23	1		717-1105-00R
Header	5 Test P.		869-0179-05

PARTS IN KIT 330-0120-07

DESIGNATOR	VALUE	COMMENT	P/N
C2, C6, C16, C22	0.1		715-5104-02
C1, C4	0.068		715-5683-01R
U1			844-0038-00R
U4, U5, U6			844-0041-00R
U9, U10, U11, U12, U13, U14			844-0065-00R
U2			844-0095-00R
U3, U7, U8			844-0187-00R



IC NO	PART NO	Vcc	Gnd
U1 thru U8	4558	8	4
U9	4066	14	7

RELEASED		04-14-80
REDRAWN & REVISED		11-03-82
MOD# 531:	03-24-95	CHANGE R12 TO 100K
MOD# 531:	03-24-95	REMOVE R1,R27,C1,C13
ECO-046	30 SEP 97	(24 AUG 99) ALL .5 CAPS > .047 (C2, C7, C14, C19)
NO MOD	21 APR 99	CORRECTED D1, D2 POSITION
NO MOD	24 AUG 99	CORRECTED SPACING ON PCB DRAWING (612-0047-01C) (EDGE CARD PADS: .156 SPACING)
DCN# 50205	13 MAY 05	CORRECT ERRORS ON BOM, SHOW 320- & 330- SPLIT CHANGE DOC NO'S. THIS REPLACES 299-0058-XX; ALL REVS
DCN# 50497	22 FEB 06	RENAMED DOCUMENT TO NEW STANDARD.
DCN# 50845	25 JAN. 2007	CORRECT INCIDENTAL SCHEMATIC ERRORS
DCN# 51418	15 JULY 2008	DELETE NOTES DUPLICATED ON REFD0058-XX.XX

Note 1 Location of D1 and D2 determines operation as BANDPASS (160Hz-5KHz) shown, or as WIDEBAND amplifier.

Note 2 Adjust VR1 for symetrical clipping on outputs.

Note 3 "⏚" symbol indicates 1/2 Vcc (+6V) VCC/2

Note 4 Unles otherwise specified, all capacitor values are given in microfarads

Bandpass 160Hz - 5Khz or Wideband

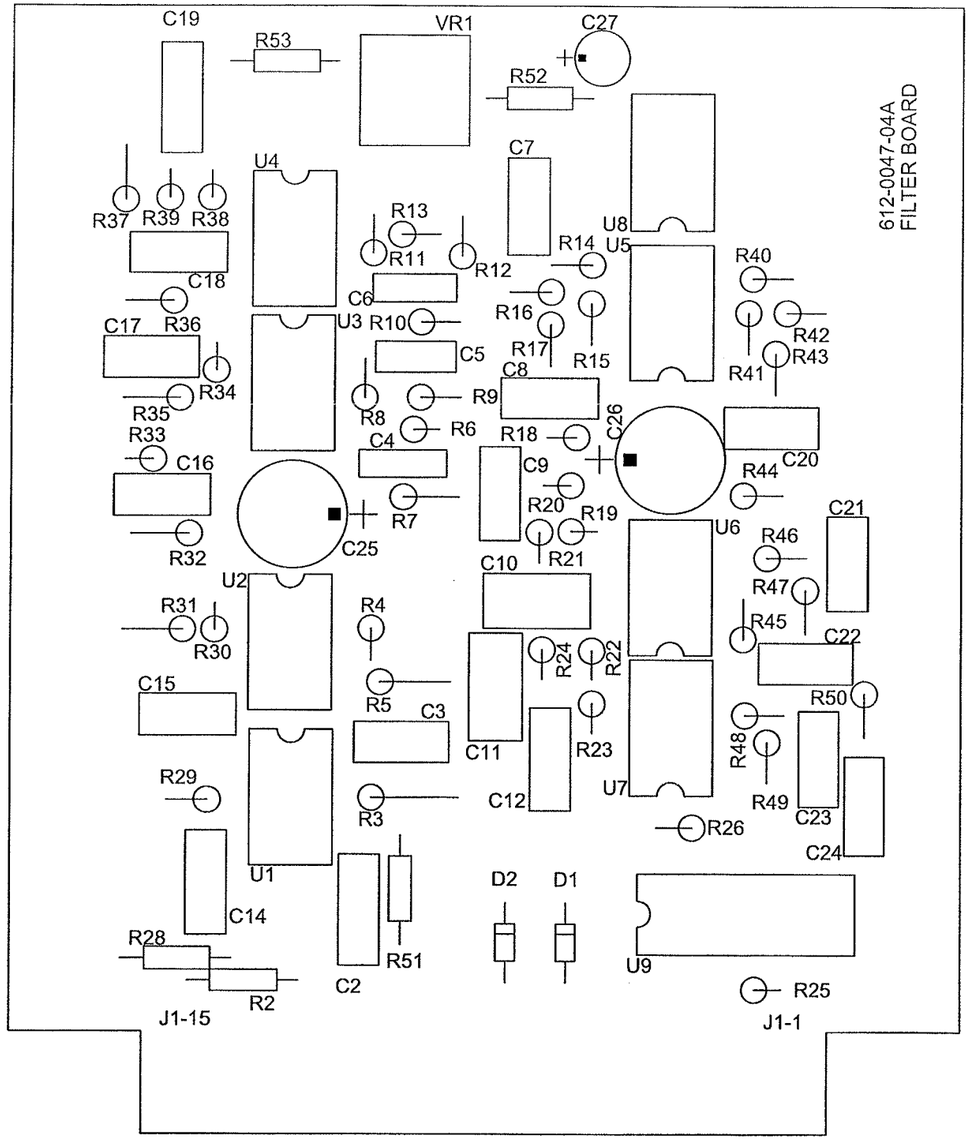
APPROVED: Donald C Yarnall

DATE: 15 July 08

PARKS MEDICAL ELECTRONICS INC.
19460 S.W. SHAW
PO BOX 5669
ALOHA, OREGON 97007
(503) 649-7007

FILTER BOARD

Size	FCSM No.	DWG No.	Rev
Orcad C		297-0058-04	01
Scale		15 JULY 08	Sheet 1 of 1



PARKS MEDICAL ELECTRONICS, INC.	
DOC# REFD0058-02.04	FILTER BOARD
DATE: 20 SEPT 2013	SCHEMATIC# 297-0058-04.01
PCB# 612-0047-04	BOM# BOM7-0058-05.00

PARKS MEDICAL ELECTRONICS INC

20 SEPT 2013 BOM7-0058-05.00 M DCN# 52568

SINGLE LEVEL BILL OF MATERIALS

FILTER BOARD

PARTS IN KIT 329-0058-03

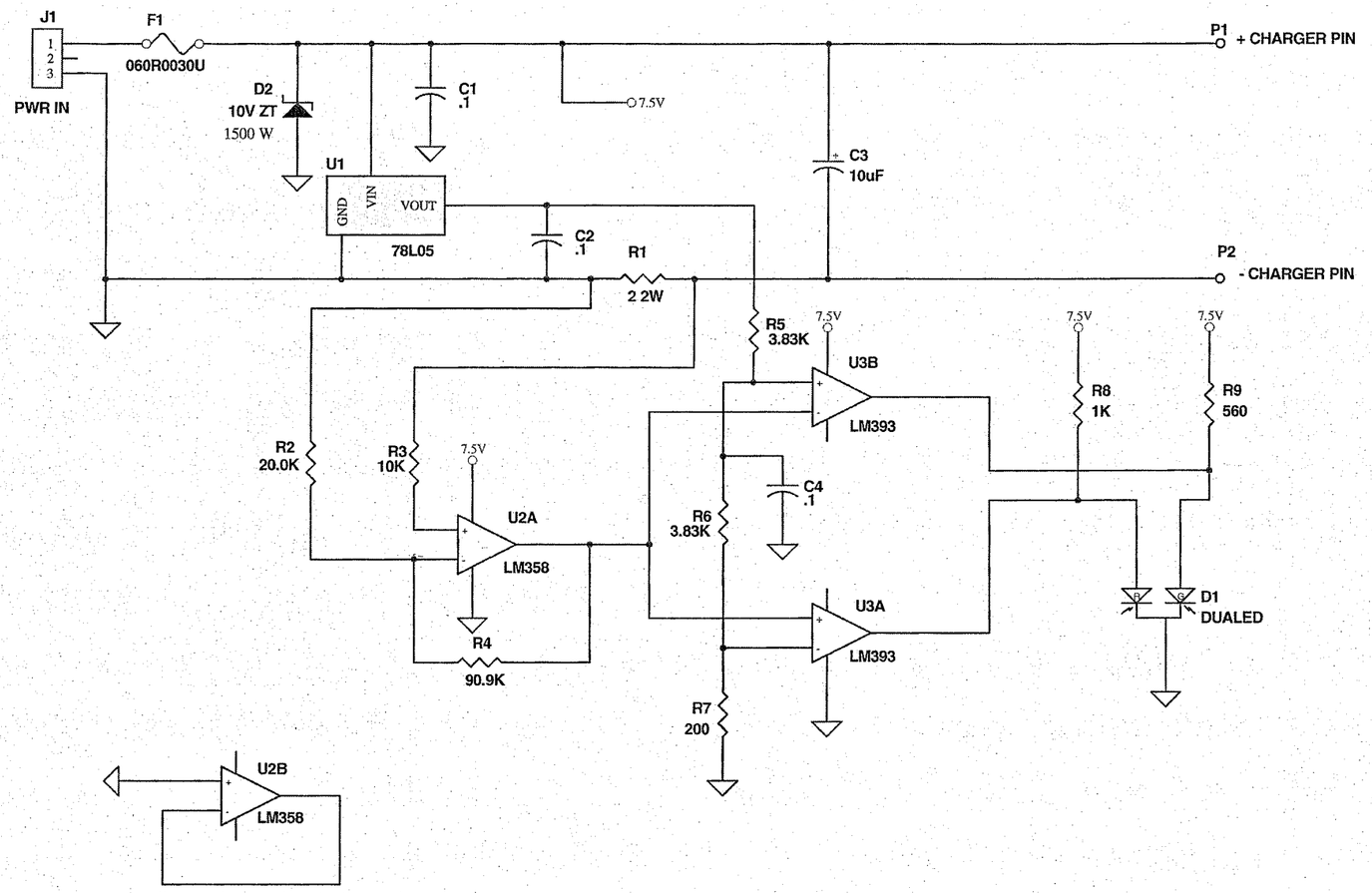
DESIGNATOR	VALUE	COMMENT	P/N
PCB			612-0047-04
R9, R20, R35, R46	13K	1%	679-1302-00R
R13, R24, R39, R50	130K		679-1303-00R
R8, R19, R34, R45	16.2K	1%	679-1622-00R
R11, R23, R38, R49	20K	1%	679-2002-00R
VR1	10K		689-0004-00R
R51	100		690-0101-00R
R2, R15, R16, R25, R26, R28, R41, R42	10K		690-0103-00R
R6, R7, R10, R12, R32, R33, R36, R37	100K		690-0104-00R
R5, R31	15K		690-0153-00R
R4, R30	180K		690-0184-00R
R52, R53	20K		690-0203-00R
R17, R18, R21, R22, R43, R44, R47, R48	33K		690-0333-00R
R3, R14, R29, R40	47K		690-0473-00R
C25, C26	100		710-1107-00R
C27	22		710-1226-01R
C3, C4, C5, C6, C15, C16, C17, C18	0.01		715-5103-07
C8, C9, C10, C11, C20, C21, C22, C23	1000pF		717-1102-02R
C12, C24	470pF		717-1471-00R
C2, C7, C14, C19	0.047		717-1473-00R
D1, D2			848-0003-00R

PARTS IN KIT 330-0058-03

DESIGNATOR	VALUE	COMMENT	P/N
U1, U2, U3, U4, U5, U6, U7, U8			844-0003-00R
U9			844-0037-00R

297-0314-00.00

2100/3100-B IR REMOTE CHARGER



APPROVED Donald E. Ford	Parks Medical Electronics 19460 SW Shaw Street P. O. Box 5669 Aloha, Oregon		
DATE: 9/20/06	2100/3100-B IR Remote Charger		
	Size: B	FCSM No.	DWG No.: 297-0314-00 / Rev: 00
	Scale		Sheet: 1 of 1

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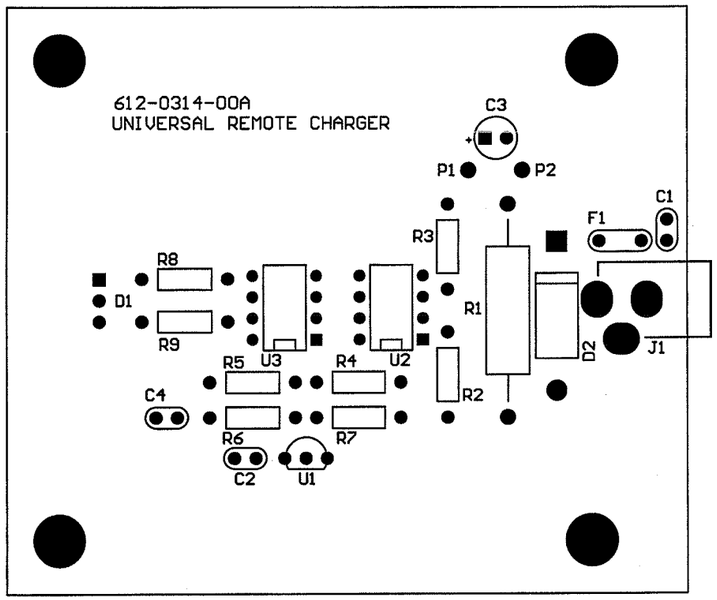
TO

16”



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0314-01.00	2100/3100-B IR REM. CHARGER
02 NOV. 2006	SCHEMATIC# 297-0314-00.00
PCB# 612-0314-00	BOM# BOM7-0314-00.01

PARKS MEDICAL ELECTRONICS INC.,

02 NOV. 2006 [BOM7-0314-00.01] M DCN# 50777

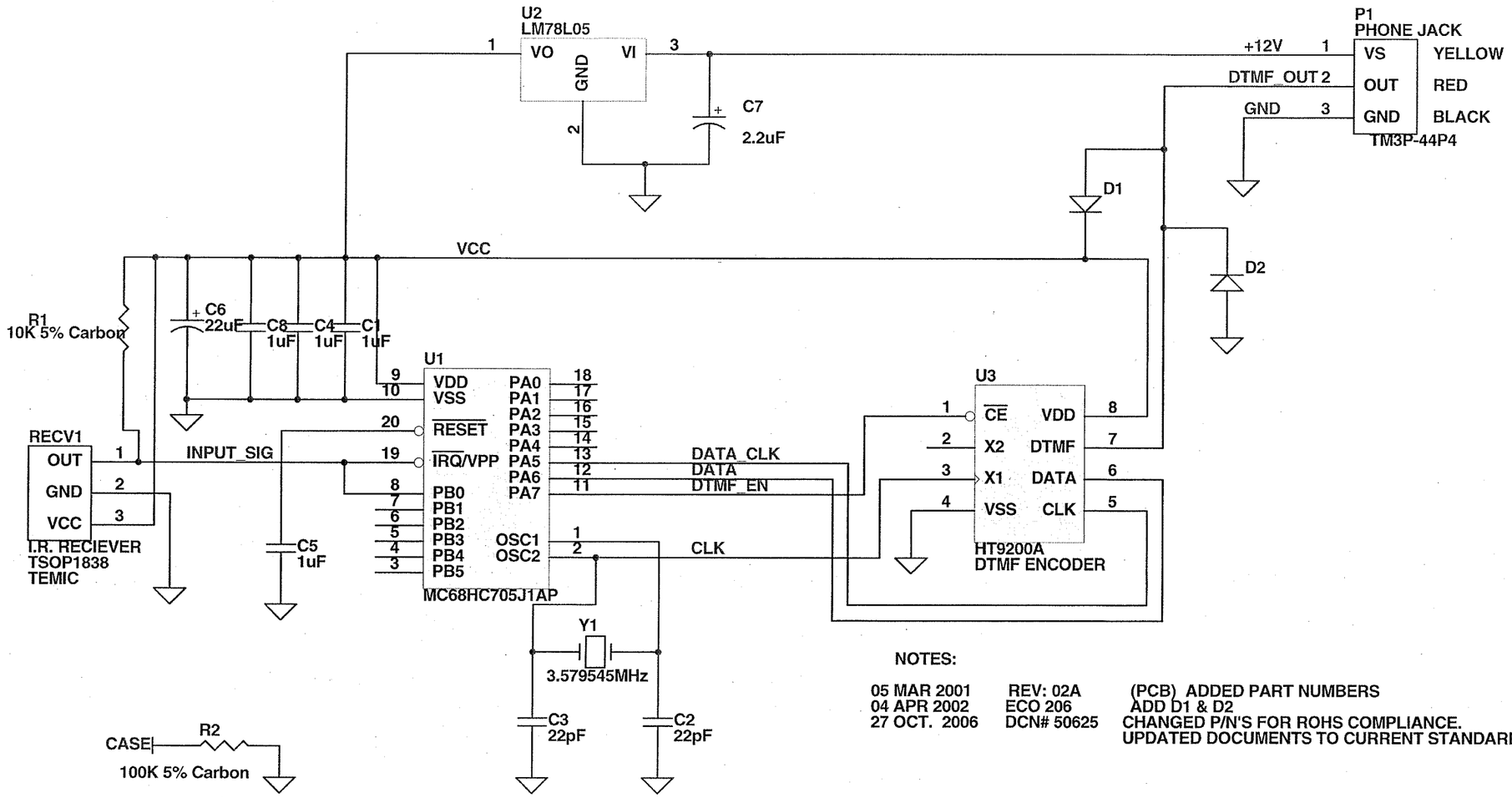
SINGLE LEVEL BILL OF MATERIAL,

2100/3100-B REMOTE CHARGER

PARTS IN KIT 330-0314-01

DESIGNATOR	VALUE	COMMENT	PART NO.
PCB			612-0314-00
R3	10.0K	1/4w, 1%	679-1002-00R
R7	200	1/4w, 1%	679-2000-00
R2	20.0K	1/4w, 1%	679-2002-00
R5, R6	3.83K	1/4w, 1%	679-3831-00
R4	90.9K	1/4w, 1%	679-9092-00
R8	1K	1/4W, 5%	690-0102-00
R9	560	1/4W, 5%	690-0561-00
R1	2 OHM, 2W	5% MF	698-6207-00
C3	10uF	0.1 LS TANT	710-2106-00R
C1, C2, C4	0.1uF	0.1 LS, CER	717-1104-04R
U2	DUAL OP AMP		844-0044-00R
U3	DUAL COMPARATOR		844-0049-00R
U1	5V REGULATOR		844-0054-00R
D2	TRANS.VOLTAGE SUPP.		848-1006-00
D1	DUAL RED/GRN		850-0200-00
F1			865-5002-00
J1			869-0190-00R
P1, P2	MIL MAX		869-0191-00R
[BOM7-0314-00.01_M.xls]			

299-0290-03.00
2100 I.R. REMOTE RECEIVER



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16”

NOTES:

05 MAR 2001	REV: 02A	(PCB) ADDED PART NUMBERS
04 APR 2002	ECO 206	ADD D1 & D2
27 OCT. 2006	DCN# 50625	CHANGED P/N'S FOR ROHS COMPLIANCE.
		UPDATED DOCUMENTS TO CURRENT STANDARD.

APPROVED: Donald C Yount

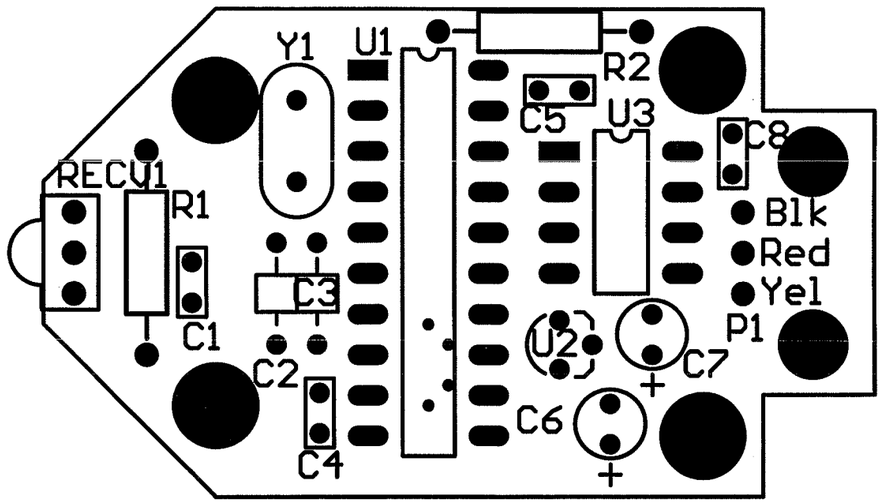
DATE: 30 Oct 06

PARKS MEDICAL ELECTRONICS, INC.
19460 S.W. SHAW STREET
P.O. BOX 5669
ALOHA, OREGON 97007
(503) 649-7007

2100 I.R. REMOTE RECEIVER

Size	FCSM No.	DWG No.	Rev
Orcad A		299-0290-03	00

Scale		Sheet
	27 OCT. 2006	1 of 1



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0285-01.01	2100 IR REMOTE RECEIVER
23 MAY 2007	SCHEMATIC# 299-0290-03.00
PCB# 612-0285-02	BOM# BOM9-0290-03.02

PARKS MEDICAL ELECTRONICS INC.,

24 MAY 2007 BOM9-0290-03.02 M DCN# 51026

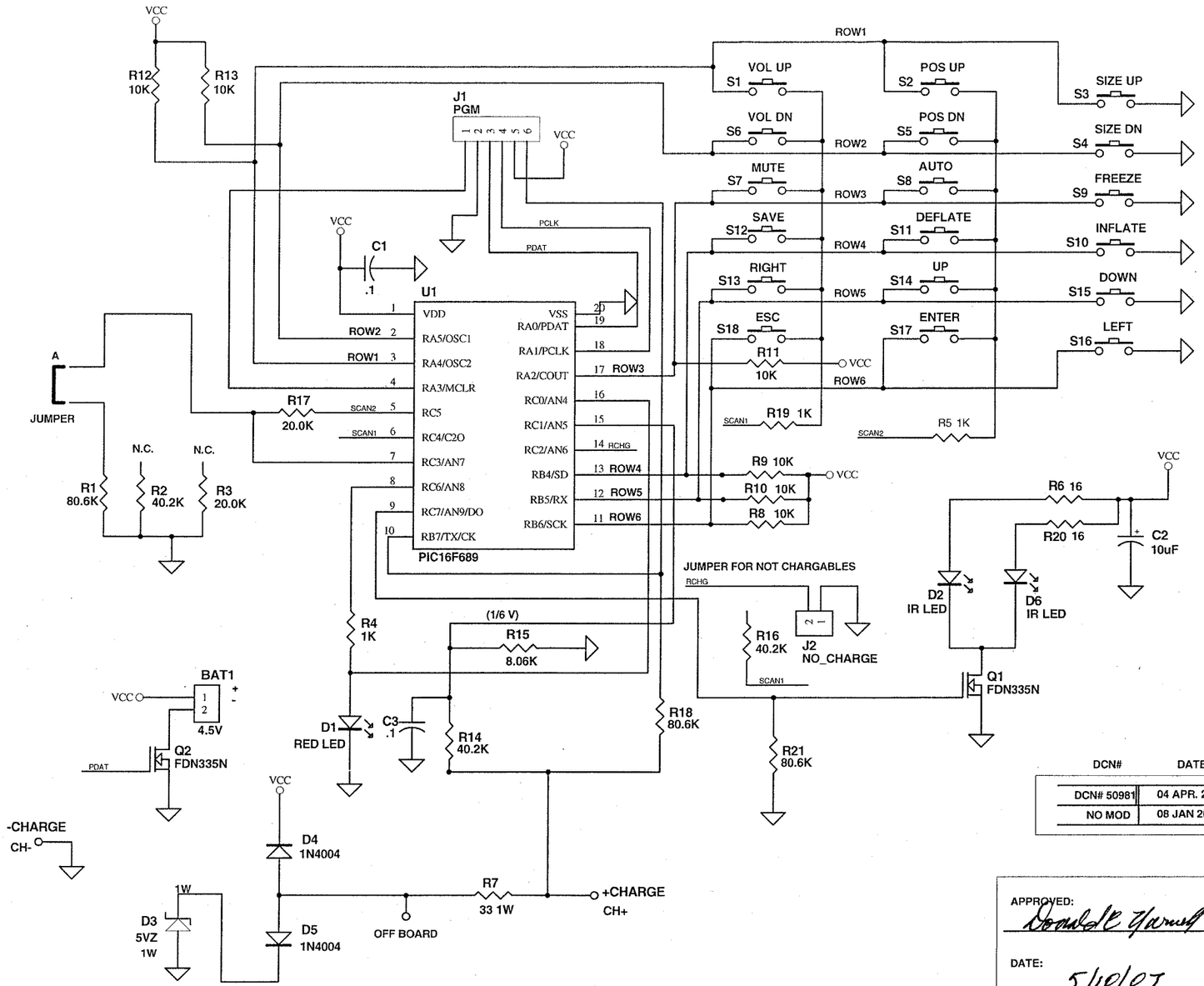
SINGLE LEVEL BILL OF MATERIAL,

2100 I.R. REMOTE RECEIVER

PARTS IN KIT 330-0285-01

DESIGNATOR	VALUE	COMMENT	P/N
PCB	PCB		612-0285-02
R1	10K 5% Carbon		690-0103-00R
R2	100K 5% Carbon		690-0104-00R
C6	22uF		710-1226-00R
C7	2.2uF		710-2225-00R
C2, C3	22pF		714-1220-00R
C1, C4, C5, C8	1uF		717-1104-04R
Y1			842-0057-00R
U2		5V Linear Regulator	844-0054-00R
U1		MICROCONTROLLER	844-0179-23
U3		Serial Input DTMF Transmitter	844-0185-00
RECV1		IR_RECEIVER	844-0186-00
D1,D2	1N4148		848-0003-00R
PARTS IN KIT 332-0277-00			
P1	PWR_SIG_CONN	4 WIRE MODULAR PHONE	866-0019-00
[BOM9-0290-03.02_M.xls]			

299-0302-01.00
2100 18-BR REMOTE



DCN#	DATE	DESCRIPTION
DCN# 50981	04 APR. 2007	MOVED D3 & D5 FOR LO CURRENT.
NO MOD	08 JAN 2007	NEW BOARD LAYOUT APPROVED FOR RELEASE.

APPROVED: Donald E Yarnell

DATE: 5/10/07

PARK'S MEDICAL ELECTRONICS INC.
19460 SW SHAW STREET
P.O. BOX 5669
ALOHA, OREGON 97007

2100 18-BR REMOTE

Size	FCSM No.	DWG No.	Rev
B		299-0302-01	00

Scale		Sheet
	04 APR. '07	0 of 0

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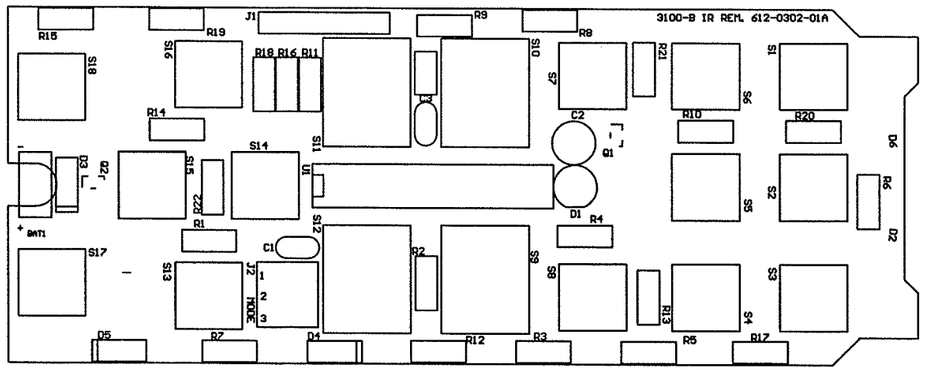
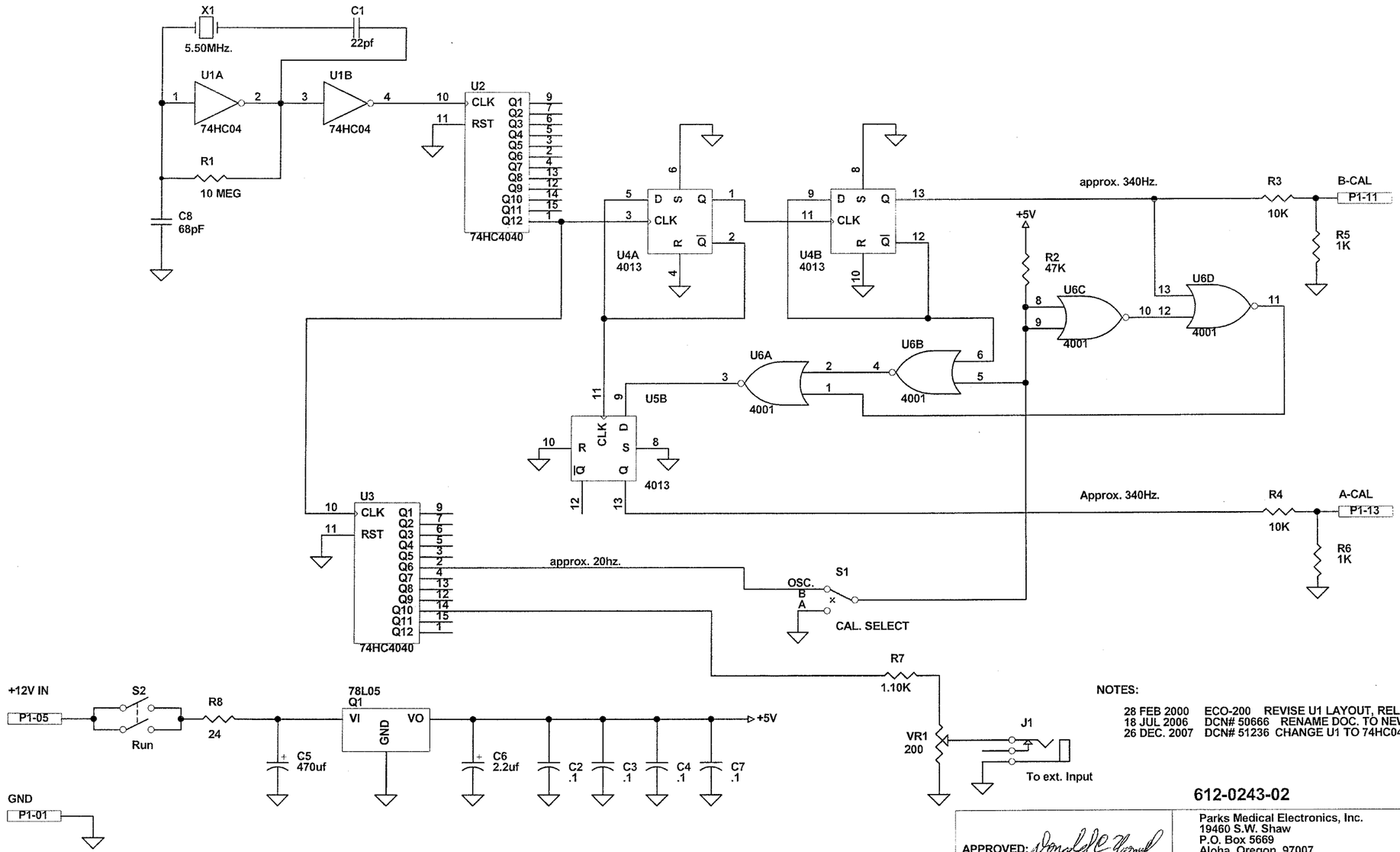


PARKS MEDICAL ELECTRONICS INC.	
DOC# REFDO302-02.00	2100 REMOTE 18 BR
27 JULY 2007	SCHEMATIC# 299-0302-01.00
PCB# 612-0302-01	BOM# BOM9-0302-01.01

	A	B	D	E
1	**PARKS MEDICAL ELECTRONICS INC.**			
2	27 JULY 2007 BOM9-0302-01.01 M DCN# 51100			
3	SINGLE LEVEL BILL OF MATERIAL,			
4	**2100 18-BR REMOTE**			
5	**PARTS IN KIT 330-0302-02**			
6	**DESIGNATOR**	**VALUE**	**COMMENT**	**P/N**
7	PCB		CIRCUIT BOARD	612-0302-01
8	R3, R17	20.0K 1%		679-2002-00
9	R2, R14, R16	40.2K 1%		679-4022-00
10	R15	8.06K		679-8061-00
11	R1, R18, R21	80.6K 1%		679-8062-00
12	R4, R5, R19	1K, 1/4W, 5%		690-0102-00
13	R8, R9, R10, R11, R12, R13	10K, 1/4W 5%		690-0103-00
14	R6, R20	16, 1/4W, 5%		690-0160-00
15	R7	33, 1W		698-5330-00R
16	C2	10uF TANT		710-2106-00
17	C1, C3	0.1uF, 0.1 LS		717-1104-04R
18	S1, S2, S3, S4, S5, S6, S7, S8, S13, S14, S15, S16, S17, S18			740-0080-00
19	S10	YELLOW SW	INFLATE	740-0084-00R
20	S11	BLACK SW	DEFLATE	740-0084-00R
21	S12	GREEN SW	SAVE	740-0084-00R
22	S9	BLUE SW.	FREEZE	740-0084-00R
23	A	JUMPER		824-0006-00
24	U1		WITH PROGRAM	844-0197-01R
25	D4, D5			848-0010-00
26	D3		5V, 1W ZENER	848-0025-00
27	Q1, Q2			849-5002-00
28	D1		T1 GREEN LED	850-0011-00
29	D2, D6		IR LED	850-0102-00
30	J1		PGM (VACANT)	869-0188-00
31	**PARTS IN KIT 332-0302-00**			
32	**DESIGNATOR**	**VALUE**	**COMMENT**	**P/N**
33	S11	BLACK SW CAP	DEFLATE	740-0064-10
34	S9	BLUE SW CAP	FREEZE	740-0081-00R
35	S12	GREEN SW CAP	SAVE	740-0082-00R
36	S10	YELLOW SW CAP	INFLATE	740-0083-00R
37	BAT 1		3.6V 2 PIN; 3X AAA NiMH	854-0007-50
38	BOM9-0302-01.01_M.xls			

297-0243-03.00

MODEL 80



NOTES:

28 FEB 2000 ECO-200 REVISE U1 LAYOUT, RELOCATE C1, R1
18 JUL 2006 DCN# 50666 RENAME DOC. TO NEW STANDARD.
26 DEC. 2007 DCN# 51236 CHANGE U1 TO 74HC04, R1 TO 10MEG, ADD C8 68pF.

612-0243-02

TRACKING:

APPROVED: Donald E Yount

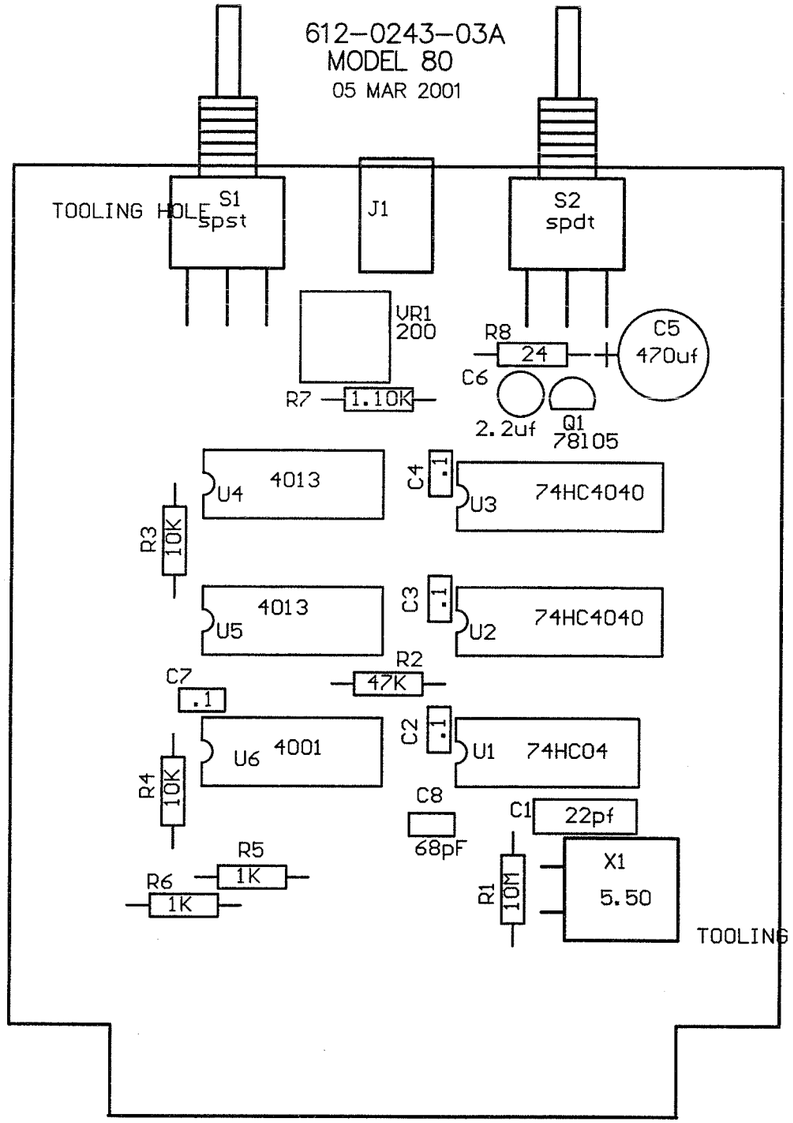
DATE: 12/26/07

Parks Medical Electronics, Inc.
19460 S.W. Shaw
P.O. Box 5669
Aloha, Oregon 97007
(503) 649-7007

Model 80, Calibration Card

Size	FCSM No.	DWG No.	Rev
Orcad B		297-0243-03	00
Scale	26 DEC. 2007	Sheet 1 of 1	

TRIM TO 16”



PARKS MEDICAL ELECTRONICS INC.	
DOC# REFD0243-03.00	MODEL 80 CALIBRATION BD.
26 DEC. 2007	SCHEMATIC# 297-0243-03.00
PCB# 612-0243-03A	BOM# BOM7-0243-03.00

PARKS MEDICAL ELECTRONICS, INC.

BILL OF MATERIALS

26 DEC. 2007 BOM7-0243-03.00 M DCN# 51236

MODEL 80

PARTS IN KIT 330-0243-02

DESIGNATOR	VALUE	COMMENT	P/N
PCB		CIRCUIT BD.	612-0243-03A
R7	1.10K		679-1101-00
VR1	200		689-0036-00
R5, R6	1K		690-0102-00R
R3, R4	10K		690-0103-00R
R1	10 MEG		690-0106-00R
R8	24		690-0240-00
R2	47K		690-0473-00R
C5	470uf		710-1477-00R
C6	2.2uf		710-2225-00R
C2, C3, C4, C7	0.1		717-1104-04R
C1	22pf		717-1220-00R
C8	68pF		717-1680-00
S1	CAL. SELECT		740-0046-01R
S2	Run		740-0047-01R
X1	5.50MHz.		842-0024-00
U6			844-0005-01R
U4,U5			844-0007-00R
Q1			844-0054-00R
U2, U3			844-0162-00R
U1			844-0198-00R
J1		Mini Phonejack	869-0133-00
BOM7-0243-03.00_M.xls			