CoughAssist E70/CoughAssist T70
Service & Technical Reference Manual

PHILIPS
RESPIRONICS

Limited Warranty

Respironics, Inc. warrants that the CoughAssist E70 & CoughAssist T70 systems shall be free from defects of workmanship and materials and will perform in accordance with the product specifications for a period of one (1) year from the date of sale by Respironics, Inc. to the dealer. If the product fails to perform in accordance with the product specifications, Respironics, Inc.will repair or replace – at its option – the defective material or part. Respironics, Inc. will pay customary freight charges from Respironics, Inc. to the dealer location only. This warranty does not cover damage caused by accident, misuse, abuse, alteration, and other defects not related to material or workmanship.

Respironics, Inc. disclaims all liability for economic loss, loss of profits, overhead, or consequential damages which may be claimed to arise from any sale or use of this product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

The warranty for repair parts is 90 days for labor and one year on the replaced part(s).

Accessories, including, but not limited to, circuits, tubing, leak devices, exhaust valves, filters and fuses, are not covered under this warranty.

This warranty is given in lieu of all other express warranties. In addition, any implied warranties – including any warranty of merchantability or fitness for the particular purpose – are limited to one year. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

To exercise your rights under this warranty, contact your local authorized Respironics, Inc. dealer or contact Respironics, Inc. at:

1001 Murry Ridge Lane

Murrysville, Pennsylvania 15668-8550

1-724-387-4000

Deutschland

Gewerbestrasse 17

82211 Herrsching Germany

+49 8152 93060

This page intentionally left blank.

CHAPTER 1: INTRODUCTION

CHAPTER 2: WARNINGS & CAUTIONS

CHAPTER 3: SPECIFICATIONS AND CLASSIFICATIONS

CHAPTER 4: SYSTEM OVERVIEW & SETUP

CHAPTER 8: REPAIR KITS

CHAPTER 9: TESTING

CHAPTER 10: TOOLS & EQUIPMENT

CHAPTER 11: SCHEMATICS

This page intentionally left blank.

CHAPTER 1: INTRODUCTION

1.0 CHAPTER OVERVIEW

This chapter provides an introduction for the CoughAssist E70/ CoughAssist T70 devices as well as contact and service training information.

1.1 COUGHASSIST E70 PRODUCT OVERVIEW

The CoughAssist E70 removes secretions in patients with an ineffective ability to do so on their own. The device clears secretions by providing high frequency oscillatory vibrations while gradually applying a positive pressure to the airway, then rapidly shifting to a negative pressure. The rapid shift in pressure produces a high expiratory flow rate from the lungs, simulating a natural cough. The air is delivered to and from the patient through the patient circuit, which includes a flexible tube, bacteria filter, and either a mask, mouthpiece, or an adapter to a tracheostomy or endotracheal tube.

Those who might benefit from the use of the CoughAssist E70 include any patient with an ineffective cough due to muscular dystrophy, myasthenia gravis, poliomyelitis, or other neurologic disorder with some paralysis of the respiratory muscles, such as spinal cord injury. It may also be used to treat ineffective secretion removal due to other bronchopulmonary diseases, such as emphysema, cystic fibrosis and bronchiectasis. It is effective for both invasively and non-invasively ventilated, and non-ventilated patients.

1.2 COUGHASSIST T70 PRODUCT OVERVIEW

The CoughAssist T70 removes secretions in patients with an ineffective ability to do so on their own. The device clears secretions by gradually applying a positive pressure to the airway, then rapidly shifting to a negative pressure. The rapid shift in pressure produces a high expiratory flow rate from the lungs, simulating a natural cough. The air is delivered to and from the patient through the patient circuit, which includes a flexible tube, bacteria filter, and either a mask, mouthpiece, or an adapter to a tracheostomy or endotracheal tube.

Those who might benefit from the use of the CoughAssist E70 include any patient with an ineffective cough due to muscular dystrophy, myasthenia gravis, poliomyelitis, or other neurologic disorder with some paralysis of the respiratory muscles, such as spinal cord injury. It may also be used to treat ineffective secretion removal due to other bronchopulmonary diseases, such as emphysema, cystic fibrosis and bronchiectasis. It is effective for both invasively and non-invasively ventilated, and non-ventilated patients.

1.3 CONTRAINDICATION

If the patient has any of the following conditions, consult their health care professional before using the device:

- A history of bullous emphysema
- Susceptibility to pneumothorax or pneumo-mediastinum
- Any recent barotrauma Intended Use

1.4 COUGHASSIST E70 INTENDED USE

The Philips Respironics CoughAssist E70 device assists patients in loosening, mobilizing, and clearing secretions by providing high frequency oscillatory vibrations while gradually applying a positive pressure to the airway, then rapidly shifting to a negative pressure. The oscillatory vibrations assist in loosening and mobilizing the secretions while the rapid shift in pressure produces a high expiratory flow rate from the lungs, which promotes the clearance of secretions.

The CoughAssist E70 device may be used either with a facemask or mouthpiece, or with an adapter to a patient's endotracheal or tracheostomy tube. It is for use on adult or pediatric patients having difficulty with secretion clearance and/or inability to cough.

The CoughAssist E70 device is for use in a hospital, institutional environment, or in the home.

1.5 COUGHASSIST T70 INTENDED USE

The Philips Respironics CoughAssist T70 is intended for use on adult or pediatric patients unable to cough or clear secretions effectively. It may be used either with facemask or mouthpiece, or with an adapter to a patient's endotracheal or tracheostomy tube. The device is intended to be used in the hospital, institutional environment, or in the home.

1.6 SERVICE TRAINING

Philips Respironics offers service training for the CoughAssist E70/CoughAssist T70 devices. Training includes complete disassembly of the device, troubleshooting subassemblies and components, setup of test equipment, and necessary testing. For more information, contact the Service Marketing department at:

E-mail: service.operations@respironics.com
Phone: (724) 755-8220
Fax: (724) 755-8230

1.7 SERVICE/TECHNICAL SUPPORT STATEMENT

For technical assistance, please contact Philips Respironics Customer Satisfaction.

U.S.A. and Canada
Phone:1-800-345-6443
Fax: 1-800-886-0245

International
Phone: 1-724-387-4000
Fax: 1-724-387-5012

CHAPTER 2: WARNINGS & CAUTIONS

2.0 CHAPTER OVERVIEW

Warnings, cautions, and notes are used throughout this manual to identify possible safety hazards, conditions that may result in equipment or property damage, and important information that must be considered when performing service and testing procedures. Please read this chapter carefully before servicing CoughAssist E70/CoughAssist T70 devices.

WARNING
Warnings indicate the possibility of harm to the operator or patient.

CAUTION
Cautions indicate the possibility of damage to the device.

NOTE
Notes are used to emphasize a characteristic or important consideration.

2.1 WARNINGS

- Always check time and pressure settings before each treatment.
- Always use a new bacteria filter when using the device on a new patient.
- Patients known to have cardiac instability should be monitored for pulse and oxygen saturation very closely.
- Monitor the device while in use and stop using it if the device malfunctions.
- Soreness and/or pain in the chest from a pulled muscle may occur in patients using the CoughAssist E70/CoughAssist T70 for the first time if the positive pressure used exceeds pressures which the patient normally receives during Positive Pressure Therapy. Such patients should start at a lower positive pressure during treatment, and gradually (over several days, or as tolerated) increase the positive pressure used. [Positive Pressure Therapy includes the use of a volume ventilator, nasal or mask ventilation or CPAP (Continuous Positive Airway Pressure), or IPPB (Intermittent Positive Pressure Breathing).
- Do not use in the presence of flammable anesthetics.
- Do not place or store the device where it can fall or be pulled into a tub or sink.
- Unplug the device if it comes into contact with water.
- Do not operate device while in carrying case.
- Never operate the CoughAssist E70/CoughAssist T70 if it has a damaged cord or plug, is not working properly, or has been dropped, damaged or immersed in water.
- Do not remove the cover; there are no serviceable parts inside the device. Have the device serviced by authorized personnel only.

- Use only power cords supplied by Philips Respironics for this device. Use of power cords not supplied by Philips Respironics may cause overheating or damage to the device.
- The use of accessories, transducers, and cables other than those specified by Philips Respironics may result in increased emissions or decreased immunity of the device. For optimum performance, the CoughAssist E70/CoughAssist T70 should be used with the patient interfaces provided by Philips Respironics.
- Portable and mobile RF communications equipment can affect Medical Electrical Equipment. See the EMC section of this manual for distances to observe between RF Generators and the device to avoid interference.
- Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

2.2 CAUTIONS

- Position the CoughAssist E70/CoughAssist T70 so that the air ports on the side, bottom, and back of the device are not blocked. The device should not be used adjacent to or stacked with other equipment. For more information, contact your home care provider.
- Never operate the device unless a bacteria filter is attached to the patient circuit.
- Turn the device off when not in use.
- Keep the power cord away from heated surfaces.
- Do not sterilize with ethylene oxide gas or steam sterilize.
- This device must only be used under the direction of a physician
- This device should only be used by trained personnel.

CHAPTER 3: SPECIFICATIONS AND CLASSIFICATIONS

3.0 CHAPTER OVERVIEW

This chapter details the specifications and classifications for the CoughAssist E70/CoughAssist T70 devices.

3.1 ENVIRONMENTAL

	Operating	*Storage*
Temperature	*5 °C to 35° C (41° F to 95° F)*	*-20° to 60° C (-4° F to 140° F)*
Relative Humidity	*15 to 95% (non-condensing)*	*15 to 95% (non-condensing)*
Atmospheric Pressure	*101 kPa to 77 kPa (approximately 0-7500 ft)*	*NA*

3.2 PHYSICAL

Dimensions	*29.2 cmW x 23.1 cm H x 19.0 cm D (11.5” W x 9.1” H x 7.5” D)*
Weight	*3.8 kg (8.4 lbs) (without detachable battery)* *4.3 kg (9.4 lbs) (with detachable battery installed)*

3.3 ELECTRICAL

AC Voltage Source	*90 to 264 VAC, 50/60 Hz, 2A/1A*
DC Power Source	*12 VDC, 8.3A*
Type of Protection Against Electric Shock	*Class II*
Degree of Protection Against Electric Shock	*Type BF Applied Part*
Degree of Protection Against Ingress of Water	*Exposure Protection, IP22*
Mode of Operation	*Continuous*

3.4 SD CARD AND SD CARD READER

Use only SD Cards and SD Card readers available from Philips Respironics, including the following:

ScanDisk® Card Reader/Writer - SanDisk Image Mate - REF SDDR-99-A15

3.5 DISPLAYED PARAMETER ACCURACY

Parameter	*Accuracy*	*Resolution*	*Range*
Pressure	*> of ± 5 cmH_2O or 10% of reading*	*1 cmH_2O*	*-70 to 70 cmH_2O*
Peak Cough Flow (PCF)	*> of ± 5 lpm or 15%*	*1 lpm*	*0-500 lpm*
Inhale Tidal Volume (vti)	*± (25 +0.15 of reading) for peak flows greater than or equal to 20 lpm*	*1 ml*	*50-2000 ml*
Accuracies stated in this manual are based on specific environmental conditions. For stated accuracy, the environmental conditions are: Temperature: 20-30 degrees C; Humidity: 50% relative; Altitude: nominally 380 meters.			

3.6 CONTROLLED ACCURACY

Parameter	*Range*	*Accuracy*
Pressure	*-70 to 70 cmH_2O*	*± 5 cmH_2O*
Inhale Time	*0-5 seconds*	*± (10% of setting + 0.1 second)*
Exhale Time	*0-5 seconds*	*± (10% of setting + 0.1 second)*
Pause Time	*0-5 seconds*	*± (10% of setting + 0.1 second)*
Frequency	*1-20 Hz*	*± (10% of setting)*
Amplitude	*1-10 cmH_2O*	*± 5 cmH_2O*
Device performance and accuracy is specified at Temperature: 20-30 degrees C; Humidity: 50% relative; Altitude: nominally 380 meters.		

3.7 SOUND

The sound pressure of the device set at -40 cmH_2O / +40 cmH_2O in the Pause phase is less than 60 dBA at 1 meter.

3.8 DISPOSAL

Dispose of this device in accordance with local regulations.

3.9 STANDARDS COMPLIANCE

The device is designed to conform to the following standards

- IEC 60601-1: Medical Electrical Equipment, Part 1: General Requirement for Safety
- IEC 60601-1-2: Collateral Standard: Electromagnetic (EMC) Compatibility - Requirements and tests.
- ISO 10993-1 Biological evaluation of medical devices - Part 1: Evaluation and testing (Biocompatibility)
- RTCA/DO-160F section 21, category M; Emission of Radio Frequency Energy

3.10 EMC INFORMATION

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
This device is intended for use in the electromagnetic environment specified below. The user of this device should assure that it is used in such an environment.		
Emissions Test	***Compliance***	***Electromagnetic Environment - Guidance***
RF Emissions *CISPR 11*	*Group 1*	*The Device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.*
RF Emissions *CISPR 11*	*Class B*	*The Device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.*
Harmonic Emissions *IEC 61000-3-2*	*Class A*	
Voltage Fluctuations/Flicker Emissions *IEC 61000-3-3*	*Complies*	

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
This device is intended for use in the electromagnetic environment specified below. The user of this device should assure that it is used in such an environment.			
Immunity Test	***IEC 60601 Test Level***	***Compliance Level***	***Electromagnetic Environment - Guidance***
Electrostatic Discharge (ESD) IEC 61000-4-2	*±6 kV Contact ±8 kV Air*	*±6 kV Contact ±8 kV Air*	*Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.*
Electrical Fast Transient/Burst IEC 61000-4-4	*±2 kV for Power Supply Lines ±1 kV for Input/Output Lines*	*±2 kV for Power Supply Mains NA*	*Mains power quality should be that of a typical home or hospital environment.*
Surge IEC 61000-4-5	*±1 kV Line to Line ±2 kV Line to Ground*	*±1 kV Line to Line ±2 kV Line to Ground*	*Mains power quality should be that of a typical home or hospital environment.*
Voltage Dips, Short Interruptions and Voltage Variations on Power Supply Input Lines IEC 61000-4-11	*<5% U_T (>95% Dip in U_T) for 0.5 Cycle* *40% U_T (60% Dip in U_T) for 5 Cycles* *70% U_T (30% Dip in U_T) for 25 Cycles* *<5% U_T (>95% Dip in U_T) for 5 Seconds*	*< 5% U_T (>95% Dip in U_T) for 0.5 Cycle* *40% U_T (60% Dip in U_T) for 5 Cycles* *70% U_T (30% Dip in U_T) for 25 Cycles* *<5% U_T (>95% Dip in U_T) for 5 Seconds*	*Mains power quality should be that of a typical home or hospital environment. If the user of the Device required continued operation during power mains interruptions, it is recommended that the Device be powered from an uninterruptible power supply or battery.*
Power Frequency (50/60) Magnetic Field IEC61000-4-8	*3 A/m*	*3 A/m*	*Power frequency magnetic fields should be at levels characteristic of a typical location in a typical home or hospital environment.*
Note: U_T is the A.C. mains voltage prior to application of the test level.			

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
This device is intended for use in the electromagnetic environment specified below. The user of this device should assure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance** Portable and mobile RF communications equipment should be used no closer to any part of the Device, including cables, that the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz[a]	3Vrms	$d = 1.2\ \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m 80 MHz to 2.5 GHz	$d = 1.2\ \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\ \sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 
Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			
a Field strength from fixed transmitters such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Device is used exceeds the applicable RF compliance level above, the Device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Device.			
b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended Separation Distance Between Portable and Mobile RF Communication Equipment and Device

This device is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The user of this device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication equipment (transmitters) and this device as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (Watts)	*Separation Distance According to Frequency of Transmitter (meters)*		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	*80 MHz to 800 MHz* $d = 1.2\sqrt{P}$	*800 MHz to 2.5 GHz* $d = 2.3\sqrt{P}$
0.01	*0.12*	*0.12*	*0.23*
0.1	*0.38*	*0.38*	*0.73*
1	*1.2*	*1.2*	*2.3*
10	*3.8*	*3.8*	*7.3*
100	*12*	*12*	*23*

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power of the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

This page intentionally left blank.

CHAPTER 4: SYSTEM OVERVIEW & SETUP

4.0 CHAPTER OVERVIEW

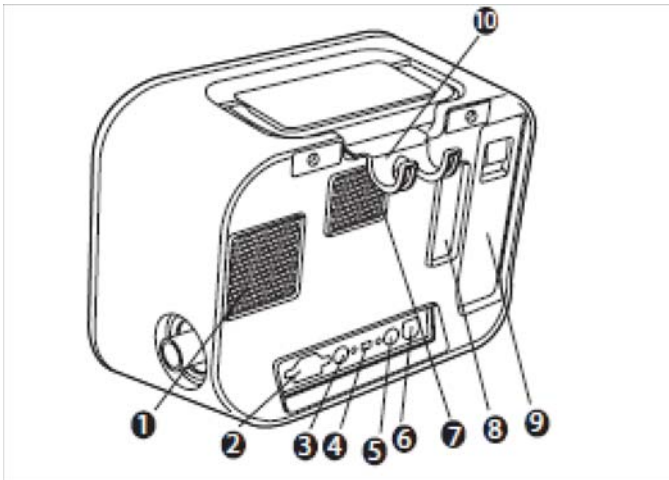
This chapter details the specifics of the CoughAssist E70/CoughAssist T70 devices and how to change settings.

4.1 DEVICE FEATURES

4.1.1 FRONT PANEL FEATURES

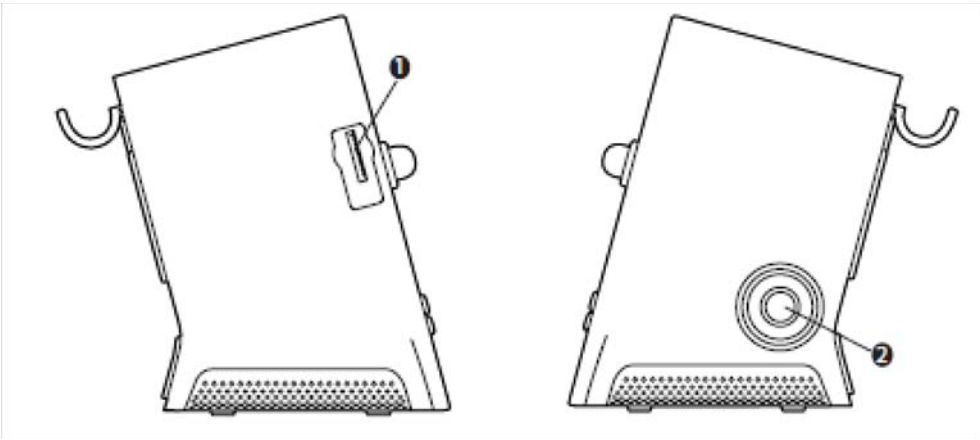
Item	*Description*	*Function*
1	*Left Button*	*This button allows you to select display options pr perform certain actions specified on-screen.*
2	*Up/Down Button*	*This button allows you to navigate the display menu and edit device settings.*
3	*Right Button*	*This button allows you to select display options or perform certain actions specified on-screen.*
4	*Power On/Power Off Button*	*This button turns the device on or off.*
5	*Manual Switch*	*The manual switch activates the exhale and inhale phases. Pressing the switch to the right (+) activates the inhale phase, while pressing it to the left (-) activates the exhale phase. Leaving the switch in the middle activates the pause phase.*
6	*Display Screen*	*The display screen allows you to view settings, system status information, real-time patient data, and logs. You can also modify certain settings on the display screen.*

4.1.2 BACK PANEL FEATURES



Item	Description	Function
1	Fan Exhaust	Location where air from inside the device is expelled.
2	AC Power Inlet	Connect the AC Power cord here.
3	Remote Control Connector	If you are using a remote control accessory (foot pedal) to initiate manual therapy, connect the remote control cable to this connector.
4	USB Connector	Connect a USB cable to this connector for service only.
5	SpO_2 Connector	If you are using the optional Oximetry accessory, connect the oximeter cable to this connector.
6	DC Power Inlet	Connect an external battery here using the Philips Respironics DC Power Cord.
7	Airpath Outlet	Location where air exits the device.
8	Airpath Inlet (Filter Area)	Location where the outside air enters the device. Insert the filter supplied with device here.
9	Detachable Battery Slot	If you are using the Philips Respironics Lithium-Ion detachable battery to power the device, attach it here. Remove the battery slot cap before use.
10	Tubing Retainer	Route the tubing and mask through this bracket for proper tubing management when the device is not in use.

4.1.3 SIDE PANEL FEATURES



Item	*Description*	*Function*
1	*SD Card Slot*	*You can insert the optional SD card into this slot if you are recording patient data from the device.*
2	*Patient circuit connection*	*You can connect your circuit tubing to this connector on the device.*

4.2 INHALATION/EXHALATION THERAPY MODES

4.2.1 MANUAL THERAPY MODE

Manual mode delivers therapy based on the Inhale Pressure and Exhale Pressure prescription settings. The device delivers the set inhalation pressure for the amount of time that the Manual switch is held in the inhalation position. The device delivers the set exhalation pressure for the amount of time that the Manual switch is held in the exhalation position. Therapy starts in the pause phase when activated in Manual mode.

4.2.2 AUTO THERAPY MODE

Auto mode delivers therapy based on the following prescription settings: Inhale Pressure, Exhale Pressure, Inhale Time, Exhale Time, and Pause Time.

Auto mode delivers pressure in the following sequence, repeating the sequence until the user exits the therapy state:

1. Positive pressure at the Inhale Pressure setting for the duration of the Inhale Time setting.
2. Negative pressure at the Exhale Pressure setting for the duration of the Exhale Time setting.
3. Atmospheric pressure for the duration of the Pause Time setting.

When the Cough-Trak feature is enabled, Auto mode delivers pressure in the following sequence, repeating the sequence until the user exits the therapy state:

1. Positive pressure at the Inhale Pressure setting when the device detects the patient's effort to inhale for the duration of the Inhale Time setting.
2. Negative pressure at the Exhale Pressure setting for the duration of the Exhale Time setting.

3. Atmospheric pressure until the device detects the next inspiratory effort.

4.3 THERAPY FEATURES

4.3.1 COUGH-TRAK

An important characteristic of the device is its ability to trigger on the patient's inspiration to help synchronize the therapy with the patient. This feature is known as Cough-Trak.

The Cough-Trak feature is available when the device is in Auto mode. The pressure delivery sequence is synchronized with the patient's effort to inhale.

When the Cough-Trak setting is activated in Auto mode, therapy starts in the Pause phase until patient effort is detected.

When Cough-Trak is enabled, the Pause Time setting is disabled and the user cannot adjust the Pause Time setting.

4.3.2 OSCILLATION (COUGHASSIST E70 ONLY)

The Oscillation therapy feature delivers an oscillatory therapy based on Frequency and Amplitude settings. Use of the oscillation feature enhances mobilization and improves bronchial drainage. The oscillations will be least apparent to the patient with lower amplitude and higher frequency settings.

If the Oscillation setting is enabled, the user can choose to apply the oscillation to the Inhale, Exhale, or Both (inhale and exhale) phases. The Frequency and Amplitude settings can be changed as needed. See Chapter 4 for more details on the Oscillation, Frequency, and Amplitude settings.

4.4 OPERATING THE COUGHTASSIST E70/COUGHASSIST T70

To navigate through all of the menu Screens and settings:

- Use the up/down button to scroll through the menu.
- Use the left/right buttons to perform the actions specified on the on-screen buttons.

4.4.1 SCREEN TIMEOUT PERIODS

The following timeout periods occur due to device inactivity:

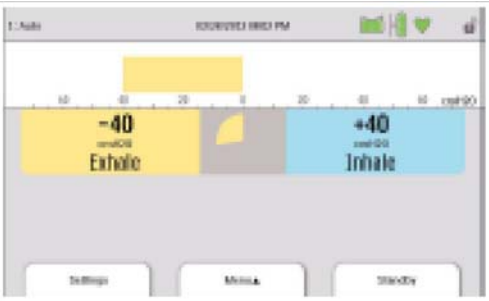
- Monitor Screen - Has a timeout period of ten minutes when therapy is not being delivered. The timer restarts when a key is touched, the manual switch is toggled in manual mode, or a patient effort is detected in auto mode when CoughTrak is enabled. When time expires, the device returns to the standby screen.
- Standby Screen - Has a timeout period of ten minutes. The timer restarts when a key is touched or the Manual switch is toggled. When time expires, the screen turns off.
- Menu/Settings Screens - Any screen displaying a menu or log has a timeout period of five minutes. The timer restarts when a key is touched. When the timer expires, the action of the Left soft key is taken.
- Menu Items - Individual menu items on the Settings or Options screens have a timeout period of 30 seconds. The timer restarts when a key is touched. When the timer expires, the action of the Left soft key is taken.
- Confirmation Messages - Confirmation messages have a timeout period of 30 seconds. When time expires, the message is removed from the screen and the previous screen is displayed.

4.4.2 ACCESSING THE STANDBY SCREEN

1. Press the ⏻ button, and the Startup screen appears momentarily, indicating the software version.
2. The Standby screen then appears. It displays the date and time, therapy mode, a patient accessory panel (if a patient accessory is attached), a status panel, and the soft key panel.
3. You can perform the following actions from the Standby screen:
   a. If an accessory module is attached, you can monitor the connection to any attached patient accessory.
   b. Modify patient settings by selecting the Left (Settings) key.
   c. Access the menu by selecting the Up (Menu) key.
   d. Initiate therapy by selecting the Right (Therapy) key. Selecting this key starts the airflow and displays the Monitoring screen.

4.4.3 ACCESSING THE MONITOR SCREEN

The Monitor screen appears after you press the Therapy key on the Standby screen. There are two versions of this screen: Detailed View Off and Detailed View On. Samples of both screens are shown below.



Detailed View Off

Detailed View On

4.4.4 MONITOR SCREEN CONTENT

The Monitor screen is divided into several sections, the Status panel, Manometer panel, Parameters panel, and the Soft buttons panel. The following information is shown on the Monitor screen:

Item/Description	Detailed View Off	Detailed View On
Status Panel		
Preset Indicator: Displays the number of the currently active preset of therapy settings (1, 2, or 3). Located in the top left corner of the screen.	√	√
Mode Indicator: Displays the current therapy mode. Located to the right of the Preset Indicator.	√	√
Attribute Indicator: Displays "Cough-Trak" or "Oscillation" when they are active. Located to the right of the Mode Indicator.	√	√
Full Access ( ) Symbol: Displays if full menu access is enabled. Located in the top right corner of the screen. If the menu access is Limited, this space is left blank.	√	√
Informational Message ( )Symbol: Displays when there are Informational Messages in the Information Log.	√	√
Detachable Battery ( ) Symbol: Displays if the detachable battery is connected. If no detachable battery is connected, this space is left blank. When the detachable battery is partially charged, some of the bars in the battery symbol will appear in green while others will be clear. For example, if the battery is 50% charged, the battery symbol will appear as ( ).	√	√
External Battery ( ) Symbol: Displays if an external battery is connected. If no external battery is connected, this space is left blank. When the external battery is partially charged, some of the bars in the battery symbol will appear in green while others will be clear. For example, if the battery is 50% charged, the battery symbol will appear as ( ).	√	√

Item/Description	Detailed View Off	Detailed View On
Remote Control ( )Symbol: Displays if a remote control (e.g., foot pedal) is connected. If no remote control is connected, this space is left blank.	√	√
Pulse Oximeter ( )Symbol: Displays if a Pulse Oximeter is connected. Indicates the status of the Pulse Oximetry currently being received: Receiving good oximetry data: toggles between and Receiving questionable oximetry data:	√	√
SD Card ( )Symbol: Displays if an SD Card is inserted. If there is an error detected with the SD Card, displays the SD Card error icon ( ). If no SD Card is inserted, this space is left blank.	√	√
Memory Card Writing ( ) Symbol: Displays if data is being written to the SD Card.	√	√
Power Source in Use Indicator ( ): This indicator box is placed around the battery being used to power the device.	√	√
Charging Indicator ( ): This indicator is placed over the detachable battery when it is being charged.	√	√
Manometer Panel		
When the device is in the Monitoring screen, displays the pressure bar (Current Pressure) with pressure markings and pressure units. When the device is not providing therapy, this location is used to display messages and status.	√	√
Parameters Panel		
Peak Cough Flow: Displays the most recent measured peak cough flow. When the device is turned on, this parameter displays dashes in Standby before the first exhalation phase is completed.		√

Item/Description	Detailed View Off	Detailed View On
SpO_2: Displayed only when the Pulse Oximeter accessory is connected to the device and the device is in Standby. Displays the current SpO_2 reading being received from the oximeter. If questionable or bad data is being received from the oximeter, displays dashes.		√
Heart Rate (HR): Displayed only when the Pulse Oximiter accessory is connected to the device and the device is in Standby. Displays the current Heart Rate reading being received from the oximeter. If questionable or bad data is being received from the oximeter, displays dashes.		√
Breath Synchronization Tool: Displayed only when the active prescription mode is **Auto**. This gauge provides a visual indication of the remaining time for the active breath phase.	√	√
Tidal Volume: Displays the most recent delivered inhaled tidal volume. It is located above the Inhale data area. When the device is turned on, this parameter displays dashes in Standby before the first inhalation phase is completed. If the tidal volume cannot be calculated, dashes are displayed.		√
Exhale Pressure Setting: Displays the current exhale pressure setting for the active prescription. It is located in the Exhale data area.	√	√
Exhale Time Setting: Displays the current exhale time setting for the active prescription when the mode is set to **Auto**. It is located in the Exhale data area.		√
Exhale Time Counter: Displays the actual time spent in the exhalation phase when the mode is set to **Manual**. This value counts up as the exhale time increases. It is located in the Exhale data area.		√

Item/Description	Detailed View Off	Detailed View On
Pause Time Setting: Displays the current pause time setting for the active prescription when the mode is set to **Auto** and Cough-Trak is not enabled. It is located in the Pause data area. If the mode is Manual, this area is left blank.		√
Inhale Pressure Setting: Displays the current inhale pressure setting for the active prescription. It is located in the Inhale data area.	√	√
Inhale Time Setting: Displays the current inhale time setting for the active prescription when the mode is set to **Auto**. It is located in the Inhale data area.		√
Inhale Time Counter: Displays the actual time spent in the inhalation phase when the mode is set to **Manual**. This value counts up as the inhale time increases. It is located in the Inhale data area.		√

The Soft buttons panel appears at the bottom of the screen. The button selection varies depending on what screen is displayed.

4.4.5 CHANGING DEVICE SETTINGS

1. Press the Up key to enter the Main Menu screen from the Standby or Monitor screens.
2. Choose from the following selections on the Main Menu screen:

- Options: View and change device settings, such as Full or Limited Access mode, Detailed View, Language, etc.
- Data: View patient and device data such as SpO2, Heart Rate, SD Card capacity, Therapy Hours, etc.
- Information Log: View informational messages generated by the device.
- Clear Patient Data: This option allows you to clear patient data from the device's internal memory. If an SD Card is inserted, all patient data stored on the SD Card is also cleared.
- Safely Remove SD Card: This option will appear if an SD Card is inserted in the device. Select this option when you want to remove the SD Card. When the "Remove SD Card" confirmation message appears, remove the card. If you press the left (cancel) button or don't remove the card within 30 seconds, the confirmation message will close and the device will continue writing to the card.
- Write Event Log to SD Card: This option allows you to copy event log data from the device to the SD Card.

4.4.6 CHANGING OPTIONS MENU SETTINGS

1. From the Standby or Therapy screen, press the Menu key to enter the Main Menu.
2. Highlight Options on the Main Menu screen and press the Right soft key (Select).
3. The following settings appear on the Options screen when the device is in Full Access mode:

Setting	Description
Menu Access	Select Full or Limited menu access. Full menu access allows health care professionals and home care providers to access all device and prescription settings. Limited menu access allows users to access only certain settings and does not allow them to change prescription settings.
Detailed View	Turn Detailed View On or Off. Detailed View displays additional information on the Monitor screen.
Language	Select the language in which the software will appear (English, French, German, etc).
Pressure Units	Select the pressure units that display on-screen. You can choose either cmH_2O or hPa. All pressure units that appear on-screen display in the unit of measure selected here.
LCD Brightness	Select the brightness of the screen backlight from 1-10, with 1 being the dimmest setting and 10 being the brightest.
Date Format	Select either mm/dd/yyyy or dd/mm/yyyy as the date format that will display on the device screens.
Time Format	Select either an AM/PM time format (hh:mm AM) or 24 Hour time format (hh:mm). For example, 2:49PM or 14:49.
Month	The month defaults to the current month. The adjustable range is from 1 (January) to 12 (December).
Day	The day defaults to the current day. The adjustable range is from 1 to 31. The maximum value is based on the selected month.
Year	The year defaults to the current year. The adjustable range is from 2000-2069.
Hour	The hour defaults to the current hour. The adjustable range is from 12 AM to 12 PM or 0-23, depending on the selected Time Format.
Minute	The minute defaults to the current minute. The adjustable range is from 0-59.
Therapy Hours	This displays the total time the patient receives therapy. You can reset this value to zero.

When the device is in Limited Access mode, the following items appear on the Options screen:

- LCD Brightness
- Date Format
- Time Format
- Month
- Day
- Year
- Hour
- Minute

4.4.7 VIEWING DEVICE DATA

1. From the Main Menu, use the Up/Down key to highlight the Data item.
2. Press the Right soft key (Select) to select the Data item.

The Data screen provides a summary of the last measured patient data and device settings, shown below. You can use the Up/Down buttons to scroll through the information.

- SpO2
- HR (Heart Rate)
- Peak Cough Flow
- Tidal Volume
- SD Card Capacity
- Serial Number
- Software Version
- Model Number
- Therapy Hours
- Calibration Date
- Detach Battery Serial Number
- Detach Battery Cycles

4.4.8 VIEWING THE INFORMATION LOG

Whenever an informational message occurs while the device is running, the  icon will display at the top of the screen. This indicates that an informational message is available and the user should check the Information Log as soon as possible.

1. To access the Information Log, from the Main Menu, use the Up/Down key to highlight the Information Log item.
2. Press the Right soft key (Select) to select the Information Log item.

The information log lists all messages that have been generated while the device is in use.

CHAPTER 5: TROUBLESHOOTING

5.0 CHAPTER OVERVIEW

This chapter identifies the informational messages that may appear on-screen and identifies necessary troubleshooting procedures. This chapter should be used by service technicians to help diagnose problems with the CoughAssist E70/CoughAssist T70 devices, along with determining what parts, if any, need to be replaced.

5.1 INFORMATIONAL MESSAGES

The following informational messages may appear on-screen.

Message	Description
Battery Not Charging – Temp.	The detachable battery is too hot and cannot be charged. Allow device and/or battery to cool to resume charging. Remove battery and charge with battery charger accessory. If battery still cannot be charged, contact your home care provider.
Check External Battery	Power is being drawn from the detachable battery even though the external battery is usable. Replace external battery cable or external battery. If problem persists, contact your home care provider.
Detach Battery Not Charging	The detachable battery cannot be charged. Replace battery. If problem persists with a different battery, contact your home care provider.
Replace Detachable Battery	Detachable battery has failed or has reached end of life. Replace battery. If problem persists with a different battery, contact your home care provider.
Internal Fan Failure – See Manual	The internal fan is not working. Device should not be used with oxygen added to the patient circuit. Before using oxygen with this device, contact your home care provider.
Card Error	The device cannot write to or read from the SD Card. Remove the SD Card and use another card, if available. If problem persists, contact your home care provider.

5.2 TROUBLESHOOTING

Question:

Why isn't my device turning on? The backlight on the buttons does not light.

Answer:

If you are using AC power:

- Check the outlet and verify that the device is properly plugged in.
- Make sure there is power available at the outlet and that the AC power cord is connected correctly to the power supply and the power supply cord is securely connected to the device's power inlet.

If you are using an external power source:

- Make sure your DC power cord and battery adapter cable connections are secure.

- Check your battery. It may need recharged or replaced.
- If the problem persists, check the DC cord's fuse following the instructions supplied with your DC cord. The fuse may need to be replaced.

If you are using a detachable battery:

- Make sure the detachable battery is inserted into the back of the device correctly.
- Check your battery. It may need recharged or replaced.

Question:

Why isn't the airflow turning on?

Answer:

Make sure the device is powered correctly.

- Make sure you pressed the Therapy button on the display.

Question:

Why is the airflow much warmer than usual?

Answer:

The air filters may be dirty. Clean or replace the air filters.

- The temperature of the air may vary somewhat based on your room temperature. Make sure the device is properly ventilated. Keep it away from bedding or curtains that could block the flow of air around the device.
- Make sure the device is away from direct sunlight and heating equipment.

Question:

Why isn't my detachable battery charging when it is inserted into the device and the device is running on AC power?

Answer:

The battery may not charge if the device is too hot or too cold or is operating at an ambient temperature outside of the specified valid range.

- Make sure the device is not too close to a heat source.
- Ensure the cooling air vents are not blocked.
- Bring the device to ambient room temperature.
- Use the optional Philips Respironics Detachable Battery Charger to charge your battery.

Question:

Why doesn't my manual switch work?

Answer:

The manual switch only works when therapy is active in Manual Mode and when the optional Foot Pedal is not attached.

- Press the Therapy button to ensure that therapy is on.
- Make sure the device is in manual mode.
- Make sure the Foot Pedal is not connected to the back of the device.
- Make sure the Inhale and Exhale pressure values are not zero.

5.3 TROUBLESHOOTING TABLE

DEVICE ACTION	POSSIBLE CAUSES	CORRECTIVE ACTION (PERFORM IN ORDER UNTIL PROBLEM IS RESOLVED)
Unit does not power ON	• *No power available* • *Main PCA power circuit faulty* • *Keypad overlay failure* • *FailedPowerSupplyPCA* • *Failed power cord* • *Failed AC inlet cable* • *Failed DC power inlet cable*	• *Verify A/C, charged external battery or detachablebatterypresent* • *Replace Main PCA* • *ReplacekeypadOverlay* • *Replace Power Supply PCA* • *Replace power cord* • *Replace AC inlet cable* • *Replace DC power inlet cable*
Unit power ON but blower does not start	• *Blower not connected to Main PCA* • *Blower Faulty* • *Faulty Main PCA*	• *Check connection from BlowertoMainPCA* • *Replace Blower* • *Replace Main PCA*
Toggle switch locked up	• *Faulty toggle switch* • *Faulty Main PCA*	• *Replace Toggle Switch* • *Replace Main PCA*

DEVICE ACTION	POSSIBLE CAUSES	CORRECTIVE ACTION (PERFORM IN ORDER UNTIL PROBLEM IS RESOLVED)
Pressure variation during operation	• *Loose Hoses* • *Failed Blower* • *Failed Valve*	• *Reattach/replace hose* • *Replace Blower* • *Replace Valves*
Device not achieving max pressure	• *Loose Hoses* • *Failed Blower* • *Failed Valve* • *Internal Leak in the pneumatic system* • *Faulty Main PCA*	• *Reattach/replace hose* • *Replace Blower* • *Replace Valves* • *Repair leak* • *Replace Main PCA*
Device not achieving max flow	• *Failed blower* • *Failed valve* • *Failed Main PCA* • *Internal leak in the pneumatic system* • *Failed air inlet filter*	• *Replace Blower* • *Replace Valves* • *Replace Main PCA* • *Repair internal leak* • *Replace air inlet filter*
Automatic timing is out of tolerance	• *Failed Main PCA*	• *Replace Main PCA*
Noisy cooling fan	• *Obstruction* • *Damaged fan*	• *Clear obstruction at cooling fan* • *Replace cooling fan*
Inoperable cooling fan	• *Main PCA Failure* • *Connection of fan to Main PCA*	• *Replace Main PCA* • *Reconnect fan power jack to Main PCA*
Cooling fan on continuously	• *Main PCA Failure* • *Connection of fan to Main PCA*	• *Replace Main PCA*

DEVICE ACTION	POSSIBLE CAUSES	CORRECTIVE ACTION (PERFORM IN ORDER UNTIL PROBLEM IS RESOLVED)
Device does not recognize detachable battery	• *Detachable battery PCA Failure* • *Main PCA Failure* • *Incorrectly installed Detachable Battery Daughter PCA* • *Failed Detachable Battery*	• *Replace Detachable Battery PCA* • *Replace Main PCA* • *Remove/reinstall Detachable Battery Daughter PCA* • *Replace Detachable Battery*
Device does not retain Detachable Battery	• *Obstruction in battery enclosure* • *Battery retainer failed*	• *Clear obstruction in Detachable Battery enclosure* • *Replace Detachable Battery*
Detachable Battery not charging/ discharging	• *Failed Main PCA* • *Failed Detachable Battery PCA* • *Failed Detachable Battery*	• *Replace Main PCA* • *Replace Detachable* • *Battery PCA* • *Replace Detachable Battery*
External Battery not recognized	• *Failed Main PCA* • *Failed External Battery cable* • *Depleted external battery* • *Failed cable (main PCA to rear connector)*	• *Replace Main PCA* • *Replace External Battery Cable* • *Charge External Battery* • *Replace Rear Enclosure Cable Assembly*
External battery not discharging	• *Failed Main PCA* • *Failed External Battery* • *Failed external battery cable*	• *Replace Main PCA* • *Replace External Battery* • *Replace Rear Enclosure Cable Assembly*
Power Source Switch over failure	• *Failed Main PCA*	• *Replace Main PCA*

DEVICE ACTION	POSSIBLE CAUSES	CORRECTIVE ACTION (PERFORM IN ORDER UNTIL PROBLEM IS RESOLVED)
Failure to recognize Pulse Oximeter or Remote Control	• *Failed accessory* • *Failed connection at device* • *Failed Main PCA*	• *Test accessory recognition using known good accessory* • *Replace Rear Enclosure Cable Assembly* • *Replace Main PCA*
Failure to recognize SD card	• *Failed Main PCA* • *Corrupted SD card*	• *Replace Main PCA* • *Replace SD Card*
Failure of device to recognize keypress	• *Failed Main PCA* • *Failed Keypad Overlay*	• *Replace Main PCA* • *Replace Keypad Overlay*

CHAPTER 6: CLEANING & MAINTENANCE

6.0 CHAPTER OVERVIEW

This section describes scheduled and routine maintenance procedures. Normal routine maintenance involves periodic checking, cleaning, and or replacing the following items as necessary:

- Cleaning the device
- Cleaning and replacing Air Filter

6.1 CLEANING THE DEVICE

The device's exterior surface should be cleaned before and after each patient use and more often if needed.

1. Unplug the device and clean the front panel and exterior of the enclosure as needed using one of the following cleaning agents:
   a. A clean cloth dampened with water and a mild detergent
   b. 70% Isopropyl alcohol
   c. DisCide Towelettes
   d. 10% Chlorine bleach solution
2. Inspect the device and tubing for damage after cleaning. Replace any damaged parts.
3. Allow the device to dry completely before plugging in the power cord.

6.2 CLEANING AND REPLACING THE AIR FILTER

Under normal usage, you should clean the air filter at least once every two weeks and replace it with a new one every six months.

1. If the device is operating, stop the airflow. Disconnect the device from the power source.
2. Remove the filter from the enclosure.
3. Examine the filter for cleanliness and integrity.
4. Wash the filter in warm water with a mild detergent. Rinse thoroughly to remove all detergent residue.
5. Allow the filter to air dry completely before reinstalling it. If the filter is torn or damaged, replace it. Only Philips Respironics-supplied filters should be used as replacement filters.
6. Reinstall the filter.

6.3 PREVENTIVE MAINTENANCE

This device does not require preventive servicing.

6.4 COUGHASSIST E70 / COUGHASSIST T70 MAINTENANCE RECORD

MODEL NUMBER	SERIAL NUMBER

DATE PURCHASED

REPLACE FILTER *(Clean and Inspect as Necessary)*	CABINET *(Clean and Inspect as Necessary)*

CHAPTER 7: REPAIR & REPLACEMENT

7.0 CHAPTER OVERVIEW

This chapter illustrates the replacement procedures for each of the available Repair Kits for the CoughAssist E70/CoughAssist T70 devices.

For technical assistance or replacement part ordering information, contact Respironics Product Support.

USA and Canada

Phone: 1-800-345-6443

Fax: 1-800-866-0245

International

Phone: 1-724-387-4000

Fax: 1-800-387-5012

Visit Philips Respironics Home Page on the World Wide Web at:

www.philips.com

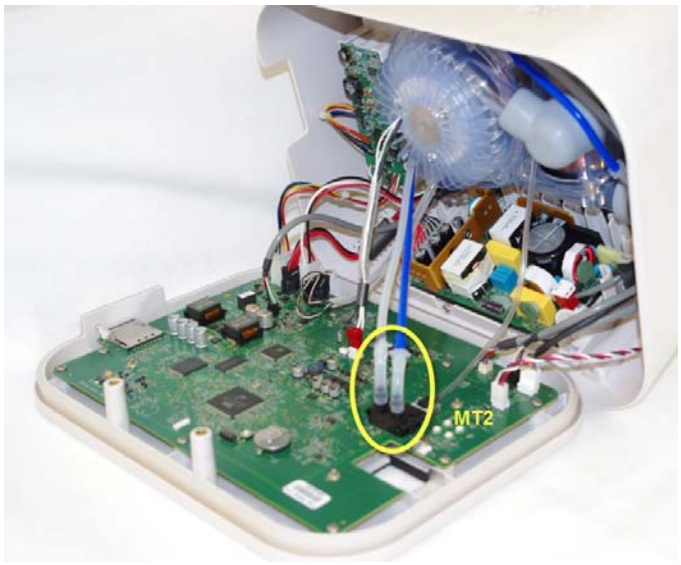
7.1 SEPARATE THE FRONT AND REAR ENCLOSURE

1. Remove AC Power, Detachable Battery , and External Battery from the device.
2. Using a T20 Torx bit remove the two screws at the bottom front of the enclosure.

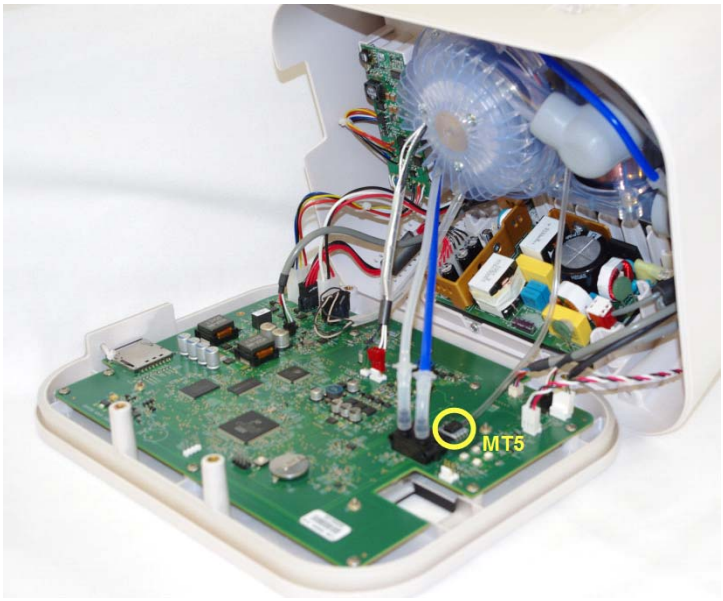
3. Using a T20 Torx bit remove the two screws from behind the handle recess area on the top of the device.

4. Gently pry away the front enclosure to expose the interior of the device.

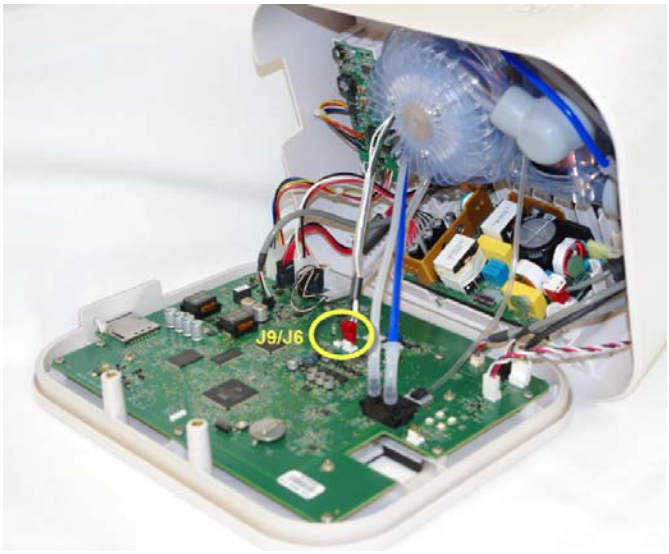
5. Remove the two pieces of tubing from the sensor MT2. The blue tube is connected to the right port and the clear tube is connected to the left port.



6. Remove the small tube from the top port of the sensor MT5.

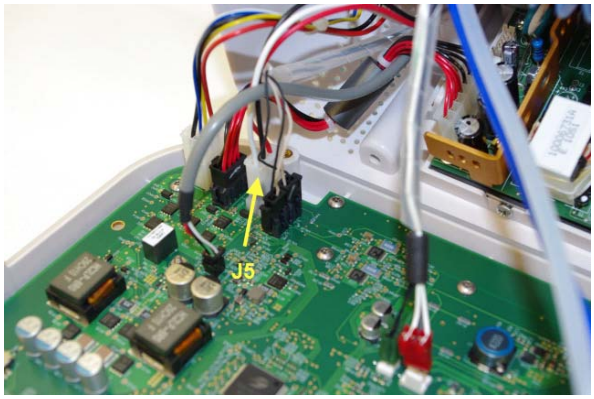


7. Remove the blower connections from J9 (Red) and J6 (Green).

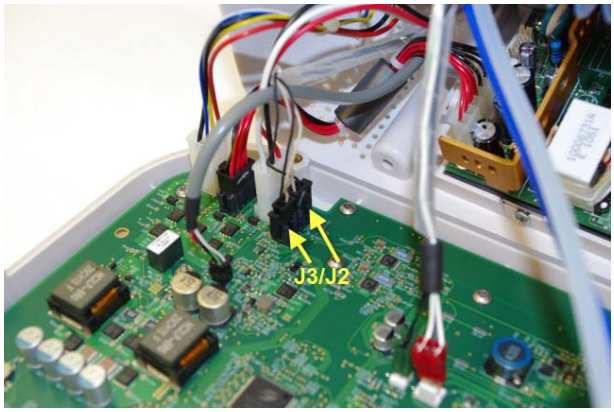


8. Remove the auxiliary connection from J19.

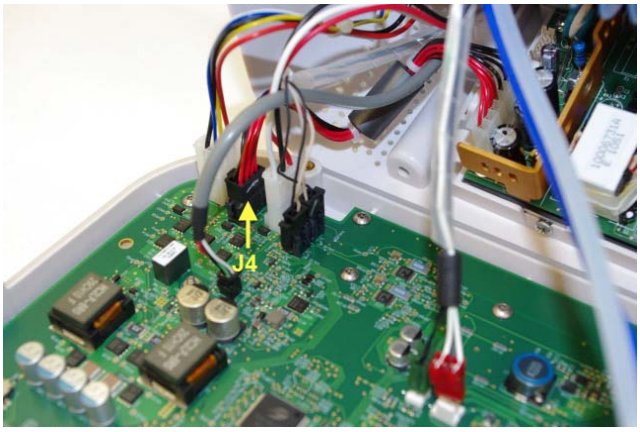
9. Remove the External DC Power connection from J5.



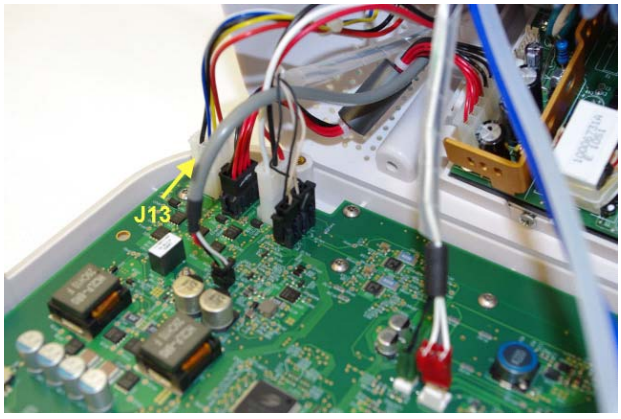
10. Remove the Valve Power from J3 and J2 (white mark on J2).



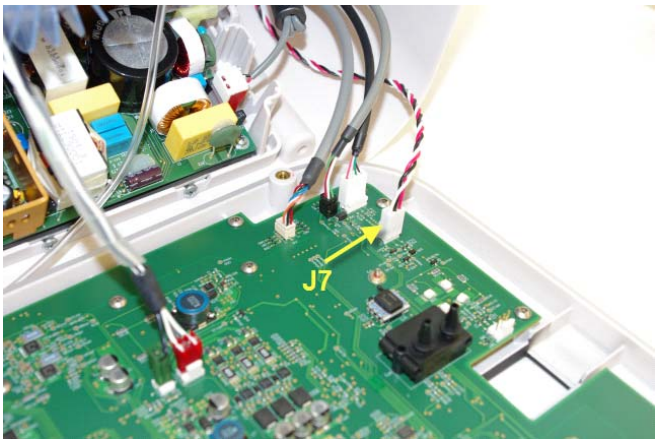
11. Remove the DC Power Supply from J4.



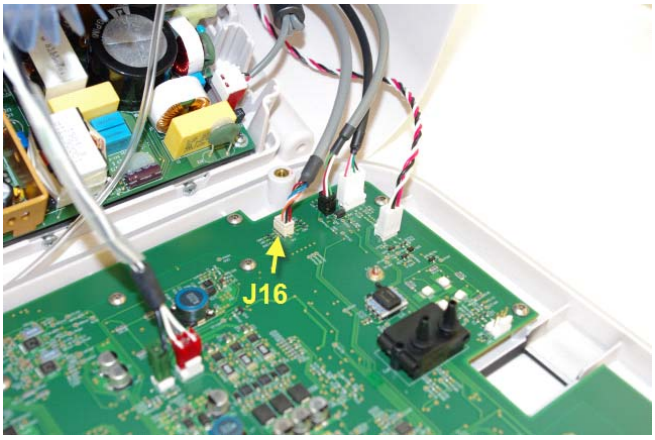
12. Remove Detachable battery Power from J13.



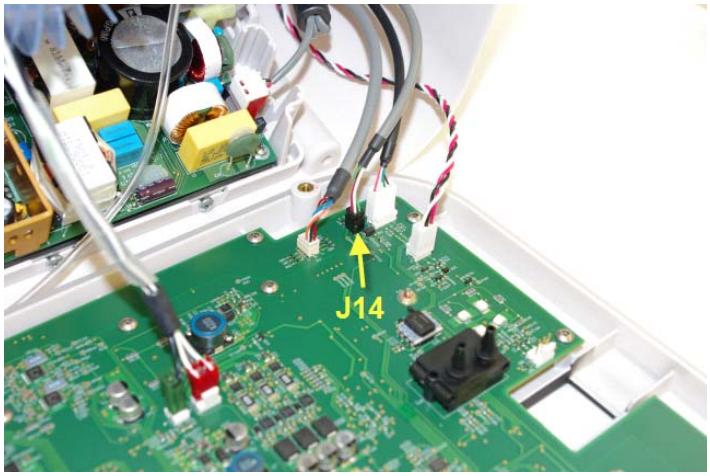
13. Remove fan connection from J7.



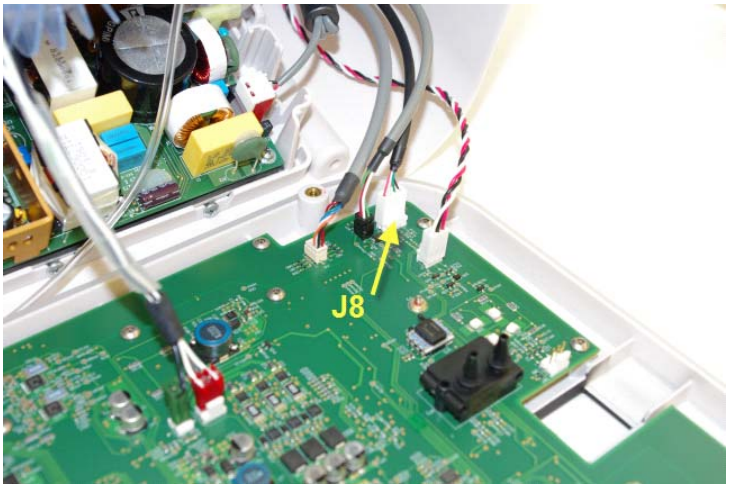
14. Remove the 10 pin connector from J16.



15. Remove the 4 pin connector from J14.



16. Remove USB-B connection from J8.



17. The Front and Rear Enclosures can be separated.

7.2 AIR INLET FILTER REPLACEMENT

REMOVAL

1. Looking at the rear of the device pinch the filter and remove from rear enclosure.

INSTALLATION

1. Place the filter into the slot on the rear of the device.

7.3 RUBBER FEET REPLACEMENT

REMOVAL

1. Using a T25 (Tamper Proof) Torx driver, remove the four screws from the bottom of the device that secure the rubber feet to the bottom enclosure.

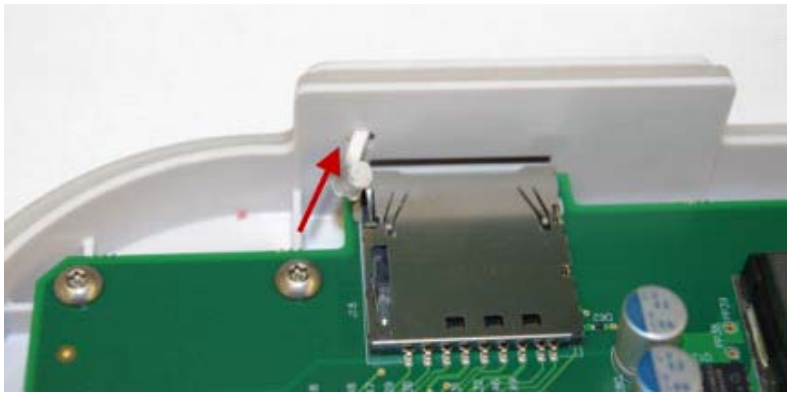
INSTALLATION

1. Place Rubber feet in proper location.
2. Using a T25 (Tamper Proof) Torx driver, secure the four screws holding the rubber feet in place to the bottom enclosure.

7.4 SD CARD COVER REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosure. Refer to the Separate the Front and Rear Enclosure section for more information.
2. Push the retainer through hole in Front Enclosure.



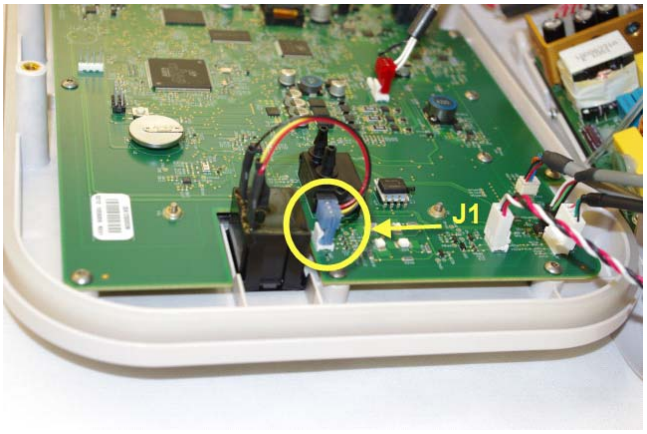
INSTALLATION

1. Push the tab through the hole on the front enclosure.
2. Connect the Front and Rear Enclosures. Refer to the Separate the Front and Rear Enclosure section for more information.

7.5 MAIN PCA REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Switch Connection from J1 on the Main PCA.



3. If applicable, remove SD Card from side of the device.
4. Remove the 12 T10 Torx screws securing the Main PCA to the Front Enclosure.

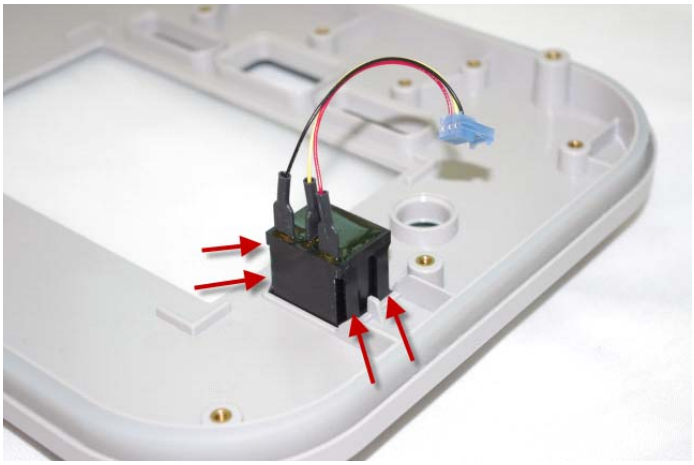
INSTALLATION

1. Set the Main PCA into the proper location on the Front Enclosure.
2. Connect the Main PCA to the Front Enclosure using 12 T10 Torx Screws.
3. Connect the Switch Connection to location J1 on the Main PCA.
4. Connect the Front and Rear Enclosures.

7.6 MANUAL SWITCH REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Main PCA.
3. Press in the locking tabs securing the Switch to the Front Enclosure.



4. Pull the Switch through the front of the Front Enclosure.

INSTALLATION

1. Push the Switch through the hole in the Front Enclosure until you hear it lock in place.
2. Install the Main PCA.
3. Connect the Front and Rear Enclosures.

7.7 KEYPAD REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove Main PCA.
3. Pull the Keypad up and out of the Front Enclosure.

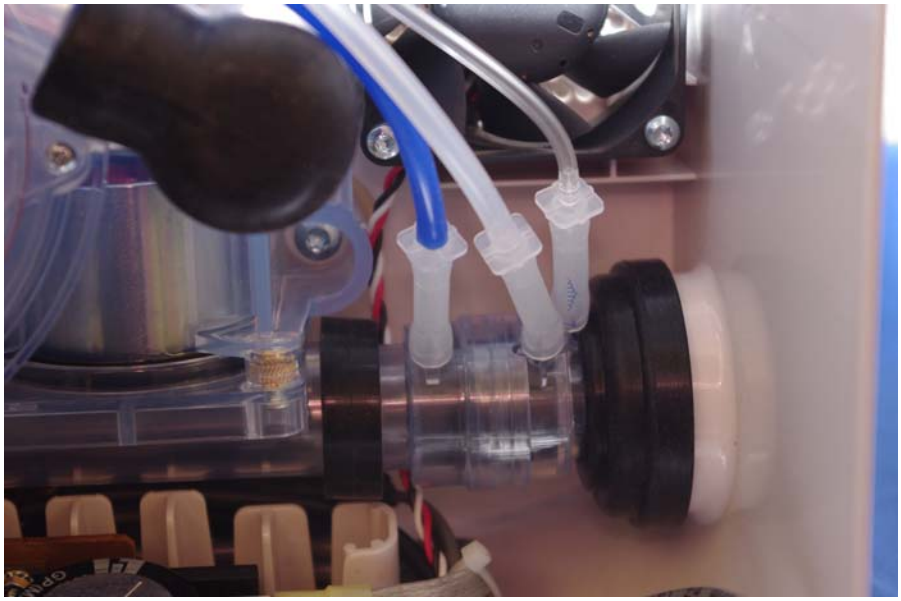
INSTALLATION

1. Place the KeyPad into the proper location on the Front Enclosure
2. Install the Main PCA.
3. Connect the Front and Rear Enclosures.

7.8 TUBING REPLACEMENT

REMOVAL

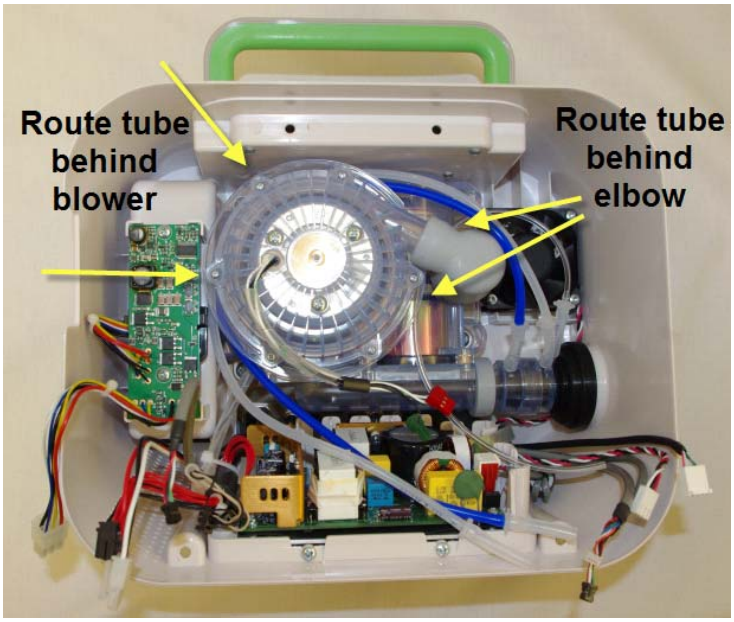
1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the three pieces of tubing from the flow path assembly.



3. Remove tubing from the enclosure.

INSTALLATION

1. Connect the blue tubing to the left port on the flow path assembly. Refer to the image below for port connection and proper routing of tubing.
2. Connect the clear tubing to the middle port on the flow path assembly. Refer to the image below for port connection and proper routing of tubing.
3. Connect the small piece of clear tubing to the right port on the flow path assembly. Refer to the image below for port connection and proper routing of tubing.

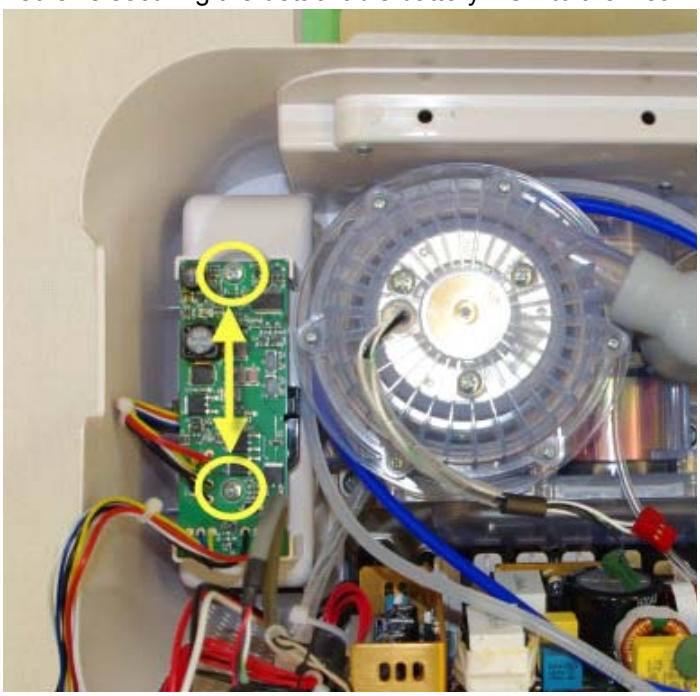


4. Connect the Front and Rear Enclosures.

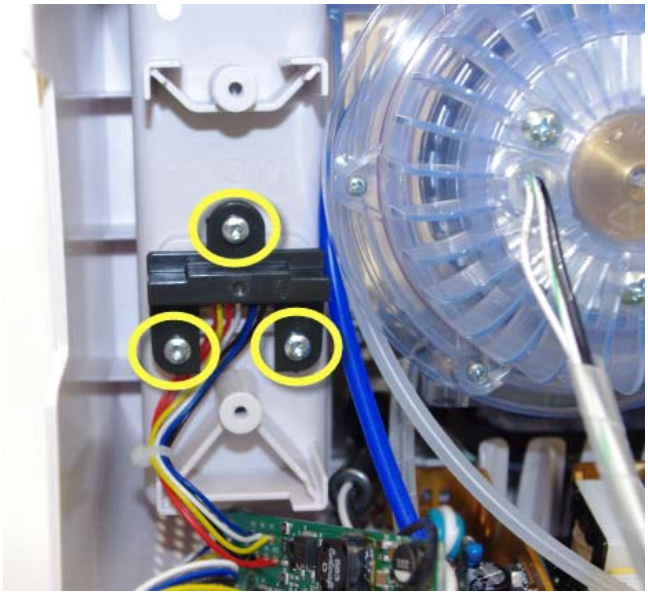
7.9 DETACHABLE BATTERY PCA REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the 2 screws securing the detachable battery PCA to the Rear Enclosure.



3. Remove the three screws securing the Detachable Battery small PCA Holder to the Rear Enclosure.



4. Slide the small PCA out of the detachable battery small PCA holder.
5. Remove the Detachable Battery PCA from the Rear Enclosure.

INSTALLATION

1. Place the Small Detachable Battery PCA in the Front Enclosure
2. Slide the Detachable Battery Retainer over the Small Detachable Battery PCA.
3. Secure the Retainer to the Front Enclosure using three screws.
4. Place the Large Detachable Battery PCA in the Front Enclosure.
5. Secure the PCA using two screws.
6. Connect the Front and Rear Enclosures.

7.10 COOLING FAN REPLACEMENT

REMOVAL

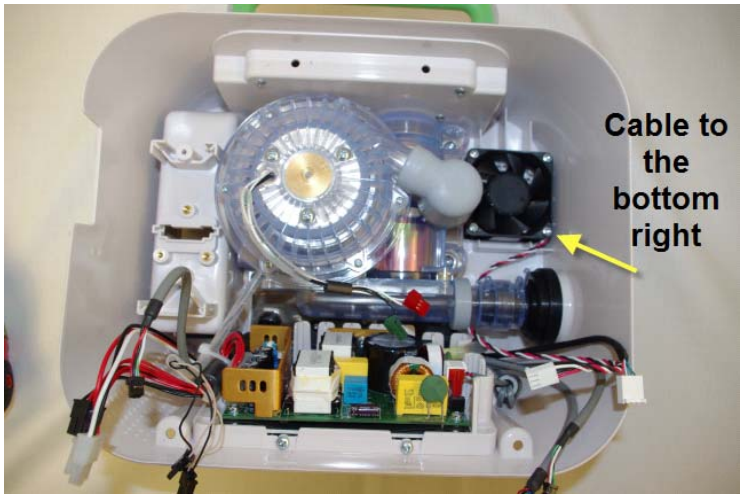
1. Separate the Front and Rear Enclosure. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Tubing from the Flow Path Assembly.

3. Remove the 4 T15 screws securing the Fan to the Rear Enclosure.

4. Remove the Fan from the Rear Enclosure.

INSTALLATION

1. Place the fan label down into the enclosure. The fan cable needs to be in the bottom right position.



2. Secure the Fan to the enclosure using four T15 screws.
3. Connect the tubing to the to the Flow Path Assembly.

4. Connect the Front and Rear Enclosures.

7.11 ELBOW REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosure. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove elbow from blower outlet and valve inlet.

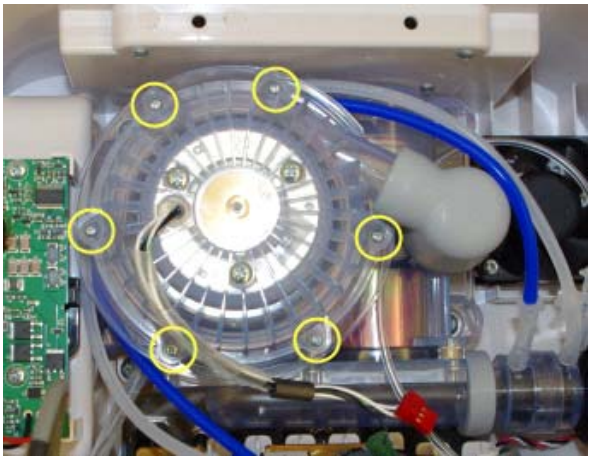
INSTALLATION

1. Connect the elbow to the blower outlet and the valve inlet.
2. Connect the Front and Rear Enclosures.

7.12 BLOWER ASSEMBLY REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Elbow.
3. Using a Philips #1 screwdriver remove the six screws securing the blower housing to the Valve Assembly.



4. Remove the Blower Assembly from the enclosure.
5. Remove the O-ring from the valve assembly enclosure.

INSTALLATION

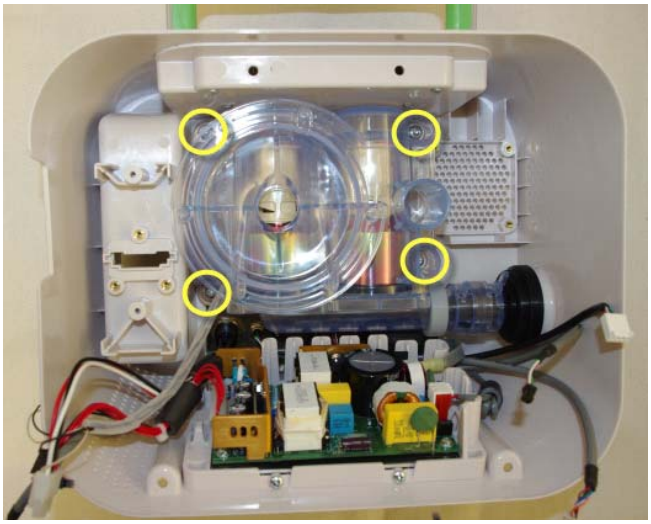
1. Place the O-ring into the valve assembly enclosure. Ensure it is properly seated in place.
2. Place the Blower Assembly into the valve assembly enclosure.
3. Secure the Blower Assembly to the valve assembly enclosure using six Philips screws.
4. Install the Elbow.
5. Connect the Front and Rear Enclosures.

7.13 VALVE ASSEMBLY/GASKET REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Blower Assembly.
3. Cut and remove the tie wrap securing the cabling to the bottom of the Rear Enclosure.

4. Remove 4 T25 screws securing the Valve Assembly to the Rear Enclosure.



5. Remove the Valve Assembly from the Rear Enclosure.
6. Remove the Flow Path Assembly from the Valve Assembly.
7. Remove the Gasket from the Rear Housing.

INSTALLATION

1. Install the Rear Housing Gasket.
2. Connect the Flow Path Assembly to the Valve Assembly.
3. Install the Valve Assembly to the Rear Enclosure using four T25 screws.
4. Secure the cabling to the bottom of the rear enclosure using a tie wrap.

5. Install the Blower Assembly.
6. Connect the Front and Rear Enclosures.

7.14 HANDLE REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove Blower Assembly.
3. Remove Valve Assembly.
4. Remove four T10 Torx screws securing handle plate to Rear Enclosure.
5. Remove Handle and Handle plate from the device.

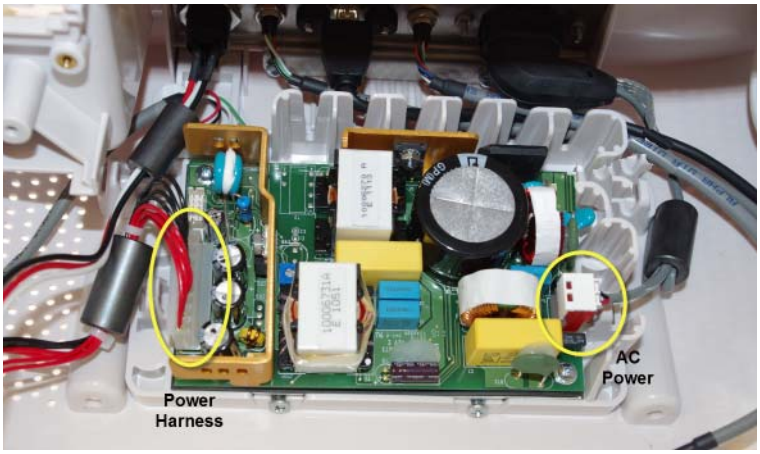
INSTALLATION

1. Install the Handle and Handle Plate to the Rear enclosure using four T10 Torx screws.
2. Install the Valve Assembly.
3. Install the Blower Assembly.
4. Connect the Front and Rear Enclosures.

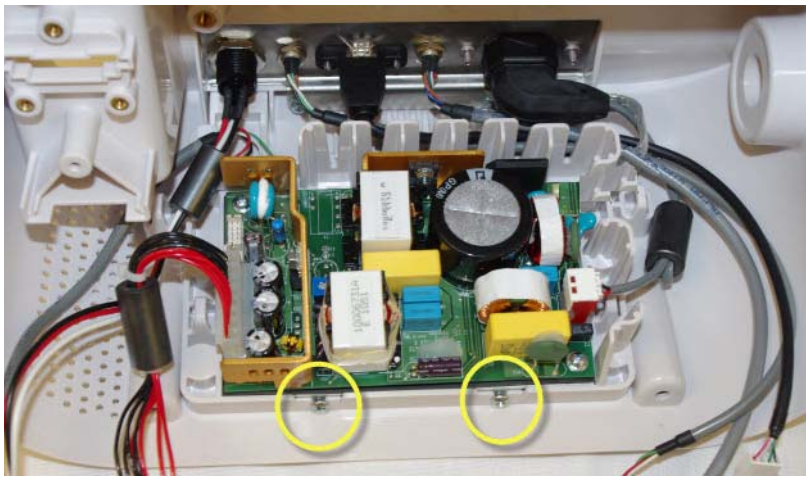
7.15 POWER SUPPLY PCA REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove AC Power from J1 on the Power Supply PCA.
3. Remove the Power Harness from J2 on the Power Supply PCA.



4. Remove the two #1 phillips head screws securing the Bottom Plate to the Rear Enclosure.



5. Remove the Power Supply PCA from the Rear Enclosure.

6. Remove the 4 T25 Torx screws securing the Power Supply PCA to the Bottom Plate.

7. Remove the Power Supply PCA.

INSTALLATION

1. Install the Power Supply PCA to the Bottom Plate using four T25 Torx screws.
2. Place the Power Supply connected to the Bottom Plate into the Rear Enclosure.
3. Secure the Bottom Plate to the Rear Enclosure using two Philips head screws.
4. Connect the Power Harness to J2 on the Power Supply PCA.
5. Connect AC Power to J1 on the Power Supply PCA.
6. Connect the Front and Rear Enclosures.

7.16 BOTTOM PLATE REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Power Supply PCA.
3. Remove the Cable from the Bottom Plate.

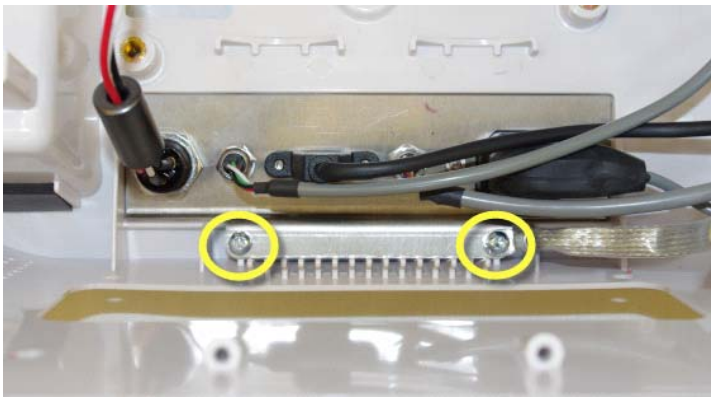
INSTALLATION

1. Connect the Cable to the Bottom Plate.
2. Install the Power Supply PCA.
3. Connect the Front and Rear Enclosures.

7.17 BRACKET ASSEMBLY REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Elbow.
3. Remove the Flow Path Assembly.
4. Remove the Blower Assembly.
5. Remove the Valve Assembly/Gasket.
6. Remove the Power Supply PCA.
7. Remove the two T15 screws securing the bracket assembly to the Rear Enclosure.



INSTALLATION

1. Connect the Bracket Assembly to the Rear Enclosure using two T15 screws.
2. Install the Power Supply PCA.
3. Install the Valve Assembly.Gasket.
4. Install the Blower Assembly.
5. Install the Flow Path Assembly.
6. Install the Elbow.
7. Connect the Front and Rear Enclosures.

7.18 REAR ENCLOSURE REPLACEMENT

REMOVAL

1. Separate the Front and Rear Enclosures. Refer to the Front and Rear Enclosure Separation instruction.
2. Remove the Elbow.
3. Remove the Flow Path Assembly.
4. Remove the Blower Assembly.
5. Remove the Valve Assembly/Gasket.
6. Remove the Power Supply PCA.
7. Remove Bracket Assembly.

INSTALLATION

1. Install the Bracket Assembly.
2. Install the Power Supply PCA.
3. Install the Valve Assembly/Gasket.
4. Install the Blower Assembly.
5. Install the Flow Path Assembly.
6. Install the Elbow.
7. Connect the Front and Rear Enclosures.

This page intentionally left blank.

CHAPTER 8: REPAIR KITS

8.0 CHAPTER OVERVIEW

This chapter illustrates the names and components for each of the repair kits for the CoughAssist E70/ CoughAssist T70 Devices. For technical assistance or replacement part ordering information, contact Respironics Product Support.

USA and Canada

Phone: 1-800-345-6443
Fax: 1-800-866-0245
Email: service@respironics.com

International

Phone: 1-724-387-4000
Fax: 1-800-387-5012

Visit the Philips Respironics Home Page on the World Wide Web at:

www.philips.com

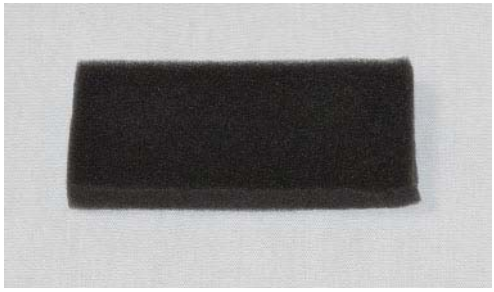
8.1 REPAIR KIT REFERENCE TABLE

NOTE

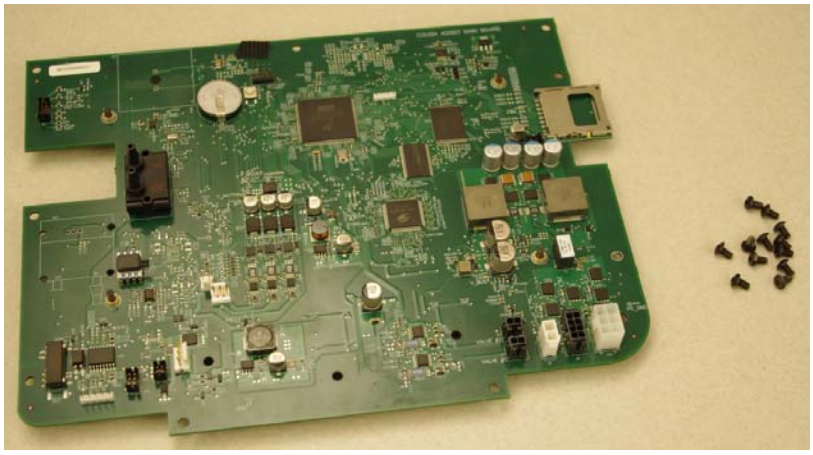
For kits with multiple part number listings, refer to the individual page to ensure proper ordering.

PART NUMBER(S)	REPAIR KIT NAME	PAGE IDENTIFIER
1099477	*CoughAssist E70 / CoughAssist T70 Pollen Filter Kit*	*page 3*
1099478	*CoughAssist E70 Main PCA Kit*	*page 3*
1109154	*CoughAssist T70 Main PCA Kit*	*page 4*
1099480	*CoughAssist E70 / CoughAssist T70 KeyPad Kit*	*page 5*
1099481	*CoughAssist E70 Front Enclosure Kit*	*page 5*
1099479	*CoughAssist E70 / CoughAssist T70 Manual Switch Kit*	*page 4*
1109155	*CoughAssist T70 Front Enclosure Kit*	*page 6*
1099482	*CoughAssist E70 / CoughAssist T70 Tubing Kit*	*page 6*
1099483	*CoughAssist E70 / CoughAssist T70 Fan Kit*	*page 7*
1099484	*CoughAssist E70 / CoughAssist T70 Internal Battery PCA*	*page 7*
1099485	*CoughAssist E70 / CoughAssist T70 Bottom Plate Kit*	*page 8*
1099486	*CoughAssist E70 / CoughAssist T70 Rubber Feet Kit*	*page 8*
1099487	*CoughAssist E70 / CoughAssist T70 Motor Blower Assembly Kit*	*page 8*
1099488	*CoughAssist E70 / CoughAssist T70 Flow Path Assy Kit*	*page 9*
1099489	*CoughAssist E70 / CoughAssist T70 Elbow Coupler Kit*	*page 9*
1099490	*CoughAssist E70 / CoughAssist T70 Valve Assy/Gasket Kit*	*page 9*
1099491	*CoughAssist E70 / CoughAssist T70 Handle Kit*	*page 10*
1099492	*CoughAssist E70 / CoughAssist T70 Detach Battery PCA*	*page 10*
1099493	*CoughAssist E70 / CoughAssist T70 Detachable Battery PCA Holder*	*page 10*
1099494	*CoughAssist E70 / CoughAssist T70 Detachable Battery Cable Kit*	*page 11*
1099495	*CoughAssist E70 / CoughAssist T70 Rear Enclosure Cable Assy Kit*	*page 11*
1099496	*CoughAssist E70 / CoughAssist T70 Rear Enclosure Kit*	*page 12*
1100864	*CoughAssist E70 / CoughAssist T70 SD Card Cover*	*page 12*
1100866	*CoughAssist E70 / CoughAssist T70 Suction Cable Kit*	*page 12*
1103217	*CoughAssist E70 Serial Number Plate Kit*	*page 12*
1109156	*CoughAssist T70 Serial Number Plate Kit*	*page 12*

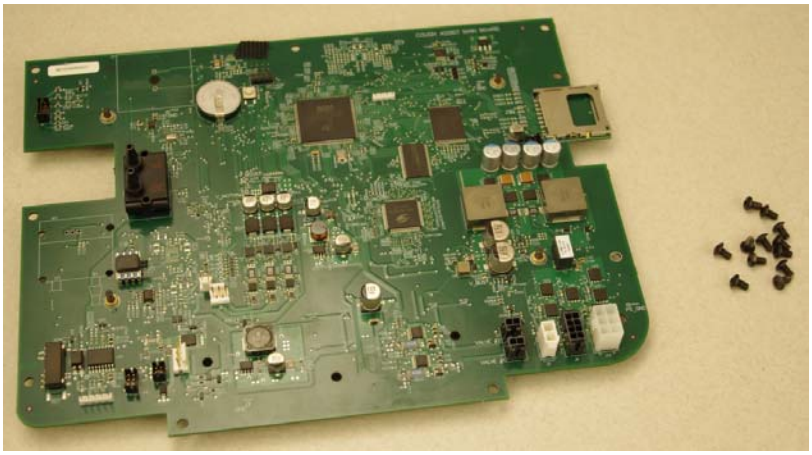
8.2 COUGHASSIST E70 / COUGHASSIST T70 POLLEN FILTER KIT

PART NUMBER: 1099477


8.3 COUGHASSIST E70 MAIN PCA KIT

PART NUMBER: 1099478


8.4 COUGHASSIST T70 MAIN PCA KIT

PART NUMBER: 1109154


8.5 COUGHASSIST E70 / COUGHASSIST T70 MANUAL SWITCH KIT

PART NUMBER: 1099479


8.6 COUGHASSIST E70 / COUGHASSIST T70 KEYPAD KIT

PART NUMBER: 1099480

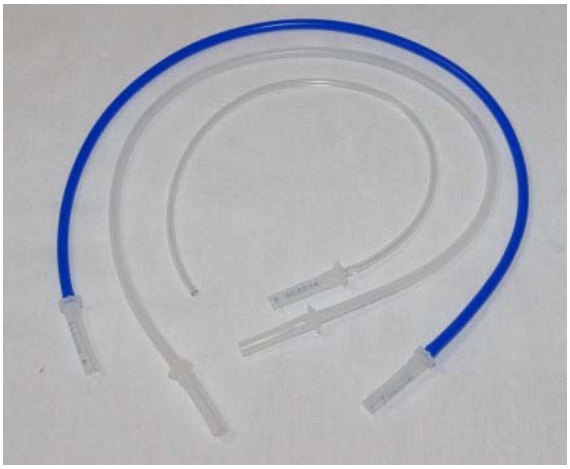

8.7 COUGHASSIST E70 FRONT ENCLOSURE KIT

PART NUMBER: 1099481

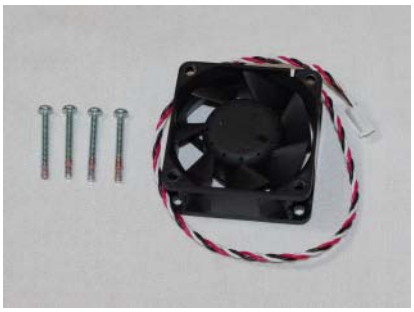

8.8 COUGHASSIST T70 FRONT ENCLOSURE KIT

PART NUMBER: 1109155


8.9 COUGHASSIST E70 / COUGHASSIST T70 TUBING KIT

PART NUMBER: 1099482


8.10 COUGHASSIST E70 / COUGHASSIST T70 FAN KIT

PART NUMBER: 1099483


8.11 COUGHASSIST E70 / COUGHASSIST T70 INTERNAL BATTERY PCA

PART NUMBER: 1099484

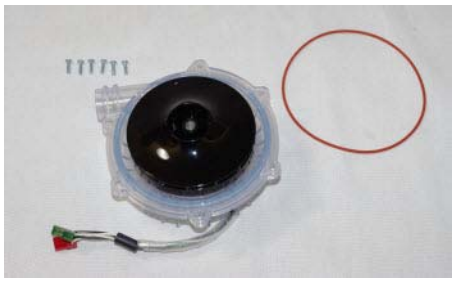

8.12 COUGHASSIST E70 / COUGHASSIST T70 BOTTOM PLATE KIT

PART NUMBER: 1099485


8.13 COUGHASSIST E70 / COUGHASSIST T70 RUBBER FEET KIT

PART NUMBER: 1099486


8.14 COUGHASSIST E70 / COUGHASSIST T70 MOTOR BLOWER ASSEMBLY KIT

PART NUMBER: 1099487


8.15 COUGHASSIST E70 / COUGHASSIST T70 FLOW PATH ASSY KIT

PART NUMBER: 1099488


8.16 COUGHASSIST E70 / COUGHASSIST T70 ELBOW COUPLER KIT

PART NUMBER: 1099489

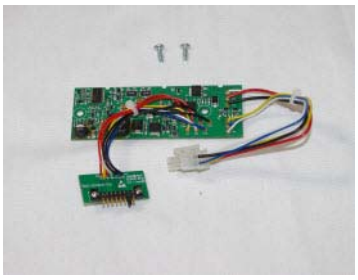

8.17 COUGHASSIST E70 / COUGHASSIST T70 VALVE ASSY/GASKET KIT

PART NUMBER: 1099490


8.18 COUGHASSIST E70 / COUGHASSIST T70 HANDLE KIT

PART NUMBER: 1099491

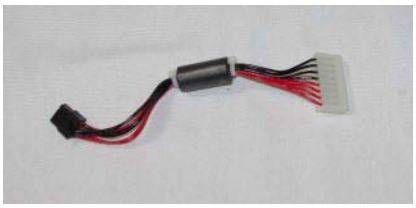

8.19 COUGHASSIST E70 / COUGHASSIST T70 DETACH BATTERY PCA

PART NUMBER: 1099492


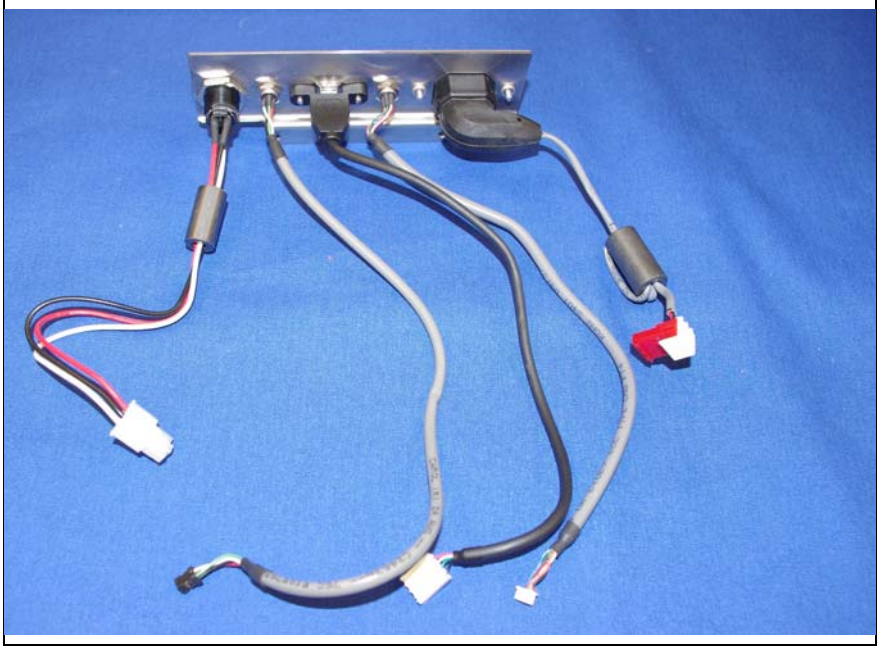
8.20 COUGHASSIST E70 / COUGHASSIST T70 DETACHABLE BATTERY PCA HOLDER

PART NUMBER: 1099493


8.21 COUGHASSIST E70 / COUGHASSIST T70 DETACHABLE BATTERY CABLE KIT

PART NUMBER: 1099494


8.22 COUGHASSIST E70 / COUGHASSIST T70 REAR ENCLOSURE CABLE ASSY KIT

PART NUMBER: 1099495


8.23 COUGHASSIST E70 / COUGHASSIST T70 REAR ENCLOSURE KIT

PART NUMBER: 1099496


8.24 COUGHASSIST E70 / COUGHASSIST T70 SD CARD COVER

PART NUMBER: 1100864

8.25 COUGHASSIST E70 / COUGHASSIST T70 SUCTION CABLE KIT

PART NUMBER: 1100866

8.26 COUGHASSIST E70 SERIAL NUMBER PLATE KIT

PART NUMBER: 1103217

8.27 COUGHASSIST T70 SERIAL NUMBER PLATE KIT

PART NUMBER: 1109156

CHAPTER 9: TESTING

9.0 CHAPTER OVERVIEW

This chapter details the necessary procedures to perform testing procedures on the CoughAssist E70/ CoughAssist T70 devices.

9.1 FUNCTIONAL CHECKOUT PROCEDURE

This procedure should be used as necessary to check functionality of device.

1. Apply AC Power to the UUT.
2. Press the Power On/Power Off button and verify that the device turns ON in Standby mode. Record the results in the Test Data Sheet.
3. Set Inhale Pressure and Exhale Pressure to 40.
4. Press the Right button keypress and release. Verify that the device enters Therapy mode. Record the results in the Test Data Sheet.
5. Apply a solid cap to the device outlet.
6. Toggle the Manual switch left and hold for 5 seconds. Verify that the device displays a negative pressure. Release the switch and verify that the device displays zero pressure. Record the results in the Test Data Sheet.
7. Toggle the Manual switch right and hold for 5 seconds. Verify that the device displays a positive pressure. Release the switch and verify that the device displays zero pressure. Record the results in the Test Data Sheet.
8. Press the right button. Verify the device enters Standby mode. Record the results in the Test Data Sheet.
9. Press the left button. Verify the device displays the Settings screen. Record the results in the Test Data Sheet.
10. Press the down arrow button 3 times consecutively. Verify the highlighted setting scrolls 3 selections down. Record the results in the Test Data Sheet.
11. Press the up arrow button 3 times consecutively. Verify the highlighted setting scrolls 3 selections up. Record the results in the Test Data Sheet.
12. Press the left button. The display will return to the Standby mode.
13. Press the Power On/Power Off button. The device will power OFF.

9.2 FUNCTIONAL CHECKOUT PROCEDURE DATA SHEET

TEST STEP	TEST	PASS	FAIL
9.1 Step 2	***User Interface*** *Power ON/OFF button*		
9.1 Step 4	***User Interface*** *Right button to therapy mode*		
9.1 Step 6	***User Interface*** *Manual button to exhale*		
9.1 Step 7	***User Interface*** *Manual button to inhale*		
9.1 Step 8	***User Interface*** *Right button to standby mode*		
9.1 Step 9	***User Interface*** *Left button to settings screen*		
9.1 Step 10	***User Interface*** *Down arrow button 3 scrolls*		
9.1 Step 11	***User Interface*** *Up arrow button 3 scrolls*		
	PRINTED NAME:	***MODEL NUMBER:***	
	SIGNATURE:	***SERIAL NUMBER:***	
	DATE:		

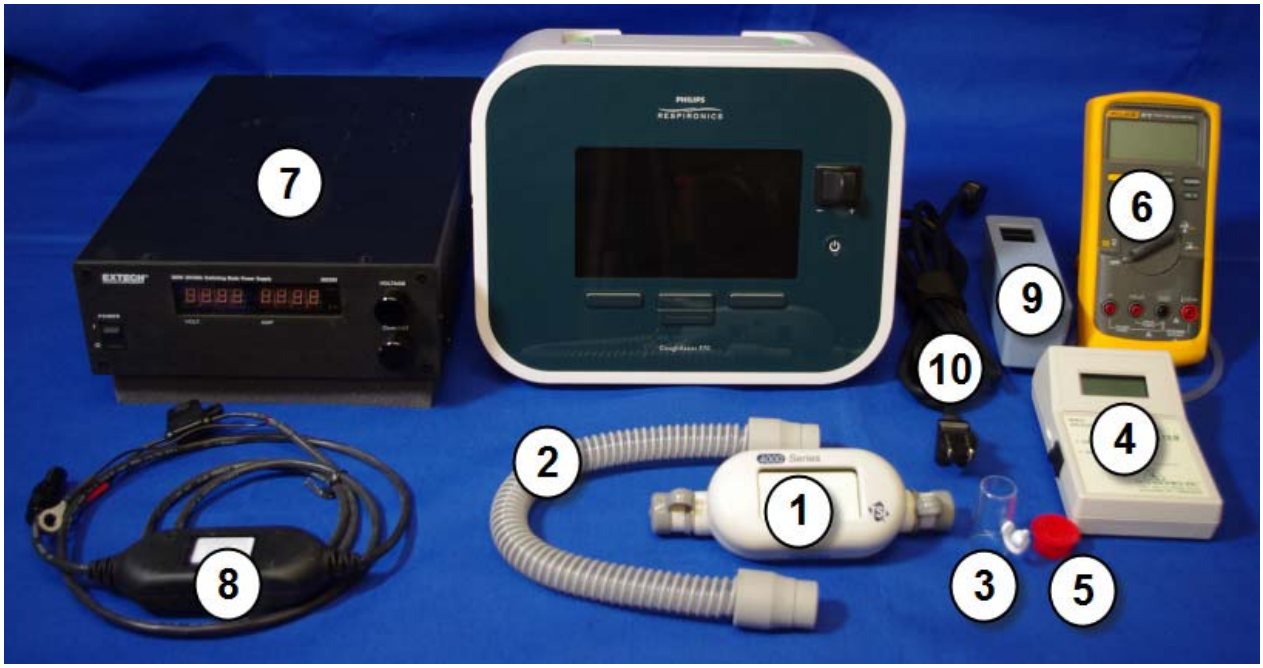
9.3 FINAL TESTING PROCEDURE

This procedure must be used after repair and any time the device is opened.

9.3.1 REQUIRED EQUIPMENT

NOTE
Refer to Chapter 10, Tools & Equipment Section for further details.

1. TSI 4040 Flow Meter (PRI P/N 1071679)
2. Hose, 22mm-18IN,Non-Autoclav (PRI P/N 1008198)
3. 02 Enrichment Attachment Single (PRI P/N 312710)
4. Digital Manometer 0-100 cmH_2O (RI P/N 1071620)
5. Solid Red Cap
6. Digital Multimeter (PRI P/N 1071681)
7. DC Power Supply 0-15V 0-2 (PRI P/N 1071678)
8. External Battery Cable (PRI P/N 1047295)
9. Detachable Battery (PRI P/N 1043570)
10. CoughAssist E70 / CoughAssist T70 AC Power Cable
11. SD card 1-2 GB (PRI P/N 1051801) (Not Shown)
12. Stopwatch (Not Shown)



9.3.2 POSITIVE PRESSURE/FLOW TEST

1. Connect test equipment per the photo below.

2. Power ON the UUT.
3. Set to Manual Mode.
4. Set Inhale to 70.
5. Set the UUT to Therapy Mode.
6. Block the Flowmeter outlet with a solid cap.
7. Ensure the TSI 4040 is powered ON.
8. Ensure the digital manometer is powered ON.
9. Toggle the manual switch to inhale and hold for 10 seconds.
10. Manometer should show ≥ 70 cmH2O (Tolerance = $\pm$ 5 cmH_2O). Record the results in the Test Data Sheet.
11. Release the manual switch.
12. Unblock the Flowmeter outlet.
13. Toggle the manual switch to inhale and hold for 10 seconds.
14. Flowmeter should show ≥ 200 LPM. Record the results in the Test Data Sheet.

9.3.3 NEGATIVE PRESSURE/FLOW TEST

1. Connect test equipment per the photo below. Reverse the direction of the flow meter for negative flow testing. Directional arrow should be pointing toward the unit under test.

2. Power ON the UUT.
3. Set to Manual Mode.
4. Set Exhale to -70.
5. Set the UUT to Therapy Mode.
6. Block the Flowmeter outlet with a solid cap.
7. Ensure the TSI 4040 is powered ON.
8. Ensure the digital manometer is powered ON.
9. Toggle the manual switch to exhale and hold for 10 seconds.
10. Manometer should show $\geq$ -70 cmH_2O (Tolerance = $\pm$ 5 cmH_2O). Record the results in the Test Data Sheet.
11. Release the manual switch.
12. Unblock the Flowmeter outlet.
13. Toggle the manual switch to exhale and hold for 10 seconds.
14. Flowmeter should show $\geq$ 200 LPM. Record the results in the Test Data Sheet.

9.3.4 ZERO FLOW TEST

1. Connect test equipment per the photo below.

2. Power ON the UUT.
3. Set to Auto Mode with Cough-Trak On.
4. Set the UUT to Therapy Mode.
5. When in Pause, record the pressure on the Manometer. Pressure tolerance is -1 to +4 cmH_2O. Record the results in the Test Data Sheet.

9.3.5 AUTOMATIC SWITCHING AND TIMING TEST

1. Power on the UUT.
2. Set inhale pressure to 40, and exhale pressure to -40.
3. Set to Automatic mode.
4. Set the UUT to Therapy Mode.
5. Verify the unit begins immediately with the inhale pressure, then exhale pressure and pause time (duration 1 second). Record the results in the Test Data Sheet.

9.3.6 COOLING FAN TEST

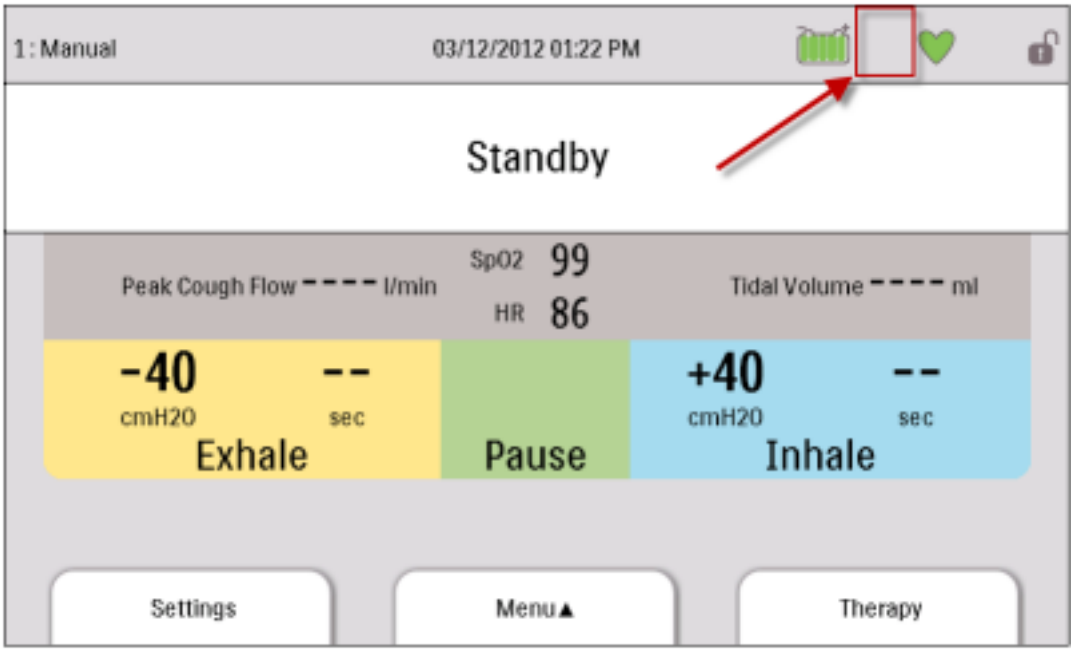
1. Power ON the UUT.
2. Verify that the Cooling Fan is operating by placing your hand at the cooling fan outlet on the rear of the UUT. You should feel air moving out of the fan outlet. Record the results in the Test Data Sheet.

9.3.7 DETACHABLE BATTERY TEST

NOTE

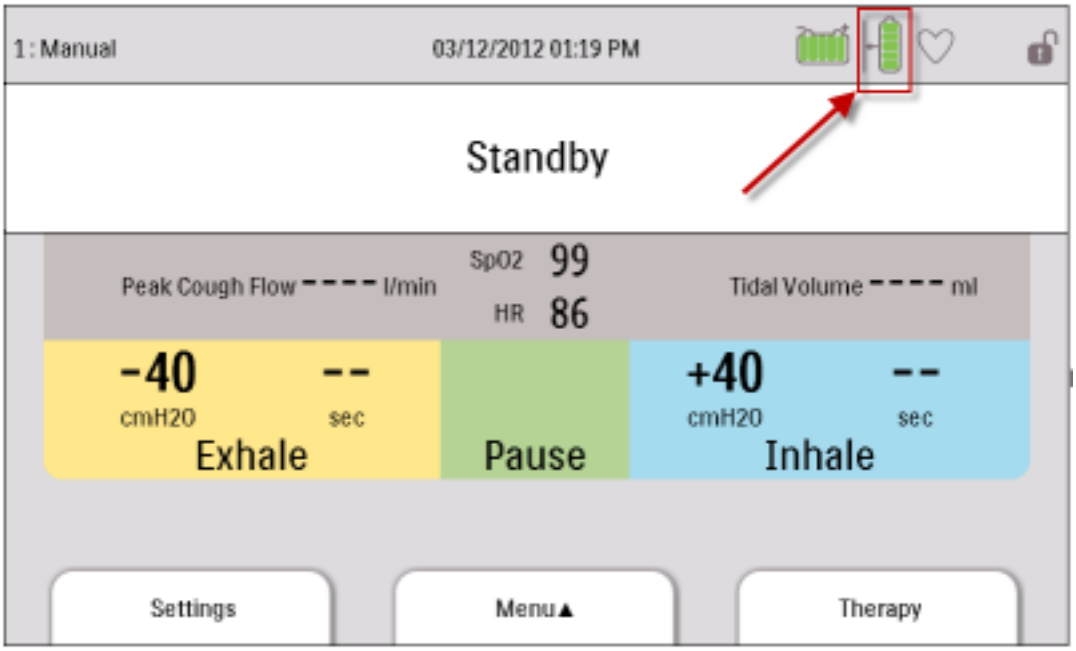
For this test, the detachable battery charge must be between 50% and 85%. To charge the battery, plug the device into AC with the device OFF and detachable battery installed until a minimum of 3 to 5 LEDs are lit when depressing the battery charge indicator on the detachable battery.

1. Apply AC power to the UUT.
2. Remove the detachable battery if installed.
3. Power ON the UUT.
4. Verify that the detachable battery indicator is not present. Record the results in the Test Data Sheet.

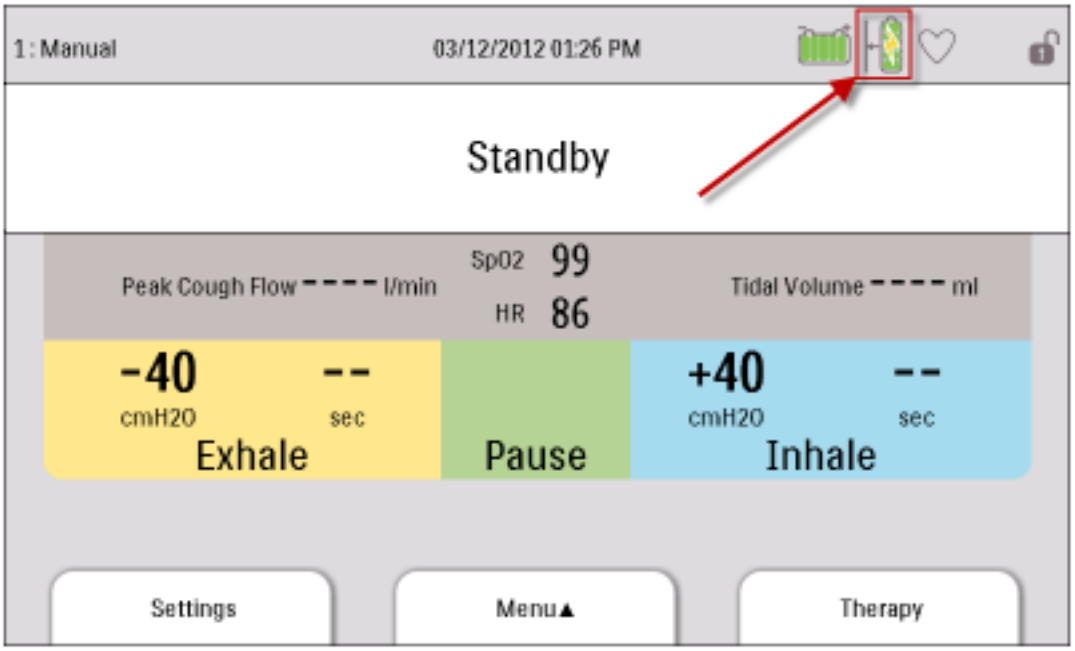


5. Install a detachable battery (Charge level must be < 85%).

6. Verify that the detachable battery indicator is present. Record the results in the Test Data Sheet.



7. Verify that the detachable battery is charging (lightning bolt symbol over the battery). Record the results in the Test Data Sheet.



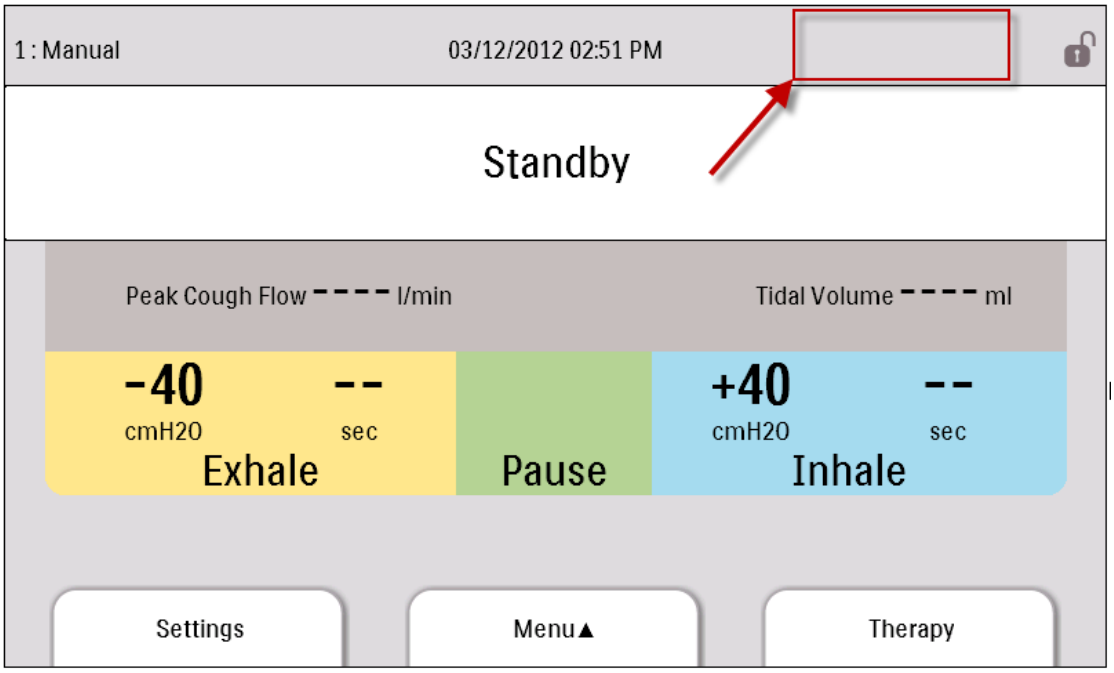
8. Remove the detachable battery from the UUT.
9. Press the battery charge button on the back of the battery. Count the lit LEDs.
10. Reinstall the detachable battery to the UUT.
11. Power ON the UUT.

12. Verify detachable battery LED's against the UUT's user interface amount of green segments. Should be ± 1. Record the results in the Test Data Sheet.

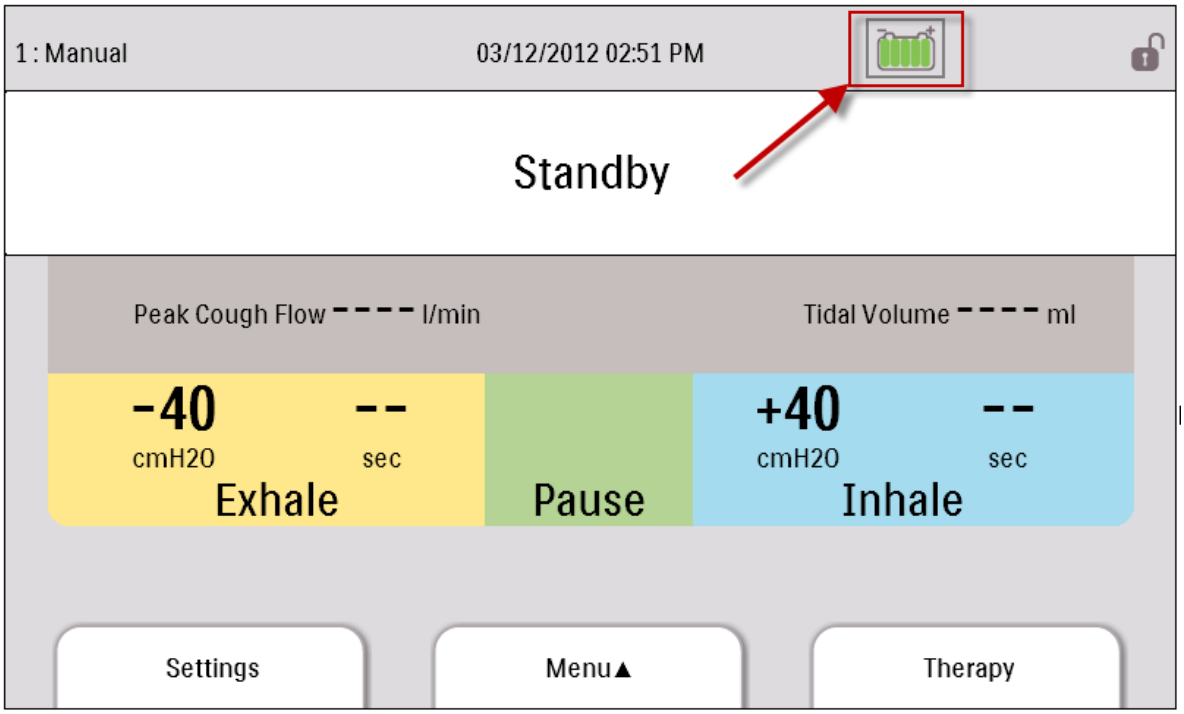
9.3.8 EXTERNAL BATTERY TEST

1. Connect AC power to the device.
2. Remove the detachable battery if installed.
3. Disconnect external DC power from the device.
4. Power on UUT.

5. Verify that the external battery indicator is not present. Record the results in the Test Data Sheet.



6. Set external Power supply to 13V if using DC Power supply. If using other external power source, connect to the UUT.
7. Disconnect AC Power.
8. Connect the external battery and verify that the external battery indicator is present showing external battery in use. Record the results in the Test Data Sheet.



9.3.9 POWER SOURCE HIERARCHY AND MANAGEMENT TEST

NOTE

For this test, set the DC Power Supply to 13.0 VDC and attach to the UUT. If using other external power source, connect to the UUT. The Detachable battery capacity must be > 50 % and attached to the UUT.

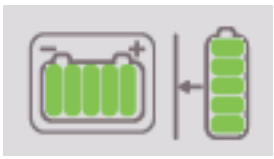
Set the UTT to the following:

- *Manual Mode*
- *Inhale and Exhale pressure settings set to 70 cmH_2O*
- *Therapy is off (Standby Mode)*

1. Attach AC power to the UUT.
2. Verify the device recognizes AC power as the power source. (Green LED indicator on the Power On/Power Off button lights) Record the results in the Test Data Sheet.

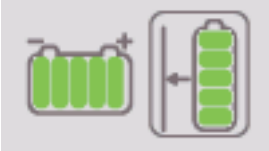
3. Turn Therapy ON. The Power On/Power Off button illuminates White. Record the results in the Test Data Sheet.

4. Remove AC Power.
5. Verify the Power On/Power Off Therapy button is NOT illuminated Green/White (OFF). Record results on test data sheet.
6. Verify the device continues to operate for 5 seconds.
7. Verify that the user interface shows the External Battery as the power source in use. Record the results in the Test Data Sheet.



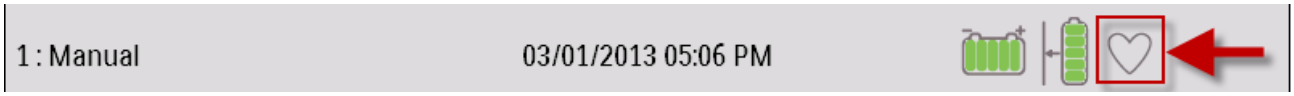
8. Remove External Battery power.
9. Verify the device continues to operate for 5 seconds. Record the results in the Test Data Sheet.

10. Verify that the user interface shows the Detachable Battery as the power source in use. Record results on test data sheet.



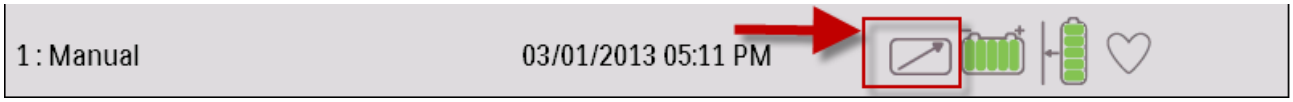
9.3.10 PULSE OX TEST

1. Connect a pulse oximeter to the device
2. Power On the UUT in Standby Mode.
3. Verify that the UUT recognizes the pulse oximetry accessory. Record the results in the Test Data Sheet.



9.3.11 REMOTE CONTROL

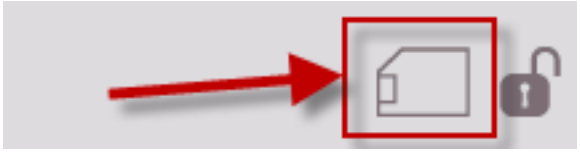
1. Connect a foot pedal to the device.
2. Power on the UUT in Standby mode.
3. Set the device to Manual mode.
4. Set the device to Therapy mode.
5. Verify that the UUT recognizes the foot pedal by displaying the foot pedal symbol. Record the results in the Test Data Sheet.



6. Toggle the foot pedal to Inhale.
7. Verify that a positive pressure is shown on the display. Record the results in the Test Data Sheet.
8. Toggle the foot pedal to Exhale.
9. Verify that a negative pressure is shown on the display. Record the results in the Test Data Sheet.
10. Fully release the foot pedal.
11. Verify that no pressure is shown on the display. Record the results in the Test Data Sheet.

9.3.12 SD CARD INTERFACE TEST

1. Apply AC Power to the UUT.
2. Turn the device ON and in Standby mode.
3. Install an SD card to the SD card slot.
4. Verify that the SD card symbol appears on the user interface.



5. Remove the SD card and verify that the symbol disappears. Record results in Test Data Sheet.

9.3.13 USER INTERFACE TEST

1. Apply AC Power to the UUT.
2. Press the Power On/Power Off button and verify that the device turns ON in Standby mode. Record the results in the Test Data Sheet.
3. Set Inhale Pressure and Exhale Pressure to 40.
4. Press the Right button keypress and release. Verify that the device enters Therapy mode. Record the results in the Test Data Sheet.
5. Apply a solid cap to the device outlet.
6. Toggle the Manual switch left and hold for 5 seconds. Verify that the device displays a negative pressure. Release the switch and verify that the device displays zero pressure. Record the results in the Test Data Sheet.
7. Toggle the Manual switch right and hold for 5 seconds. Verify that the device displays a positive pressure. Release the switch and verify that the device displays zero pressure. Record the results in the Test Data Sheet.
8. Press the right button. Verify the device enters Standby mode. Record the results in the Test Data Sheet.
9. Press the left button. Verify the device displays the Settings screen. Record the results in the Test Data Sheet.
10. Press the down arrow button 3 times consecutively. Verify the highlighted setting scrolls 3 selections down. Record the results in the Test Data Sheet.
11. Press the up arrow button 3 times consecutively. Verify the highlighted setting scrolls 3 selections up. Record the results in the Test Data Sheet.
12. Press the left button. The display will return to the Standby mode.
13. Press the Power On/Power Off button. The device will power OFF.

9.3.14 SHIPPING PREPARATION

Prior to shipping the device back to the dealer, ensure the following parameters are set.

1. Mode = Auto.
2. CoughTrak = OFF
3. Inhale Pressure = 40 cmH_2O
4. Exhale Pressure = – 40 cmH_2O
5. Inhale Flow = Medium
6. Inhale Time = 2 sec
7. Exhale Time = 2 sec
8. Pause Time = 2 sec
9. Oscillatory Therapy = Off **(CoughAssist E70 Only)**
10. Oscillation Frequency = 1 Hz **(CoughAssist E70 Only)**
11. Oscillation Amplitude = 2 cmH_2O **(CoughAssist E70 Only)**
12. Language = English
13. Pressure Units = cmH_2O

Test Complete

9.4 COUGHASSIST E70 / COUGHASSIST T70 TEST DATA SHEET

TEST STEP	TEST	SPECIFICATION	VALUE (IF REQUIRED	PASS	FAIL
9.3.2 Step 10	***Positive Pressure/Flow*** *Pressure Measurement*	*≥ 70 cmH_2O*			
9.3.2 Step 14	***Positive Pressure/Flow*** *Pressure Measurement*	*≥ 200 LPM*			
9.3.3 Step 10	***Negative Pressure/Flow*** *Pressure Measurement*	*≥ - 70 cmH_2O*			
9.3.3 Step 14	***Negative Pressure/Flow*** *Pressure Measurement*	*≥ 200 LPM*			
9.3.4 Step 5	***Zero Flow*** *Flow Measurement*	*-1 to 4 cmH_2O*			
9.3.5 Step 5	***Automatic Switching and Timing***	*1 second Pause Time*			
9.3.6	***Cooling Fan***				
9.3.7 Step 4	***Power Sources*** *Detachable Battery NOT present*				
9.3.7 Step 6	***Power Sources*** *Detachable Battery present*				
9.3.7 Step 7	***Power Sources*** *Detachable Battery charging*				
9.3.7 Step 12	***Power Sources*** *Detachable Battery LED Count*	*+/- 1 segment*			
9.3.8 Step 5	***Power Sources*** *External Battery NOT present*				
9.3.8 Step 8	***Power Sources*** *External Battery present*				
9.3.9 Step 2	***Power Sources Hierarchy*** *AC as Power Source (Green)*				
9.3.9 Step 3	***Power Sources Hierarchy*** *AC as Power Source (White)*				
9.3.9 Step 5	***Power Sources Hierarchy*** *AC as Power Source (OFF)*				
9.3.9 Step 7	***Power Sources Hierarchy*** *External Battery as Power Source*				
9.3.9 Steps 9 & 10	***Power Sources Hierarchy*** *External Battery disconnected operates for 5 seconds*				

TEST STEP	TEST	SPECIFICATION	VALUE (IF REQUIRED	PASS	FAIL
9.3.10 Step 3	***Pulse Ox recognized***				
9.3.11 Step 5	***Remote Control recognized***				
9.3.11 Step 7	***Remote Control*** *Positive Pressure*				
9.3.11 Step 9	***Remote Control*** *Negative Pressure*				
9.3.11 Step 11	***Remote Control*** *Zero Pressure*				
9.3.12 Step 5	***SD Card Interface recognized***				
9.3.13 Step 2	***User Interface*** *Power ON/OFF button*				
9.3.13 Step 4	***User Interface*** *Right button to therapy mode*				
9.3.13 Step 6	***User Interface*** *Manual button to exhale*				
9.3.13 Step 7	***User Interface*** *Manual button to inhale*				
9.3.13 Step 8	***User Interface*** *Right button to standby mode*				
9.3.13 Step 9	***User Interface*** *Left button to settings screen*				
9.3.13 Step 10	***User Interface*** *Down arrow button 3 scrolls*				
9.3.13 Step 11	***User Interface*** *Up arrow button 3 scrolls*				
9.3.14	***Shipping Preparation***				
	PRINTED NAME:			***MODEL NUMBER:***	
	SIGNATURE:			***SERIAL NUMBER:***	
	DATE:				

CHAPTER 10: TOOLS & EQUIPMENT

10.0 CHAPTER OVERVIEW

This chapter details the necessary hand tools and supplies for troubleshooting, testing, and repairing the E70/T.70 Device

10.1 COMMON HAND TOOLS

- Torx driver with bits as follows
  - T25 Tamper Proof
  - T25
  - T20
  - T15
  - T10
- Flat head screwdriver
- Phillips head screwdriver #1
- Phillips head screwdriver #2
- Long nose (needle nose) pliers
- Side cutters

10.2 REQUIRED EQUIPMENT

1. TSI 4040 Flow Meter (PRI P/N 1071679)

   ACCEPTABLE OPTIONS

   - Any commercially available Digital Flowmeter that meets the below specifications
     - Flow measurement range of 0 to 300 Std L/min
     - Accuracy 2% of reading or 0.05 Std L/min, whichever is greater
2. Hose, 22mm-18IN,Non-Autoclave (PRI P/N 1008198)
3. 02 Enrichment Attachment Single (PRI P/N 312710)
4. Digital Manometer 0-100 cmH_2O (PRI P/N 1071620)

   ACCEPTABLE OPTIONS

   - Any commercially available Digital Manometer that meets the below specifications
     - Measurements of 1-100 cmH_2O
     - Accuracy of + 0.3 cmH_2O
5. Solid Red Cap
6. Digital Multimeter (PRI P/N 1071681)

   ACCEPTABLE OPTIONS

   - Any commercially available Digital Multimeter that meets the below specifications
     - Measurements of AC/DC current, True RMS Voltage and resistance.

7. DC Power Supply 0-15V 0-2 (PRI P/N 1071678)

   ACCEPTABLE OPTIONS

   - Any commercially available External Power Supply that meets the below specifications
     - 0.0-15VAC
     - 0.0-25 A Regulated Power Supply
     - 100-240V input
   - 12 VDC Deep Cycle Marine Battery
8. External Battery Cable (PRI P/N 1047295)
9. Detachable Battery (PRI P/N 1043570)
10. CoughAssist E70 / CoughAssist T70 AC Power Cable
11. SD card 1-2 GB (PRI P/N 1051801)

    ACCEPTABLE OPTIONS

    - Any commercially available SD card that meets the below specifications
      - 1-2 GB SD Card
12. CA 70 SERIES,FOOT PEDAL (RI P/N1059017)
13. Stopwatch

10.3 SUPPLIES

- Cleaning Cloth
- Mild Detergent
- Leak Detector

CHAPTER 11: SCHEMATICS

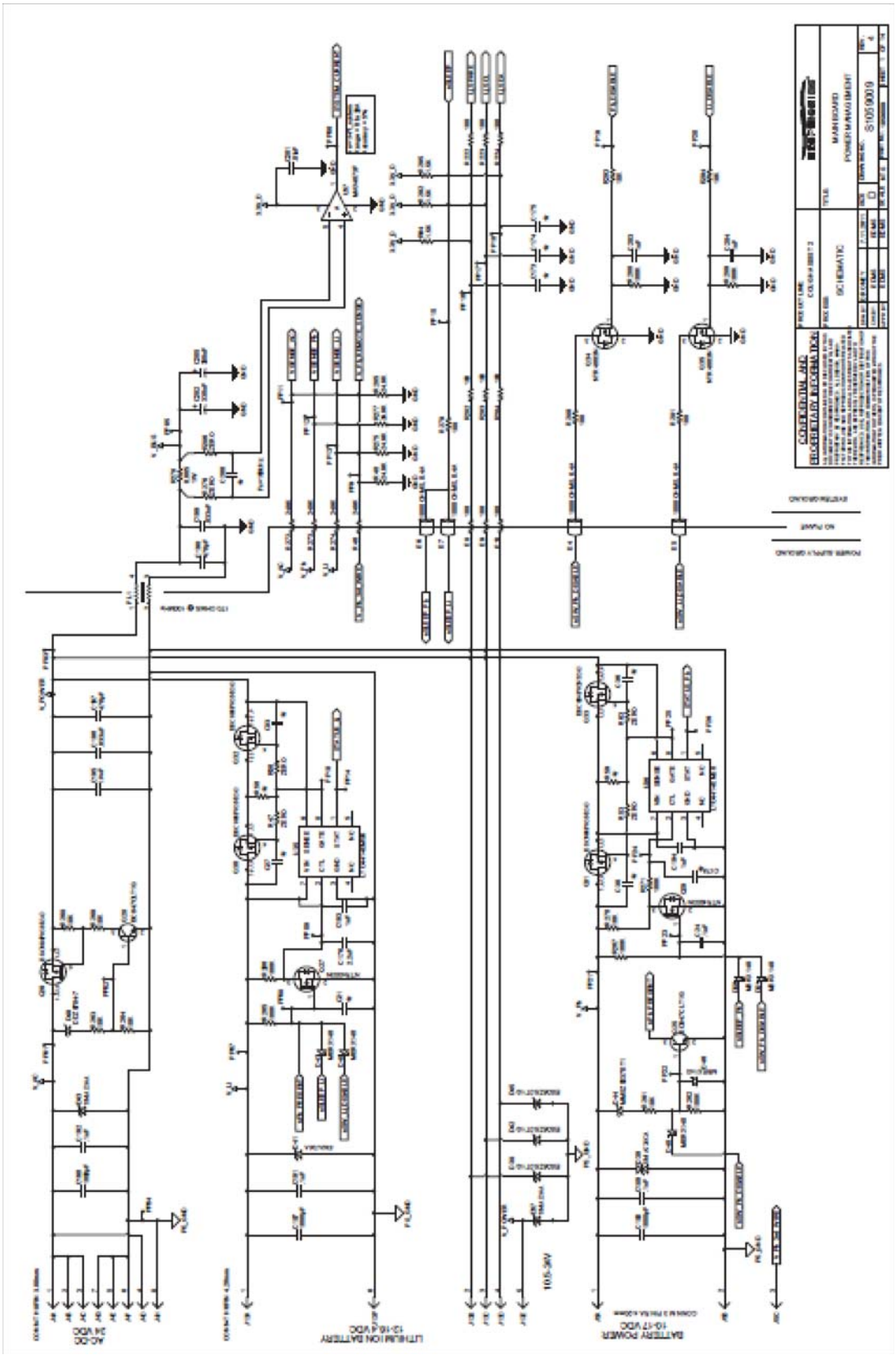
11.0 SCHEMATICS STATEMENT

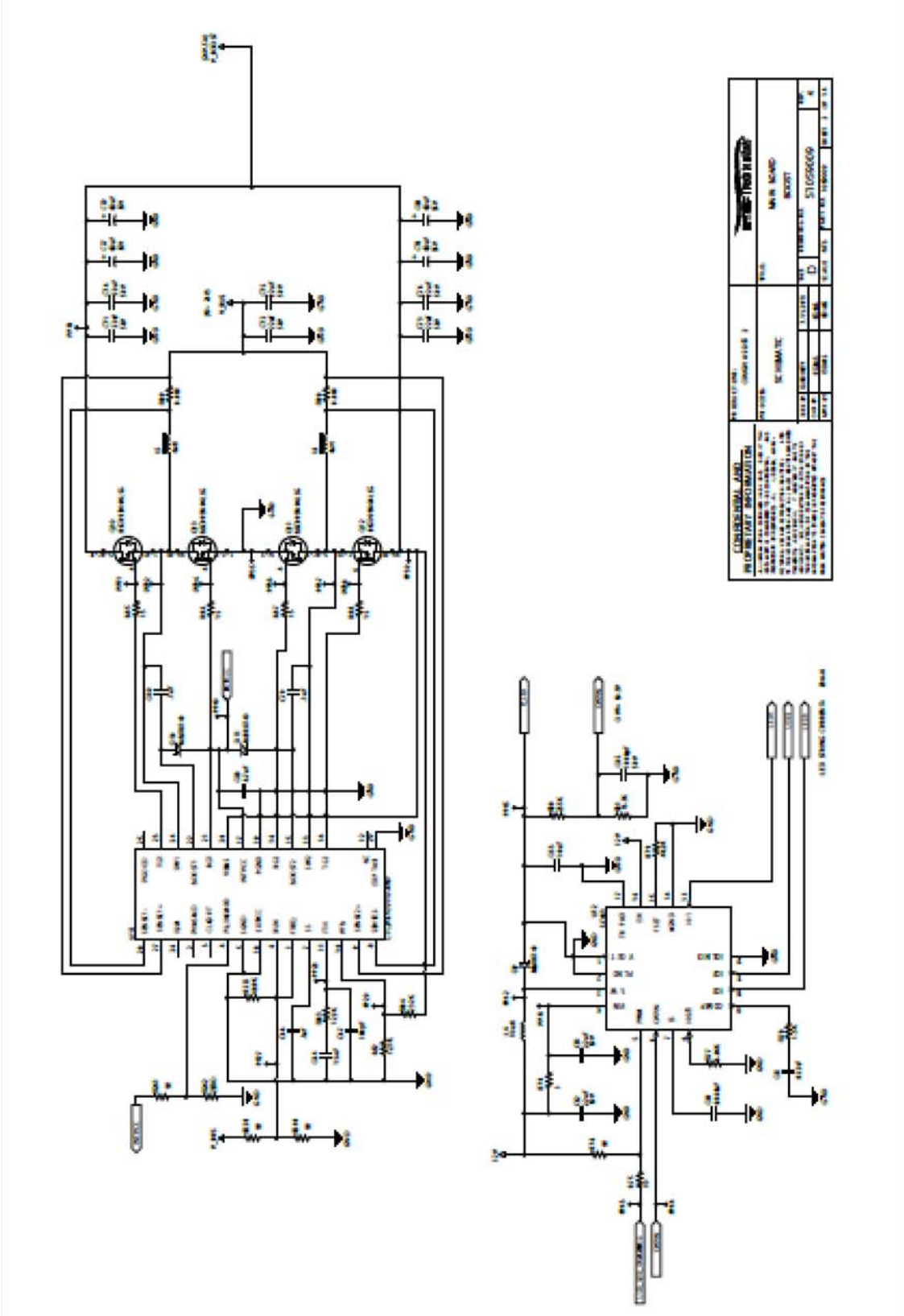
Schematics are supplied with this manual in direct support of the sale and purchase of this product.

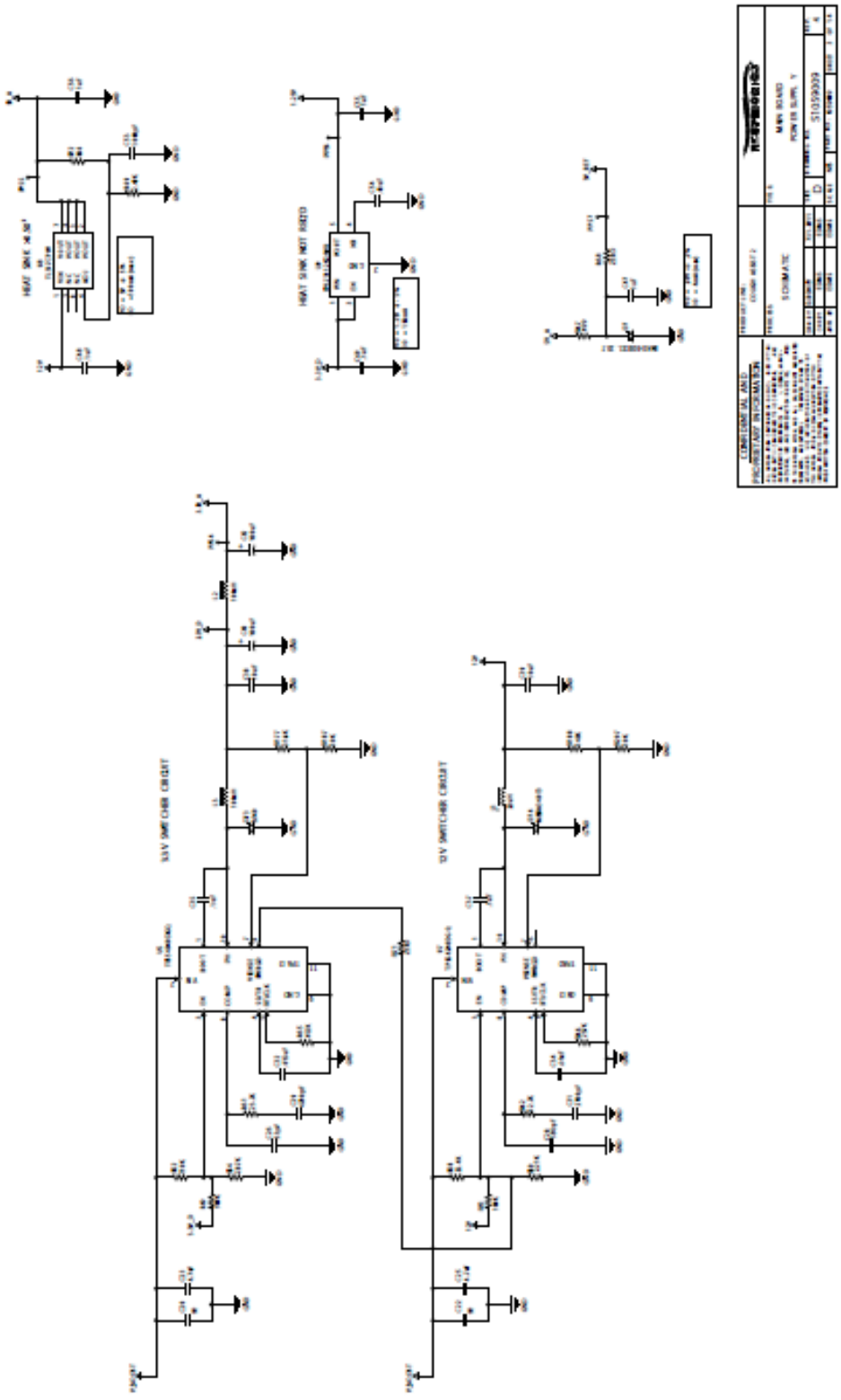
The schematics are proprietary and confidential. Do not copy the schematics or disclose them to third parties beyond the purpose for which they are intended. Patents are pending.

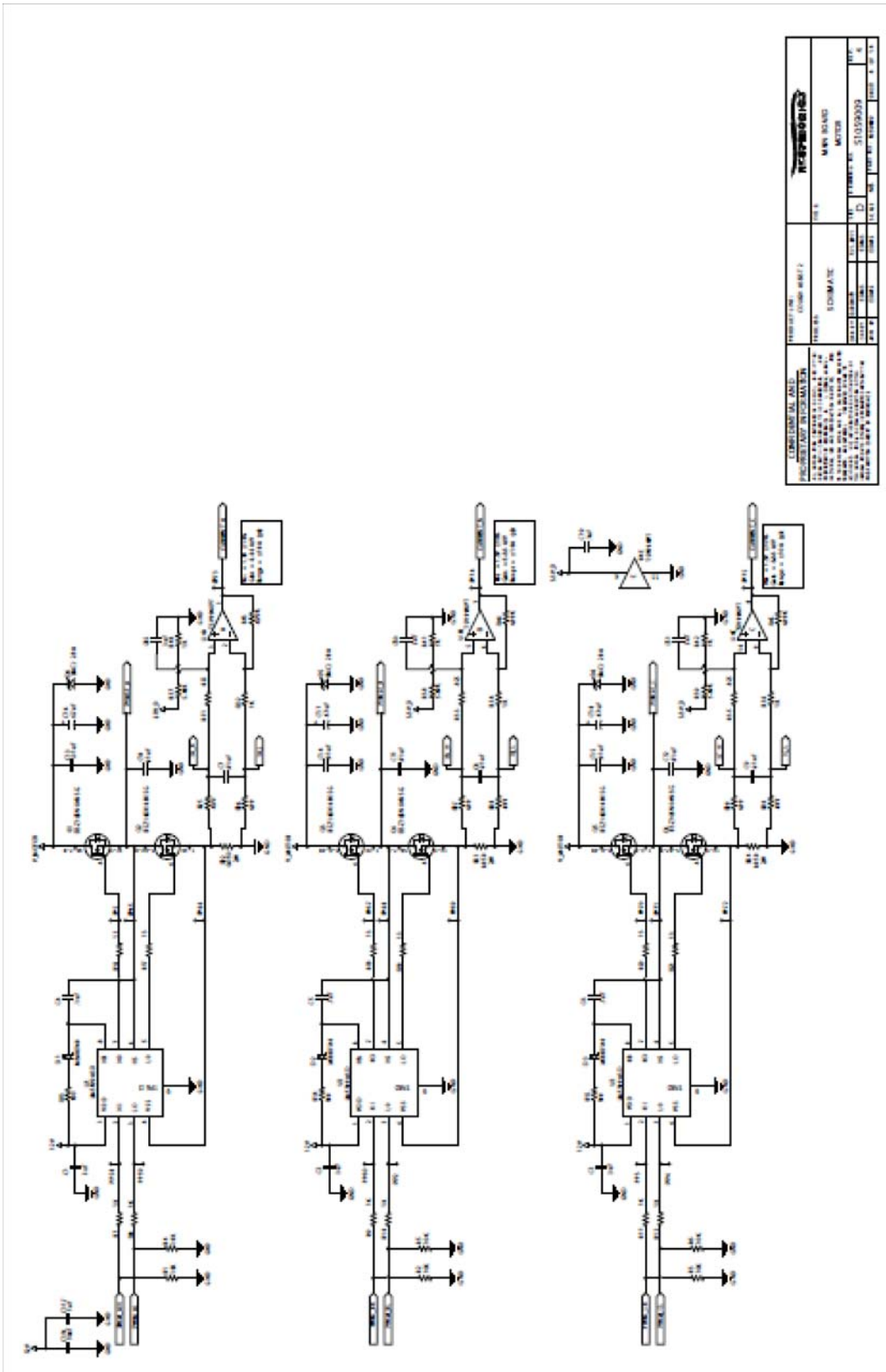
The schematics are intended to satisfy administrative requirements only. They are not intended to be used for component level testing and repair. Any changes of components could effect the reliability of the device, prohibit lot tracking of electronic components, and void warranties. Repairs and testing are supported only at the complete board level.

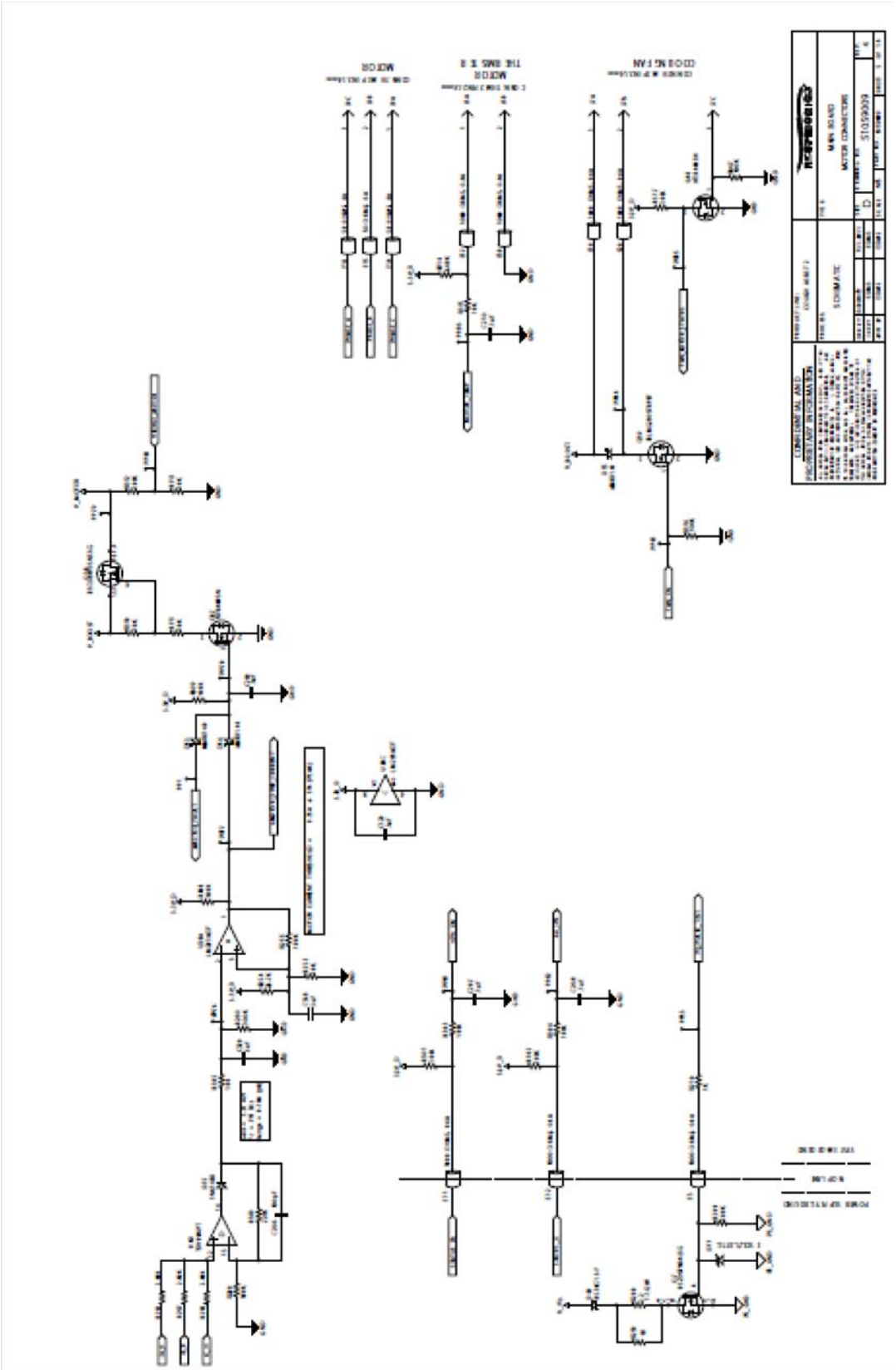
The schematics are of the revision level in effect at the time this manual was last revised. New revisions may or may not be distributed in the future.

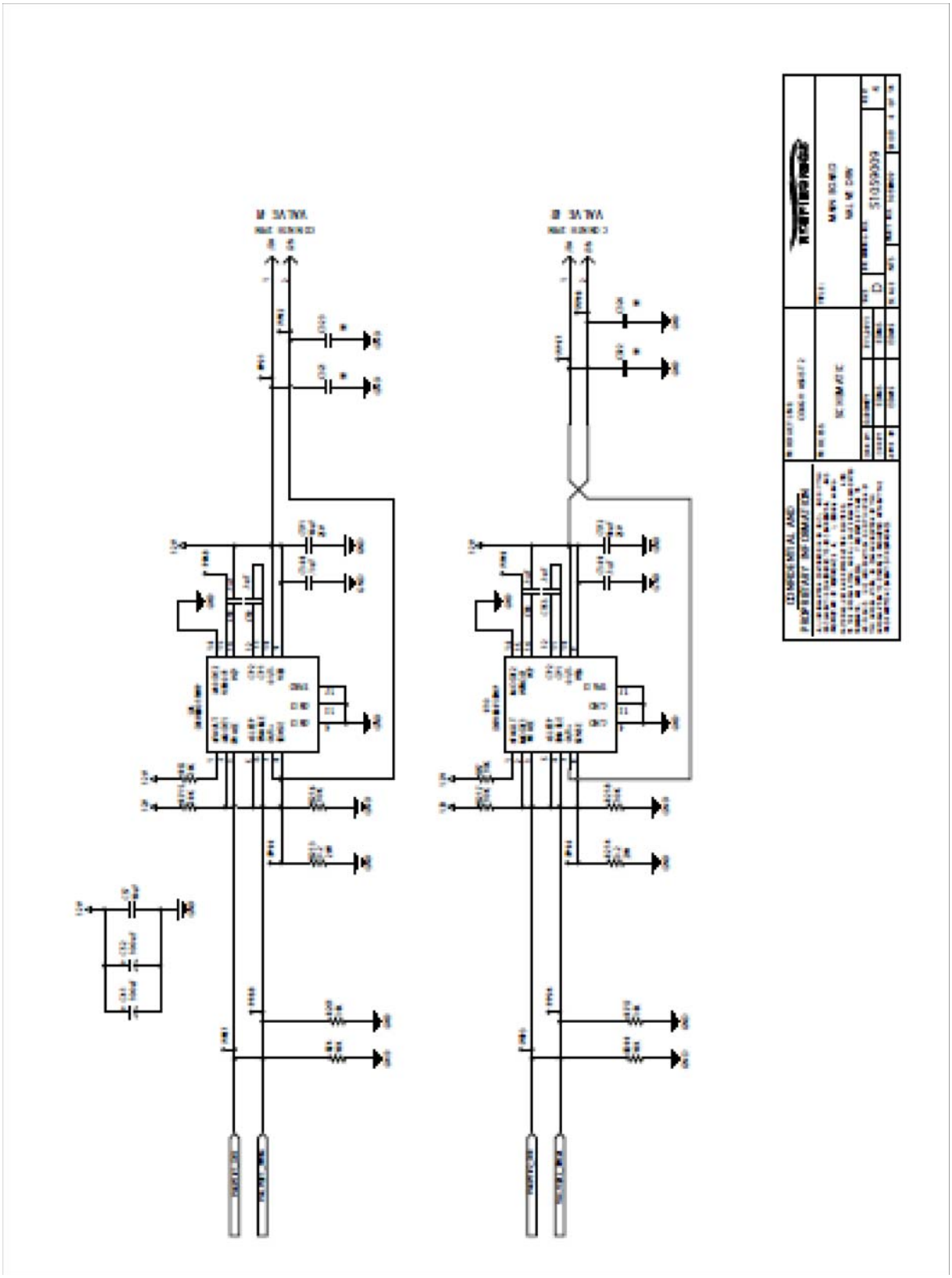


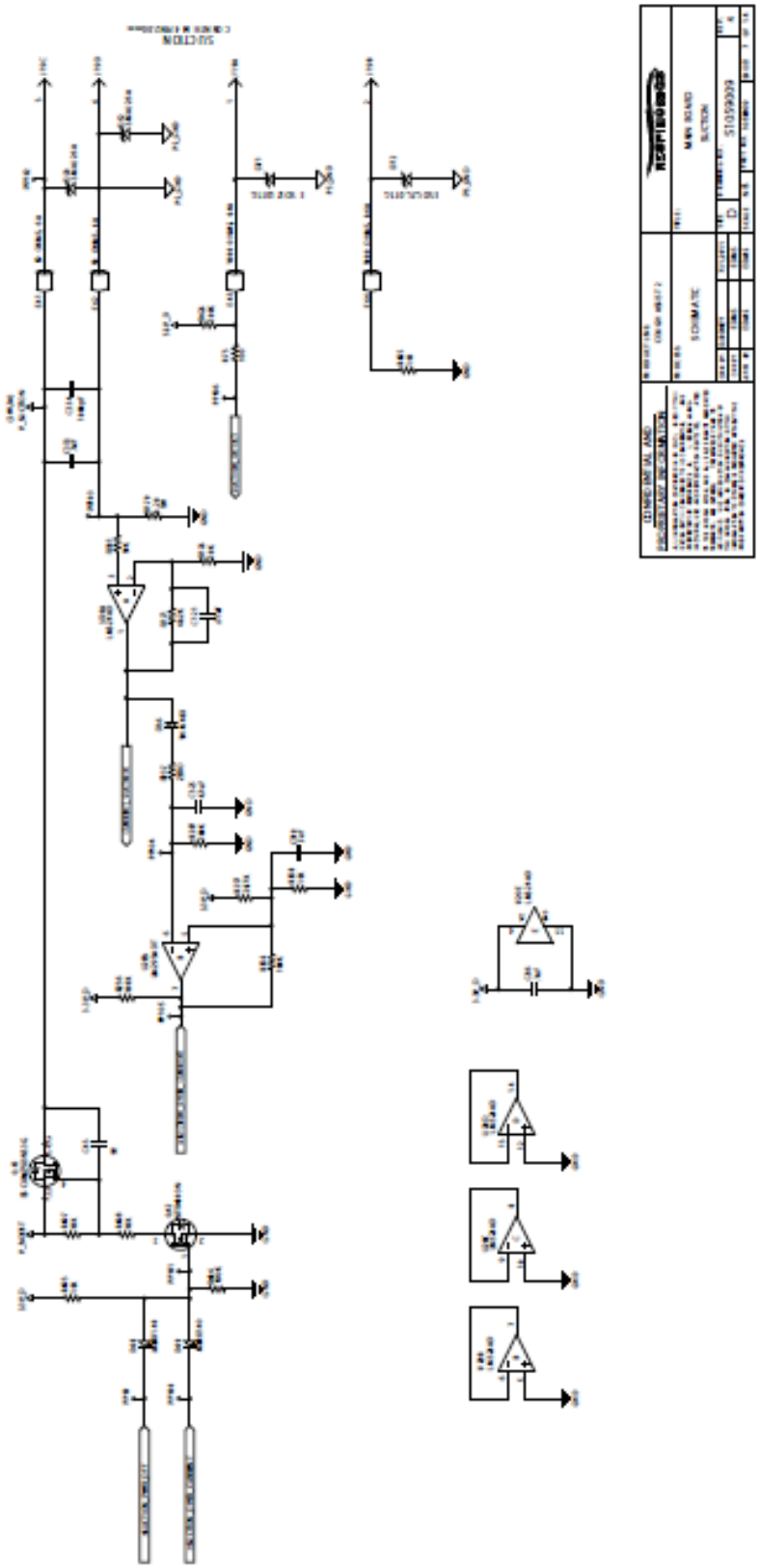


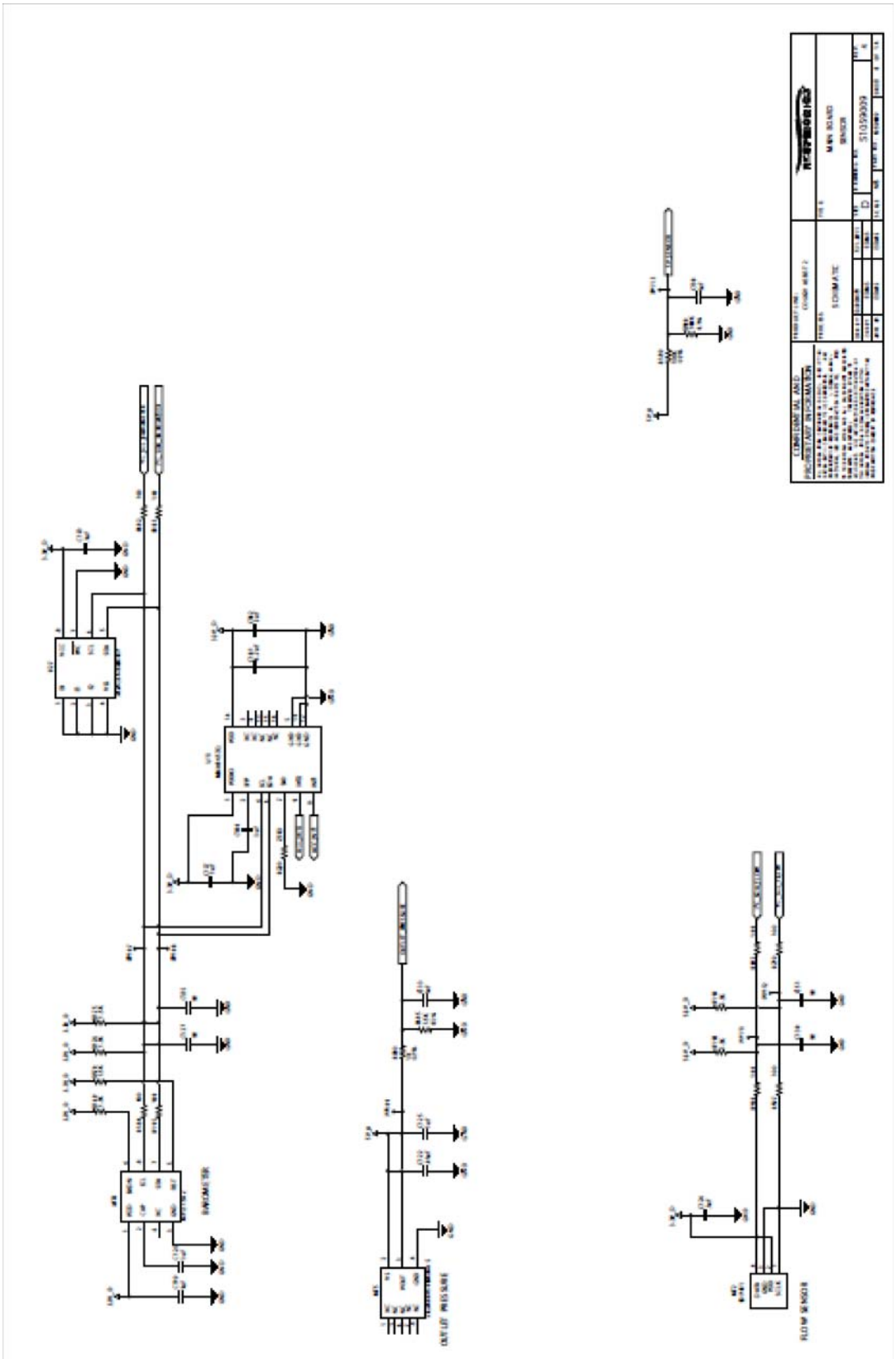


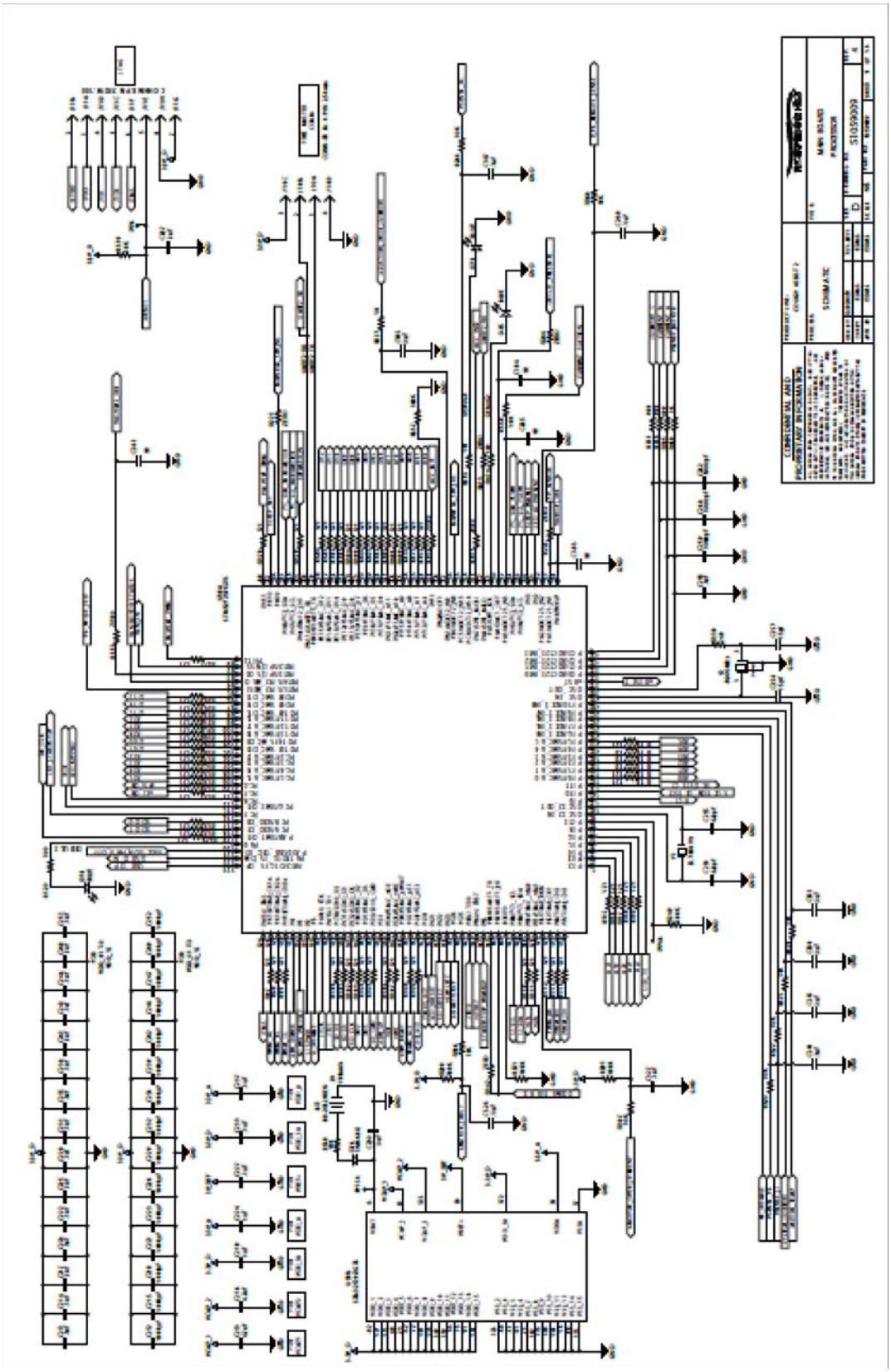


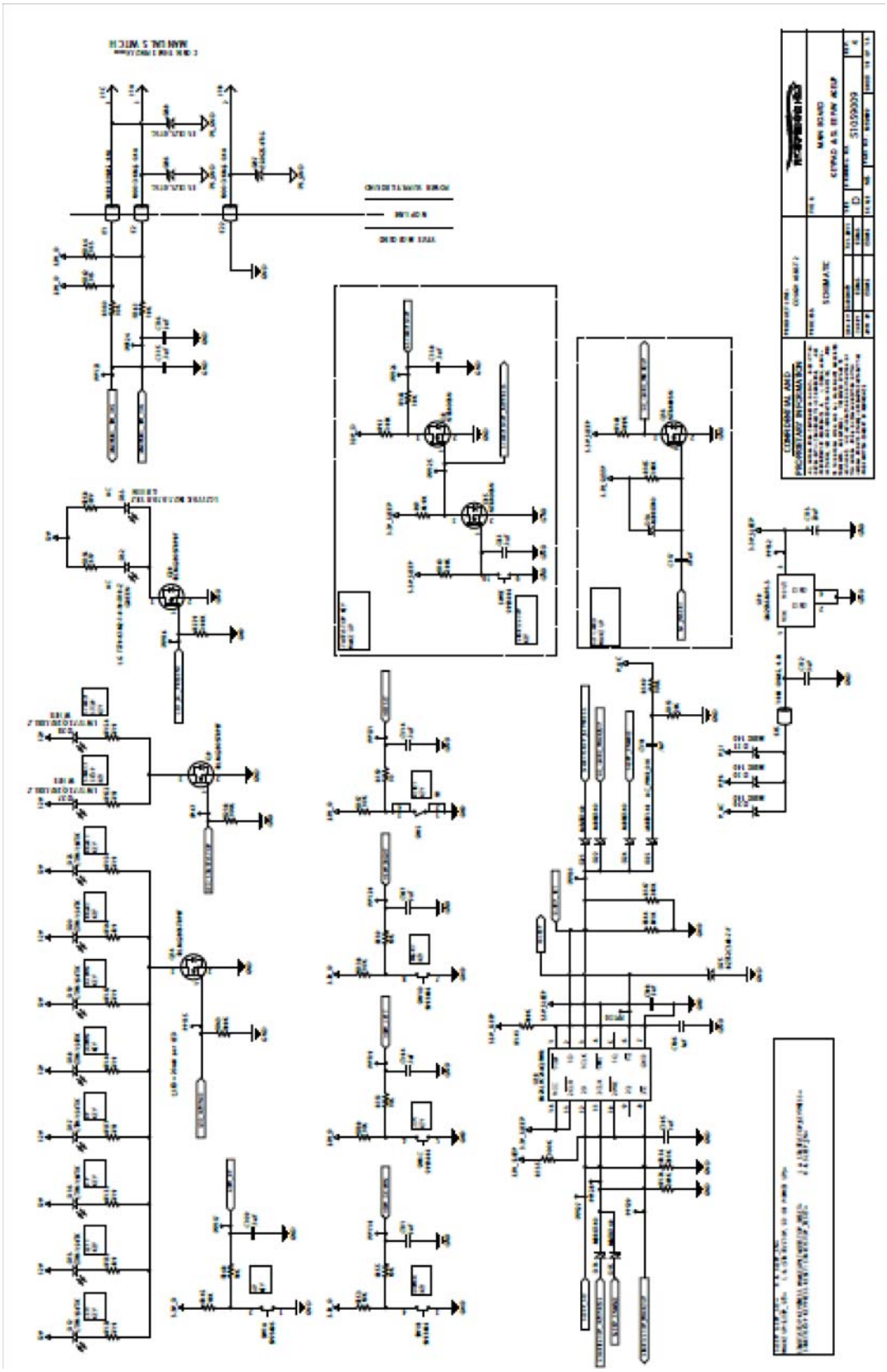


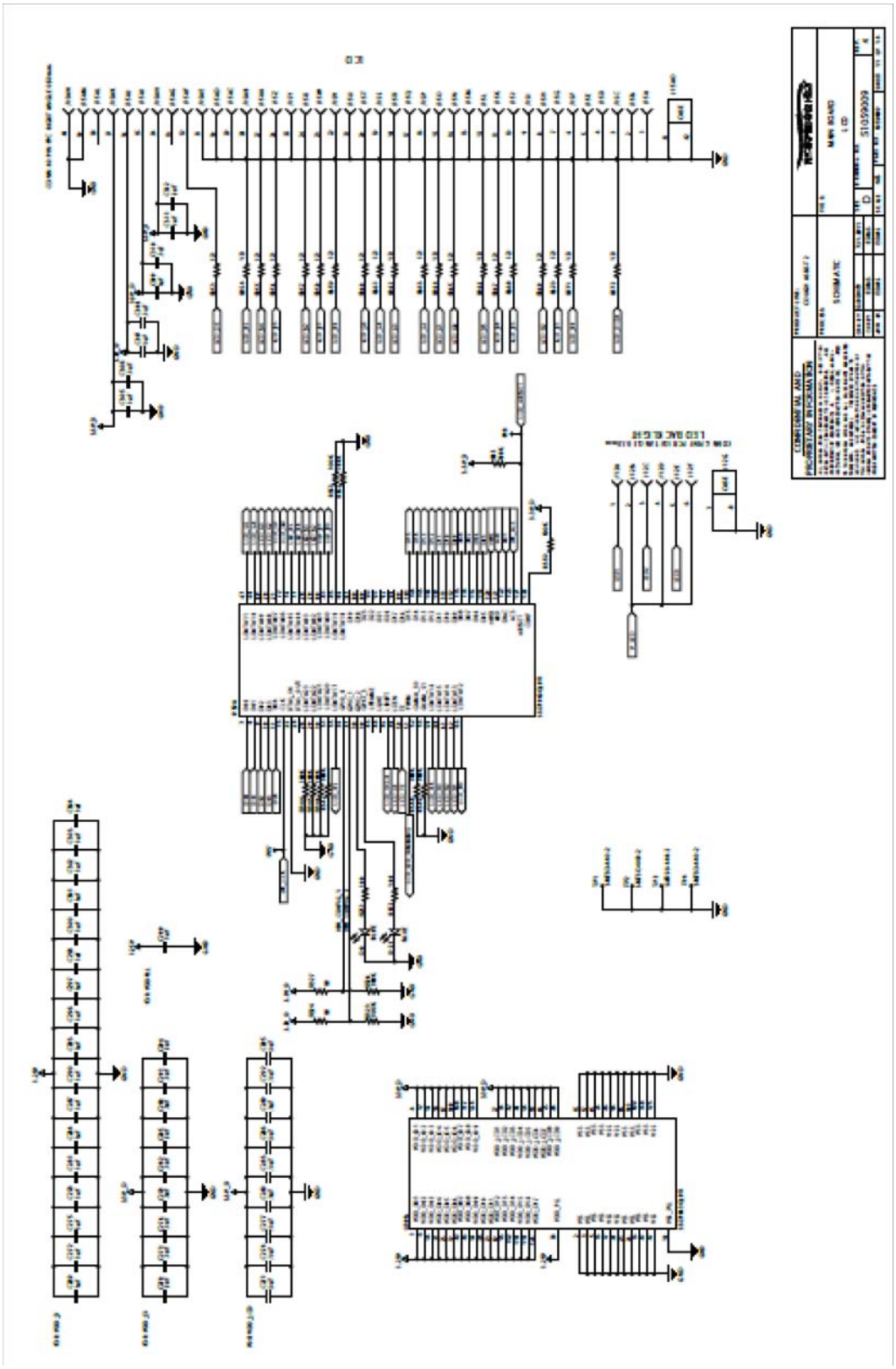


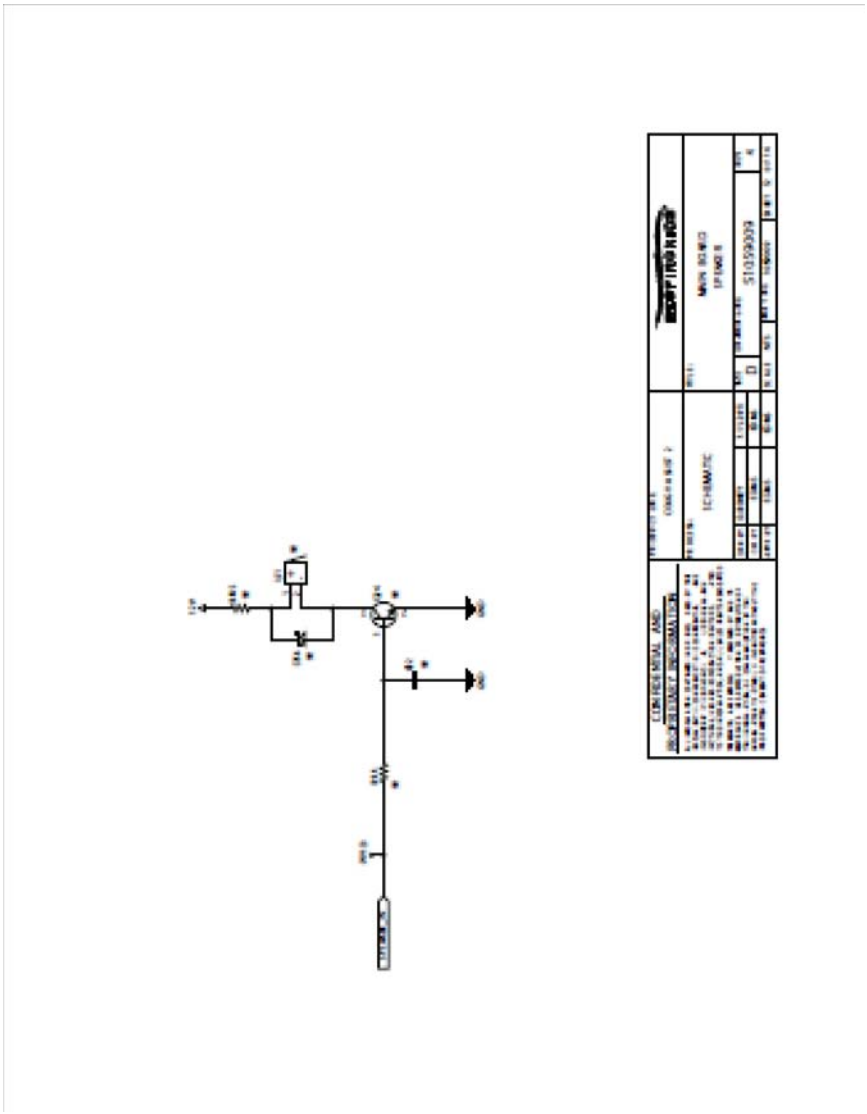


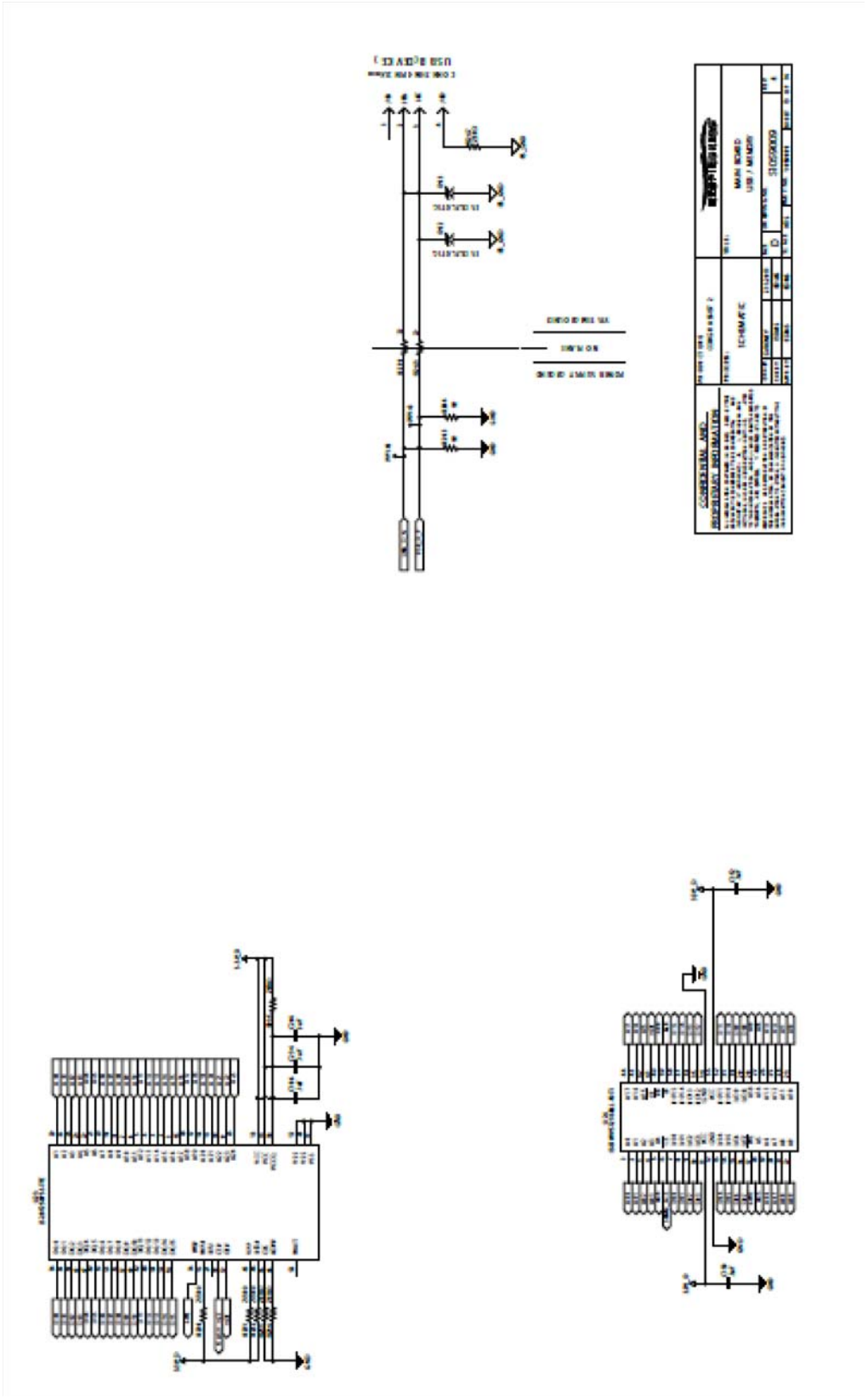


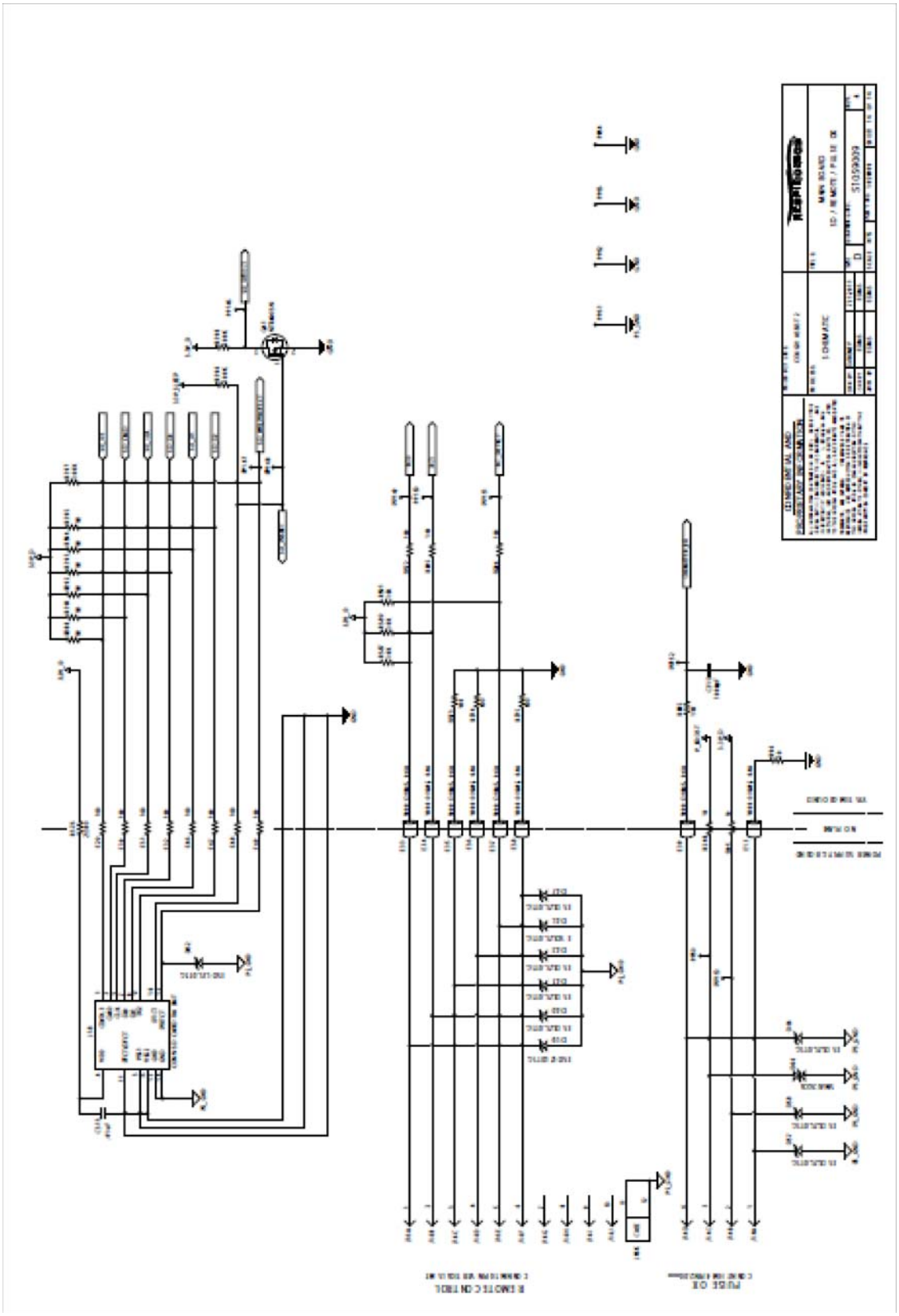












This page intentionally left blank.

Respironics Inc.
1001 Murry Ridge Lane
Murrysville, PA 15668 USA

Respironics Deutschland
Gewerbestrasse 17
82211 Herrsching, Germany
EC REP

CE
0123

1099559, VER. 02
BRM 03/27/2013