MODEL AM-801

PORTABLE PORTAL MONITOR OPERATIONS & MAINTENANCE MANUAL EFFECTIVE SERIAL #'s 221 - 268

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1.0 SPECIFICATIONS

INPUT SENSITIVITY	**< 1 µCi Cs^{137} "WALK THROUGH" MODE OF OPERATION**
DISPLAY	**VGA – 256 COLOR – TOUCH SENSITIVE SCREEN**
OPERATOR INPUT CONTROLS	**ALL OPERATOR INPUT IS THROUGH TOUCH SENSITIVE VGA SCREEN**
MODELS	**AM-801, AM-801-5-T, AM-801-5-B, and AM-801-6**
OPERATING MODES	**WALK THROUGH , TIMED COUNT, AREA MONITOR and DRIVE THROUGH W/ OPTIONAL VH-1 Kit**
TIMED COUNT	**1 – 30 SECONDS**
AUDIO	**DIGITALLY RECORDED VERBAL COMMANDS FOR ALL MAJOR OPERATING PARAMETERS. INSTRUMENT IS SUPPLIED WITH PRE RECORDED COMMANDS.**
HIGH VOLTAGE	**ADJUSTABLE - 300 - 1300 VDC - REGULATION ± 1%**
LOW VOLTAGE	**+5 VDC & -5 VDC REGULATION ± 0.5 %**
POWER	**120/250 VAC – 50/60 Hz WALL TRANSFORMER 15 VDC 1 AMP OR BATTERY OPERATION**
BATTERIES	**9 – "D" SIZE ALKALINE 10-12 HRS NOMINAL**
TEMPERATURE RANGE	**(-4°F) -20° C TO (140° F) 60°C**
MEMORY RETENTION	**10 YEARS**
HUMIDITY RANGE	**5 - 95% NON CONDENSING**
PORTAL DIMENSIONS (OUTSIDE)	**42" W X 87" Tall**
PORTAL DIMENSIONS (INSIDE)	**36" W X 84" Tall**
WEIGHT (Dependent on Model) AM-801	**APPROXIMATELY 80# W/CARRYING CASE 125#**
HOUSING	**16 Ga. ALUMINUM**
HOUSING FINISH	**GREY 2 PART POLYEUTHRANE ENAMEL**
SECURITY	**OPERATOR PANEL IS SECURED BY KEY LOCK**

MAIN COMPONENTS IN SHIPPING CONTAINER

TOP LAYER

BOTTOM LAYER

BOTTOM LAYER EMPTY

2.0 DESCRIPTION

The Model AM-801 is a ruggedized, portable monitor that can be utilized to screen large numbers of persons quickly for low levels of gamma and beta radiation. The AM-801 utilizes 4 large area plastic scintillators totaling 672 cubic inches to meet and exceed the measuring requirements of FEMA standard for portable portal monitors. The instrument is weather resistant, light weight, and easy to assembly without tools. The AM-801 comes with a durable carrying case, complete with wheels. The system automatically counts the person passing through the portal and is equipped with a real time clock, which displays the correct date, time and year. All of the data for the system is stored in a non-volatile memory, capable of maintaining the data for 10 years**.**

3.0 THEORY OF OPERATION

3.1 GENERAL

The AM-801 utilizes the latest field proven, microprocessor circuitry and large area plastic scintillators to accurately and rapidly measure beta (above 500 keV) radiation and gamma radiation from 60 keV to 2MeV. The instrument is very user friendly and can be utilized by persons with minimal training. Radiation detection is by 4 plastic scintillators with a total volume of 672 cubic inches. Each Scintillator has a 0.031 aluminum window that permits the AM-801 to measure higher energy beta and gamma radiation to 60 keV. The scintillators are contained in a durable aluminum housing that is very weather resistant and can be quickly disassembled without tools. The readout and data entry are accessed through a large area color monitor that utilizes a touch sensitive screen for all data input. FIGURE 1 shows the VGA monitor doing the BACKGROUND INITILIZATION prior to normal operation. The most pertinent measuring and diagnostic data is continuously displayed on the monitor. The operator can see some of the data that is to be displayed i.e Detector high voltage and BKG CPS. Parameters that are or can be displayed include the background count, date and time, number of persons who have passed through the portal, high voltage, battery voltage, counting rate of each detector, relative energy distribution of the incoming radiation and software version of each detector. An outline of the monitor and the relative strength of the radiation field striking each detector is displayed on the green vertical bars. The count rate is displayed by each detector. Touching the graphic of each detector displays a course spectrum of the radiation energy striking the detector and the signal with and without background subtract as shown in FIGURE 2. During the startup period, the instrument is automatically running systems checks, establishing background and verbally stating that the unit is not ready for operation. The upper center of the portal displays the OPERATIONAL CONDITION of the portal i.e. background initialization, too fast, alarm etc. and the block below displays the seconds remaining before normal operation can begin.

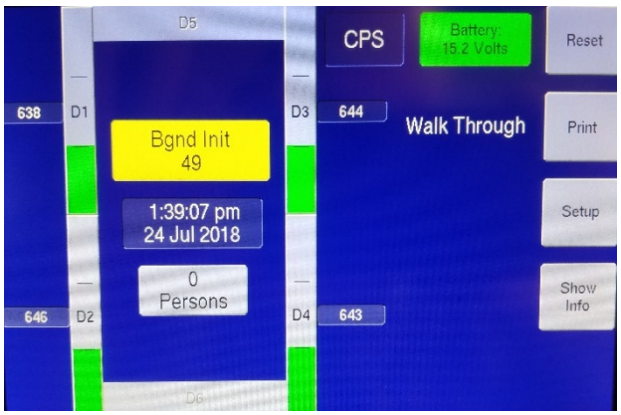


FIGURE 1

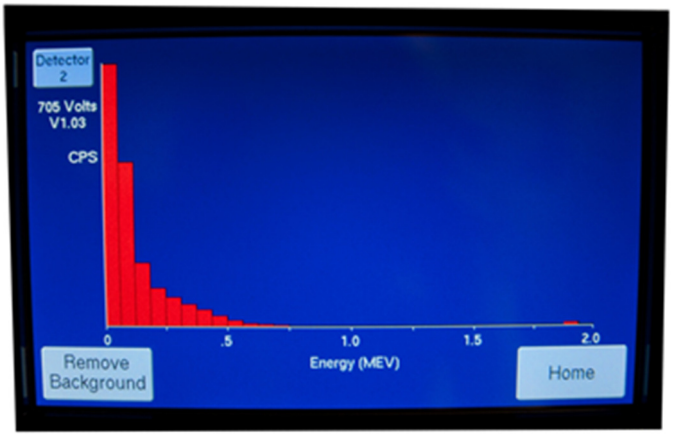


FIGURE 2

The Four blocks on the edge of the display on the right side provide access to printer, additional menus, system setup and additional information. Four different modes of operation are provided: “WALK THROUGH”, “DRIVE THROUGH, “AREA MONITOR” and TIMED COUNT of 0.1-30 seconds. The “WALK THROUGH” mode is utilized to screen large numbers of persons rapidly who are potentially contaminated with radioactive material. This mode of operation can easily detect radiation levels of <1µCi (based on Cs^{137}). The “DRIVE THROUGH” mode can be used to screen vehicles when used with the optional VH-1 kit. The “AREA MONITOR” mode can be used to monitor area backgrounds when not being used for other monitoring situations. The “TIMED COUNT” mode can be utilized for radiation contamination by stopping the person in the portal and counting for between 1-30 seconds (this is the most sensitive mode of operation.

Verbal commands precede each function and Alarms are provided for all modes of operation to acknowledge if the person passing through or standing in the portal is contaminated or if they have walked to fast or not stayed in the portal until the count was completed. Several diagnostics are continuously monitoring the instruments systems to determine if they are operating correctly. Diagnostics are provided for low detector counting rate, background counting rate to high, high voltage out of range, and low battery voltage. Alarms are provided for some of these diagnostics that must be reset on the touch screen by touching the AKNOWLEDGE ALARM button.

The operator can access the screen that displays selections for the following: Model of AM-801, Alarm Set Points, Operating Modes, and Operating Times touching the SETUP button will cause the Setup Screen to appear (FIGURE 4). FIGURE 3 shows the portal in alarm.

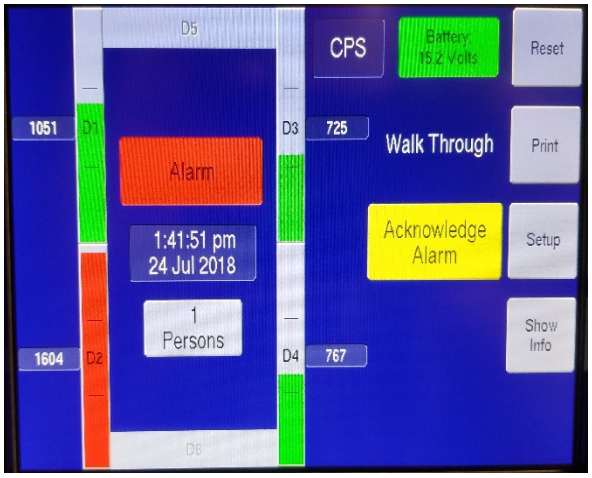


FIGURE 3

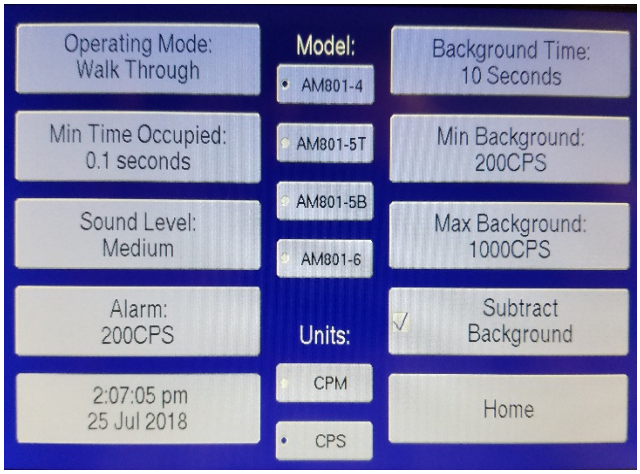


FIGURE 4

Touching the “Operating Mode” Button on the Setup Screen will sequence through the Four Operating Modes, Touching the “Min Time Occupied” Button will bring up a keypad for counting time selection and Touching the “Alarm (Above Bkg)” Button will bring up a keypad for Alarm selection**.**

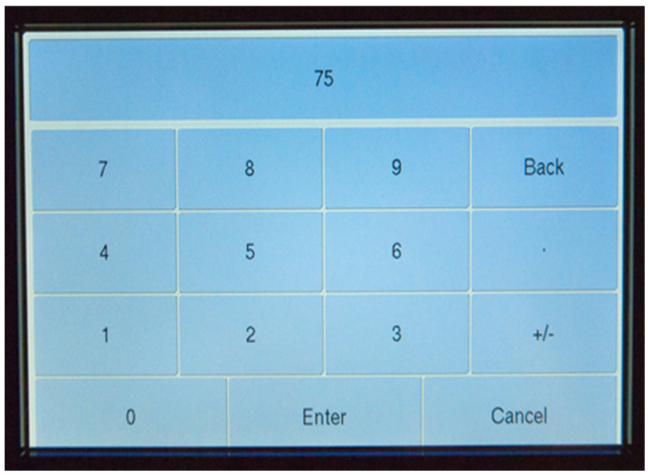


FIGURE 5

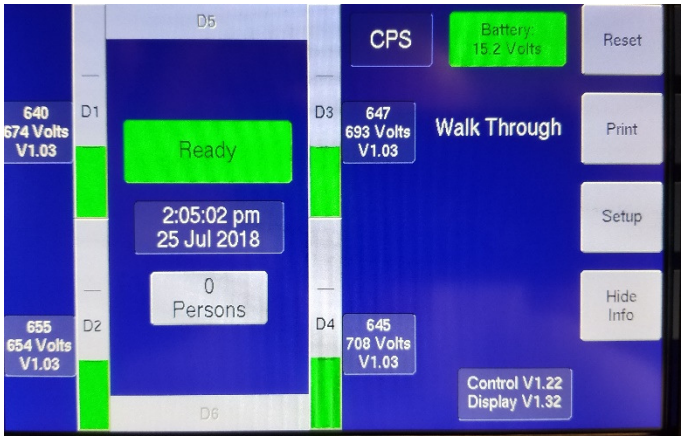


FIGURE 6

FIGURE 5 shows the key pad that will appear to numeric parameters. After entering the new information the operator touches the ENTER KEY and then the HOME button to return to normal operation. The AM-801 can operate from an internal battery or from the external wall transformer connected to 120 vac 60 Hz or 250vac 50 Hz. All of the internal power is provided by a highly regulated low temperature coefficient power supply. A separate high stability power supply with a low temperature coefficient provides 300 - 1500 vdc (±1%) and is located at each scintillation detector. The voltage from the internal batteries and/or external power supply is constantly displayed in the upper right part of the Display. The high voltage supply voltages, for each detector, is constantly monitored (alarms when out of range) and can be displayed by touching the INFO button in the lower right side of the VGA display. FIGURE 6 shows the VGA display with the information available for each detector that can be displayed on the HOME SCREEN. All of the signals from each detector are connected to the main control pc board located inside the portal housing by 8 conductor Ethernet cables. One 16 conductor cable connects the internal electronic of the portal monitor to the main control housing.

4.0 ASSEMBLY AND PACKING INSTRUCTIONS

4.1 GENERAL

The model AM-801 is provided in a heavy duty plastic case that can be utilized to ship and store the instrument. The case contains a custom heavy duty dense foam insert with storage areas that protect each of the instruments major components during shipping and handling. The shipping case is equipped with large wheels and a handle to facilitate the transportation and handling of the AM-801. The AM-801 can be quickly assembled and disassembled without any tools i.e. pliers, screwdrivers or wrenches.

AM-801 MAIN COMPONENTS

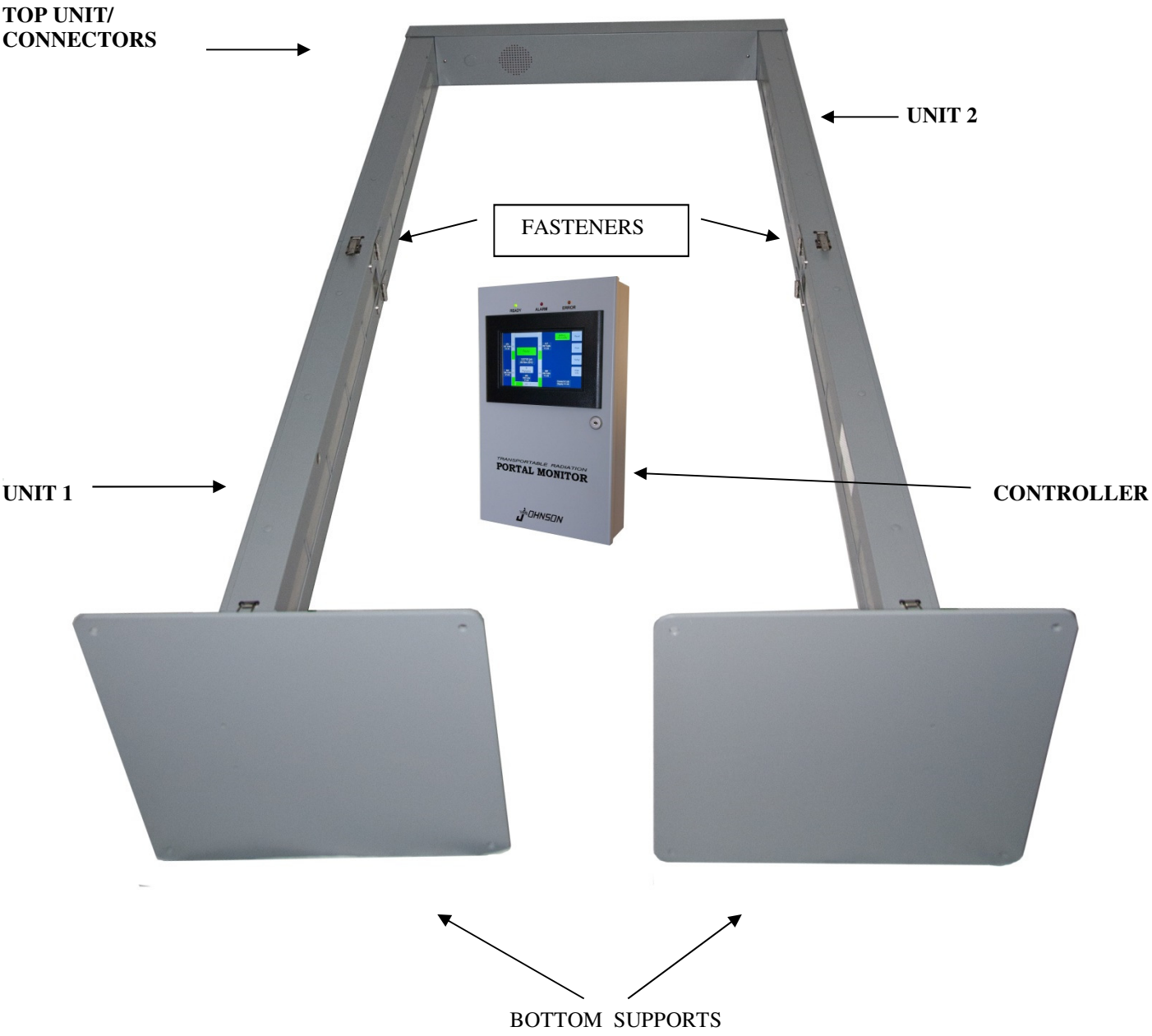


FIGURE A

4.2 ASSEMBLY

4.2.1 Remove the side upright U1 in FIGURE A and unfold until the center ends meet as shown in Figure A. Engage the lever type fasteners (3 total) on each side and rear of the upright located near the center of the upright as shown in FIGURE A.

4.2.2 Remove the side upright U2 (side with cable sticking out) as shown on Figure A and unfold until the center ends meet as shown in FIGURE A. Engage the lever type fasteners (3 total) on each side and rear of the upright located near the center of the upright as shown in FIGURE A.

4.2.3 Remove the Top Unit from the case and place at the top of both uprights U1 & U2 as shown in Figure A - connect to U1 and U2 as described in Steps A-D below

2 CABLE SIDE 1 CABLE SIDE

FIGURE B

A. TWO (2) CABLES WILL BE PRESENT AT THE END OF **U1 UPRIGHT**. **U2 UPRIGHT** WILL HAVE ONE (1) CABLE. THE END OF THE **"TOP UNIT"** WITH 2 CABLES IS THE SIDE THAT MUST BE CONNECTED TO THE **U1 UPRIGHT** THAT HOLDS THE CONTROLLER UNIT.

B. CONNECT THE ETHERNET CABLE TOGETHER ON EACH UPRIGHT TO THE ETHERNET CABLES IN THE **"TOP UNIT"**.

C. CONNECT THE REMAINING 4 PIN CONNECTOR FROM THE **U1 UPRIGHT** AND **"TOP UNIT".**

D. **CAREFULLY shove the wiring into the Top Unit and slide the Top Unit on to the 2 uprights (U1 & U2). Engage the lever type fasteners on both sides to securely connect the top and sides together.**

4.2.4 Attach the bottom supports to U1 Upright and U2 Upright. Engage the lever type fasteners.

4.2.5 The main frame of the portal monitor is now complete. Check all fasteners to be sure they are securely connected.

4.2.6 Standing at the top of the portal grasp and raise until the portal is upright.

4.2.7 Remove the "CONTROLLER UNIT" from the shipping case and place on the hangers of the U1 Upright.

4.2.8 Connect the 16 pin cable from the U1 Upright to the connector in the bottom of the CONTROLLER UNIT.

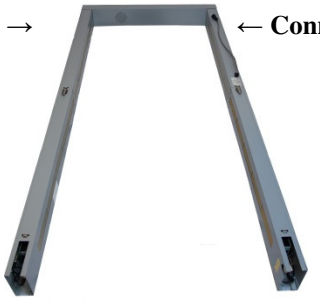
This completes the assembly of the portal monitor – FIGURE C demonstrates the above Assembly Instructions.

AM-801 SET UP PROCEDURE

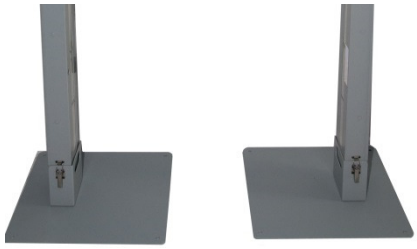
STEP 1 – Remove Lid and Feet From Carry Case

STEP 2 - "CAREFULLY" - Unfold and **Lock** both **"SIDE"** Pieces –Lay on Flat Surface and Connect to **"TOP"** Piece (2 Connector **"SIDE"** To 2 Connector **"TOP"** and 1 Connector **"SIDE"** to 1 Connector **"TOP"**) as Shown in Step 2

Connector → **← Connectors**



STEP 3 - Completed **"TOP"** and **"SIDES"**



STEP 4 - Attach **"BOTTOM FEET"** to side pieces then attach thin metal strap to **"BOTTOM FEET"** to keep them from separating

STEP 5 – "CAREFULLY" Raise **UNIT** to a **Standing** Position

STEP 6 – Attach **ELECTRONIC CONTROLLER to** Side of **UNIT –** then Attach **AC Power UNIT** is now Ready to **Turn On**

FIGURE C

"TO UNASSEMBLE REVERSE THE SETUP INSTRUCTIONS"

5.0 OPERATING INSTRUCTIONS

5.1 GENERAL

The model AM-801 portal monitor is 100% digital and microprocessor controlled. All data entry and readout is through the VGA touch sensitive monitor in the CONTROL BOX HOUSING. The AM-801 can be operated from standard 120 vac 60 Hz/250 vac 50 Hz house current via an AC/DC Power Converter or from 9 standard "D" alkaline batteries. The instrument has a nominal operating life of 10-12 hours for each set of alkaline batteries. All programming and important data i.e. program settings and person count is held in memory WITH AN INTERNAL BATTERY BACKUP WITH A NOMINAL 10 YEAR LIFE. Johnson suggests that the AM-801 always be tested for correct operation if the instrument has been in storage and not used for more than 6 months.

The MAIN POWER SWITCH is located on the outside underneath of the CONTROL BOX HOUSING. The fuse used in the AM-801 is 1 amp SLO-BLO and is located inside the CONTROL BOX HOUSING. Access to the inside of the CONTROL BOX HOUSING is controlled by a key lock to prevent unauthorized access.

The bottom of the CONTROL BOX HOUSING has the ON/OFF switch, the POWER RECEPTABLE for the AC/DC Power Converter input and a 9 pin SERIAL CONNECTOR for an external printer. JOHNSON RECOMMENDS THE AM-801 BE OPERATED FROM 120 VAC 60 HZ OR 250 VAC 50 HZ POWER SOURCE WHERE POSSIBLE. ALTHOUGH BATTERY OPERATION IS ACCEPTABLE BATTERY LIFE IS LIMITED TO APPROXIMATELY 10-12 HOURS. POWER CONSUMPTION OF THE AM-801-5-B IS ONLY APPROXIMATELY 12 WATTS SO JOHNSON RECOMMENDS THE OWNERS OF THE AM-801-5-B PROVIDE A 100 FT 16 GA EXTENSION CORD FOR FIELD OPERATION AND IMPROVE THE OPPORTUNIES FOR POWER LINE OPERATION.

5.2 AUDIBLE ALARMS

A large diameter waterproof Sonalert alarm are located in the CONTROL BOX HOUSING of the Portal Monitor. The Sonalert is utilized to provide an audible alarm when the preset alarm set points have been exceeded. Once the audible alarms have been engaged they will continue to sound until they have been reset by the operator.

5.3 OPERATING INSTRUCTIONS

NOTE: **THE FOLLOWING STEPS SHOULD BE COMPLETED BEFORE OPERATION OF THE AM-801**

5.3.1 Follow the assembly instructions in SECTION 4 of this manual.

5.3.2 Provide 120 vac 60 Hz OR 250 vac 50 Hz power for operation or install a set of 9 "D" size alkaline batteries.

5.3.3 Turn on power to the AM-801

5.3.4 AM-801 will acknowledge it is not ready and is in process of checking the internal circuitry and establishing a background count.

NOTE: **OPERATOR SHOULD NOW CHECK THE DISPLAY TO MAKE SURE THE CORRECT NUMBER OF DETECTORS ARE SHOWING FOR THE MODEL OF AM-801 IN USE – SECTION 5.3.9 WILL EXPLAIN THIS IN GREATER DETAIL**

5.3.5 Once the checking and background count have been established CHECK THE VGA SCREEN FOR ALARMS - IF NO ALARMS ARE PRESENT the instrument will be ready for choosing the final settings for the type operation that will be utilized. "WALK THROUGH", "TIMED COUNT", "AREA MONITOR" or "DRIVE THROUGH" (needs optional VH-1 Kit)

5.3.6 The operator can now proceed to set the real time clock, select the Mode of Operation and select the final settings.

5.3.7 Touch the SETUP button on the right side of the monitor and the SETUP SCREEN WILL APPEAR.

5.3.8 FIGURE 4 is the SETUP SCREEN. TO ADJUST FOR OPERATION ONLY, THE FOLLOWING MAY NEED TO BE ADJUSTED.

5.3.9 AM-801 MODEL ADJUSTMENT: There are four (4) Models available and they are listed below –
AM-801-4 (standard model) – 4 scintillation detectors – 2 on each side (use this configuration with VH-1 Kit)
AM-801-5-T (optional) – 5 scintillation detectors – 2 on each side and 1 in the Head section
AM-801-5-B (optional) – 5 scintillation detectors – 2 on each side and 1 in the Foot section
AM-801-6 (optional) – 6 scintillation detectors – 2 on each side and 1 in both the Head and Foot sections
SELECTION OF THE CORRECT MODEL IS MADE IN THE SETUP SCREEN BY SELECTING THE BUTTON WITH THE CORRECT MODEL NUMBER ON IT – IF THE WRONG MODEL IS SELECTED AT STARTUP THE INSTRUMENT WILL ALARM.

NOTE: **WHEN USING HEAD AND FOOT DETECTORS THE "TIMED COUNT" MODE OF OPERATION WITH A MINIMUM COUNT TIME OF 5 SECONDS MUST BE USED TO MEET FEMA REQUIREMENTS.**

5.3.10 MODE ADJUSTMENT: 4 choices are available "WALK THROUGH", "DRIVE THROUGH", "TIMED COUNT" and "AREA MONITOR". The WALK THROUGH mode will be used most of the time to process large numbers of people quickly. Touch "Operating Mode" button until "WALK THROUGH" Appears.

5.3.11 MINIMUM TIME OCCUPIED: This is the time the person passing through the portal must occupy the portal to achieve a satisfactory count. This time should generally be set to 0.1 to 0.2 seconds for the WALK THROUGH MODE OF OPERATION by touching the screen and the keypad will appear like FIGURE 5. Enter the correct numbers on the keypad and touch "Enter" to return to SETUP screen

5.3.12 SOUND LEVEL: Three choices are available SOFT, MEDIUM AND LOUD. Select the correct sound level.

5.3.13 ALARM (above background): The background is constantly being monitored and subtracted from the readings the monitor receives when a person walks through the portal. This alarm is the number of counts the monitor measures above the current background. A 1µCi source of Cs 137 will easily trip the alarm at a setting of 75 cps.

"CAUTION" **SETTINGS OF LESS THAN 30 CPS CAN RESULT IN FALSE ALARMS DUE TO FAST COUNTING RATES AND THE STATISTICAL NATURE OF COUNTING.**

5.3.14 Touch the "Home" button to return the system to NORMAL OPERATION.

5.3.15 SYSTEM TEST: System should now be ready for NORMAL WALK THROUGH OPERATION. VGA monitor should indicate all detectors GREEN and top of monitor should indicate READY.

5.3.16 STANDARDIZATION WITH Cs 137 TEST SOURCE:

A. PLACE 1µCi test source in the approximate middle of the the portal (horizontally and vertically).
B. Cover the optical sensor (inside middle of portal on side with the control housing) for approximately 0.5 seconds.
C. System should alarm immediately and detector bar graph (VGA MONITOR) should turn red, AUDIBLE alarm should sound, ALARM LIGHT should be ON and verbal command STOP SEE OPERATOR.
D. This test indicates system is operating properly and sensitivity to radiation is correct.

5.4 INSTRUMENT OPERATION – "WALK THROUGH" MODE

5.4.1 Touch the SETUP button on the display screen to determine if settings are correct. Complete the following steps to assure the system is in the correct operating MODE.

5.4.2 The "Operating Mode" button in the upper left side of the SETUP screen will display the operating mode "WALK THROUGH", "DRIVE THROUGH", "AREA MONITOR" or "TIMED COUNT". If the operating mode displayed on the button is not "Walk Through" touch the button until "Walk Through" appears.

5.4.3 The button below the "Operating Mode" is Minimum Time the person being measured is in the portal. To measure radiation levels of less than 1 µCi set the time at 0.2 seconds. To set the time touch the "Min Time Occupied" button and a numerical key pad will appear enter 0.2 seconds and touch ENTER the screen then should return to the SETUP SCREEN.

5.4.4 The button below the "Sound Level" button is the "Alarm (Above Bkg)". To measure radiation levels of less than 1 µCi set to 75 cps (this number will need to be adjusted depending on the background the instrument is setup in). To set the Alarm touch the "Alarm (Above Bkg)" button and a numerical key pad will appear enter desired Alarm Set Point and touch ENTER screen should then return to the SETUP SCREEN.

5.4.5 The other two buttons on the SETUP SCREEN are the "Min Background" and "Max Background" buttons. These buttons are set at the factory. The MAXIMUM BACKGROUND = 2000 cps AND THE MINIMUM BACKGROUND = 100 cps. These are operational alarms and tell the operator the background is abnormally high or the background is abnormally low and that the detection system should be checked for proper operation. If the background count exceeds 2000 cps (approximately 20 µR/hr) the portal monitor should be moved to an area with less background to assure maximum sensitivity.

5.4.6 Select the "Home" button on the lower right side of the screen to return to the Home Screen. Figure 8 shows the Home Screen. Figure 6 shows the Home Screen with data i.e. detector high voltage. To remove the display of this data touch the "Show Info" button in the lower right side of the screen to make the high voltage disappear from the display.

5.4.7 To return the person counter to 0 the instrument must be powered down then back up (the counter will return to zero after every power down).

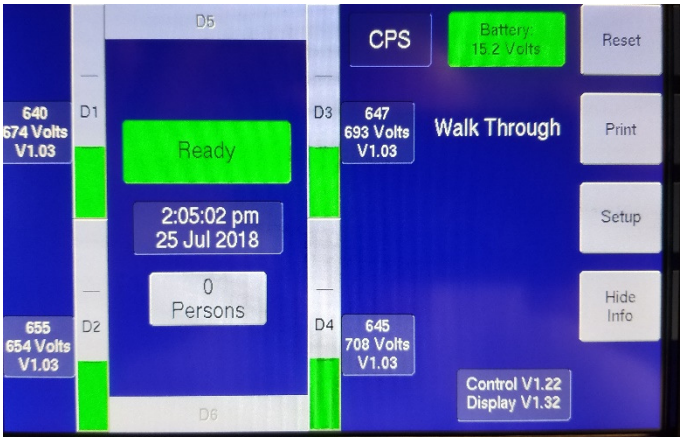


FIGURE 8

5.4.8 The model AM-801 is now ready for operation. Persons **MUST NOT** enter the portal until the home screen indicates system is "READY". After a person passes through portal the instrument will indicate visually and by audible instructions if the person is not contaminated and when the next person can pass through the portal.

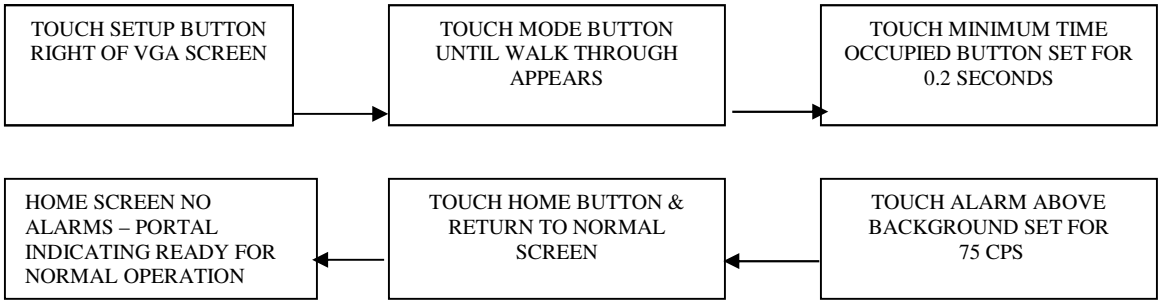
5.4.9 A radiation reading that is higher than the alarm set point will cause the detector/detectors receiving the high radiation to turn red and the Alarm will sound and Alarm light will light. An audible command will instruct the person in the portal to stop and see the operator.

5.4.10 The operator must acknowledge the alarm by touching the "Reset" button at the top right of the display screen before the monitor will return to normal operation.

5.4.11 Walking too fast through the portal will prompt a verbal and audible **TOO FAST** and light the **ERROR** light.

5.4.12 The instrument will take a few seconds to reset and then will indicate visually and by audible command when it is ready for normal operation. The following flow chart shows the steps that are necessary for this type operation.

WALK THROUGH MODE OF OPERATION



5.5 INSTRUMENT OPERATION – "TIMED COUNT" MODE

5.5.1 Touch the SETUP button on the display screen to determine if settings are correct. Complete the following steps to assure the system is in the correct operating MODE with the correct settings.

5.5.2 The "Operating Mode" button in the upper left side of the SETUP screen will display the operating mode "WALK THROUGH", "DRIVE THROUGH", "AREA MONITOR" or "TIMED COUNT". If the operating mode displayed on the button is not "Timed Count" touch the button until "Timed Count" appears.

5.5.3 The button below the "Operating Mode" is "Min Time Occupied" this button is used to set the time the person being measured is in the portal. To measure radiation levels of less than 1 µCi set the time at 3 seconds. To set the time touch the "Min Time Occupied" button and a numerical key pad will appear. Enter 3 seconds and touch the "Enter" button the Screen should return to the SETUP SCREEN - FIGURE 9.

5.5.4 The button below the "Sound Level" button is the "Alarm (Above Bkg)". To measure radiation levels of less than 1 µCi set to 75 cps (this number will need to be adjusted depending on the background the instrument is setup in). To set the Alarm touch the "Alarm (Above Bkg)" button and a numerical key pad will appear enter desired Alarm Set Point and touch ENTER screen should then return to the SETUP SCREEN.

5.5.5 The other two buttons on the SETUP SCREEN are the "Min Background" and "Max Background" buttons. These buttons are set at the factory. The MAXIMUM BACKGROUND = 2000 cps AND THE MINIMUM BACKGROUND = 100 cps. These are operational alarms and tell the operator the background is abnormally high or the background is abnormally low and that the detection system should be checked for proper operation. If the background count exceeds 2000 cps (approximately 20 µR/hr) the portal monitor should be moved to an area with less background to assure maximum sensitivity.

5.5.6 Select the "Home" button on the lower right side of the screen to return to the Home Screen. Figure 8 shows the Home Screen. Figure 6 shows the Home Screen with data i.e. detector high voltage. To remove the display of this data touch the "Show Info" button in the lower right side of the screen to make the high voltage disappear from the display.

5.5.7 To return the person counter to 0 the instrument must be powered down then back up (the counter will return to zero after every power down).

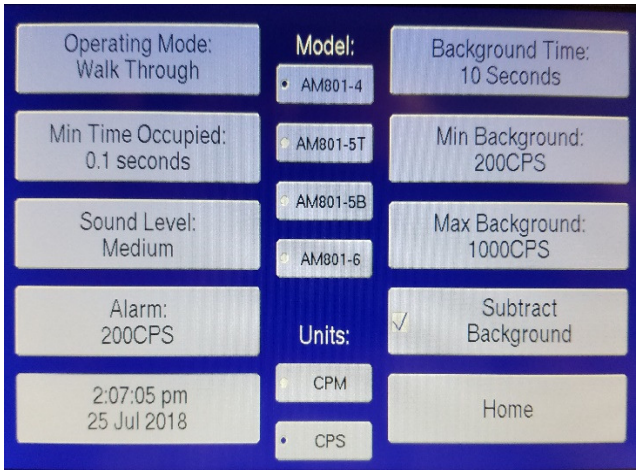


FIGURE 9

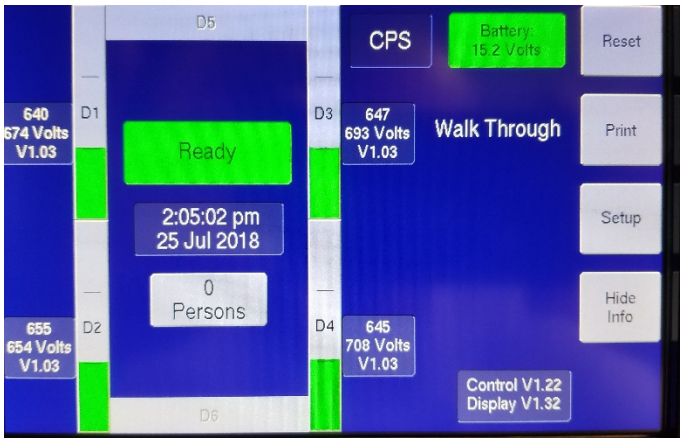


FIGURE 10

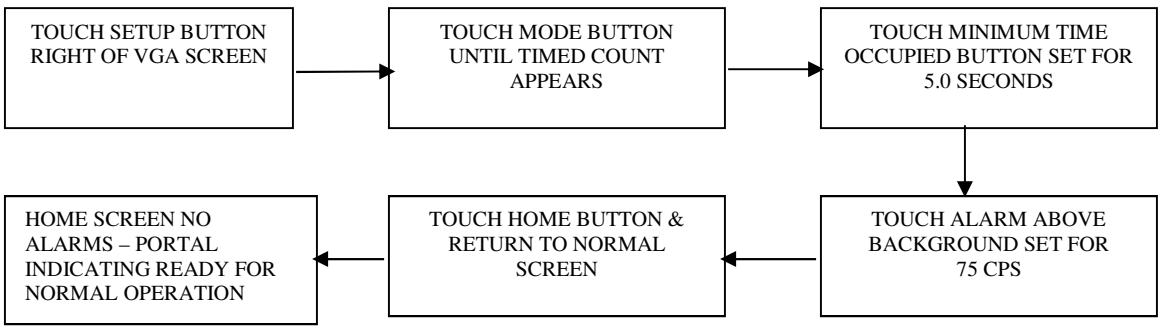
5.5.8 The model AM-801 is now ready for operation. Persons **MUST NOT** enter the portal until the home screen indicates system is "READY". After person enters the portal they must remain stationary until the timed count is complete or the monitor will indicate INCOMPLETE COUNT and light the error light.

5.5.9 A radiation reading that is higher than the alarm set point will cause the detector/detectors receiving the high radiation to turn red and the Alarm will sound and Alarm light will light. An audible command will instruct the person in the portal to stop and see the operator.

5.5.10 The operator must acknowledge the alarm by touching the "Reset" button at the top right of the display screen before the monitor will return to normal operation.

5.5.11 The instrument will take a few seconds to reset and then will indicate visually and by audible command when it is ready for normal operation. The following flow chart shows the steps that are necessary for this type operation.

TIMED COUNT MODE OF OPERATION



5.6 "DRIVE THROUGH" MODE (OPTIONAL VH-1 KIT - MUST USE AM-801-4 MODEL SELECTION)

5.6.1 Operating instructions for the "Drive Through" mode of operation are provided in the VH-1 Kit Operations Manual.

5.7 INSTRUMENT OPERATION – "AREA MONITOR" MODE

5.7.1 Touch the SETUP button on the VGA screen to determine if settings are correct. Complete the following steps to assure the system is in the correct operating MODE.

5.7.2 The "Operating Mode" button in the upper left side of the SETUP screen will display the operating mode "WALK THROUGH", "DRIVE THROUGH", "AREA MONITOR" or "TIMED COUNT". If the operating mode displayed on the button is not "Area Monitor" touch the button until "Area Monitor" appears.

5.7.3 The button below the "Operating Mode" is Minimum Time the person being measured is in the portal.

NOTE: **THE ELECTRIC EYE IS DIABLED IN THIS MODE OF OPERATION WHICH ALSO DISABLES THE "MIN TIME OCCUPIED" AND "SUBTRACT BACKGROUND" FUNCTIONS.**

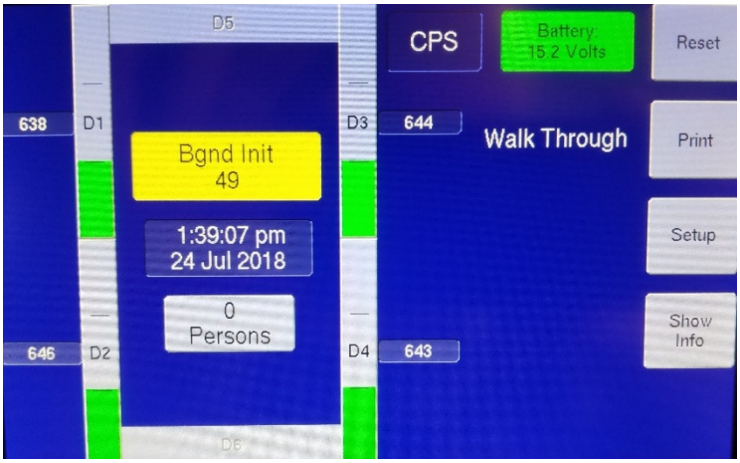
5.7.4 The button below the "Sound Level" button is the "Alarm (Above Bkg)". To set the Alarm touch the "Alarm (Above Bkg)" button and a numerical key pad will appear enter desired Alarm Set Point and touch ENTER screen should then return to the SETUP SCREEN.

NOTE: **BECAUSE BACKGROUND SUBTRACT IS DISABLED IN THIS MODE IT IS RECOMMENDED ALARM SET POINTS BE AT LEAST 150 CPS ABOVE BACKGROUND TO LIMIT FALSE ALARMS.**

5.7.5 The other two buttons on the SETUP SCREEN are the "Min Background" and "Max Background" buttons. These buttons are set at the factory. The MAXIMUM BACKGROUND = 2000 cps AND THE MINIMUM BACKGROUND = 100 cps. These are operational alarms and tell the operator the background is abnormally high or the background is abnormally low and that the detection system should be checked for proper operation. If the background count exceeds 2000 cps (approximately 20 µR/hr) the portal monitor should be moved to an area with less background to assure maximum sensitivity.

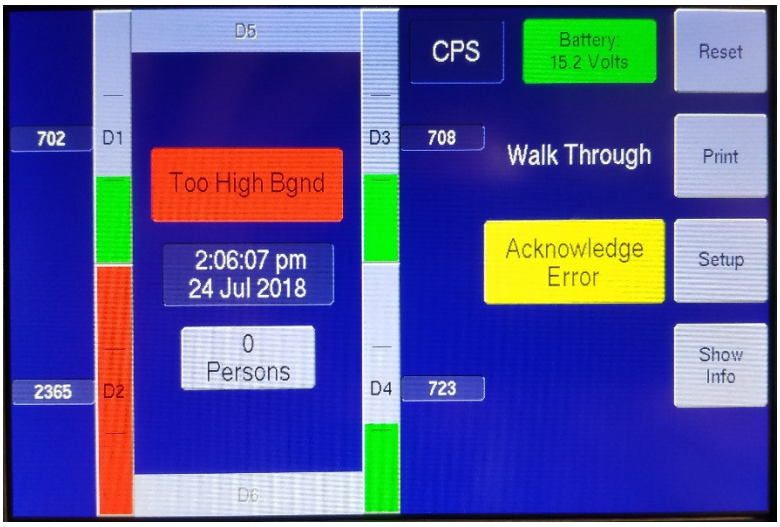
5.7.6 Select the "Home" button on the lower right side of the screen to return to the Home Screen. Figure 8 shows the Home Screen. Figure 6 shows the Home Screen with data i.e. detector high voltage. To remove the display of this data touch the "Show Info" button in the lower right side of the screen to make the high voltage disappear from the display.

6.0 DETAILED DESCRIPTION OF OPERATING SCREENS FOR THE AM-801



BACKGROUND INITALIZATION

This screen is present when the system is first turned on and is present while the system is performing a check of its internal diagnostics prior to operation. During this screen the system is establishing background, checking high voltage, battery voltage and several internal checks for the internal circuitry. This screen is present for the time that has been set to count background.

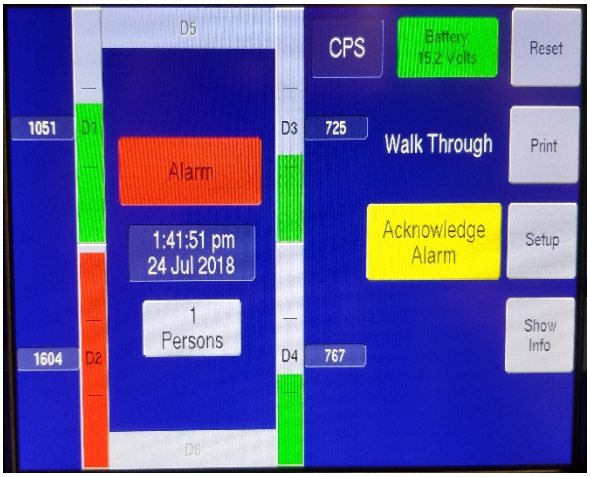


HOME SCREEN - TOO RAPID (BACKGROUND) CHANGE

This screen appears if the background suddenly has a rapid change and exceeds the alarm that has been preset for the detectors when they are in normal operating mode. Sudden changes in background (less than 1 minute) cannot be tolerated during normal operation. This type alarm indicates that a test source or other type radioactive material may have been placed close to the detectors and must be removed before normal operation can begin. Long term changes of up to 20 µR/hr (approximately 2000 CPS) can be compensated for during normal operation.

KEY PAD DATA ENTRY

This screen appears when the user accesses the SETUP screen and touches a button on the screen that requires the user to enter numerical data. The user simply enters the desired numerical data and then touches ENTER and the screen returns to the SETUP screen.



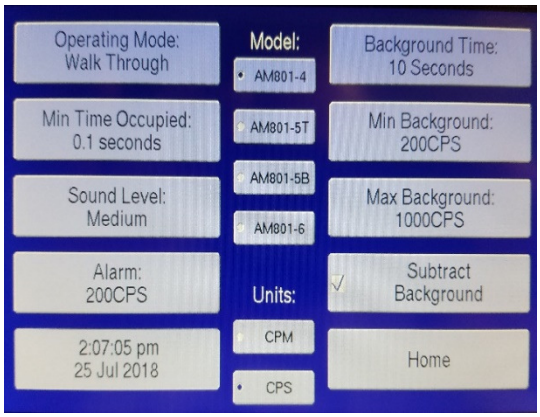
HOME SCREEN - COUNT TO HIGH ALARM

This screen appears when one or all of the monitor's scintillation detectors measure a radiation field that exceeds the alarm set point. The high radiation field will cause the scintillator/scintillators to turn RED and the monitor will sound an alarm, turn on the red alarm light and issue a verbal instruction STOP SEE OPERATOR.

HOME SCREEN - NORMAL OPERATING – NO ALARM

This screen appears when system has completed all internal and background checks and is ready for NORMAL OPERATION. The screen shows the pertinent data utilized to operate the system:

A. Count rate of each detector
B. Number of persons that have passed through the portal
C. Correct time and date
D. Power supply (battery voltage if batteries are being used)

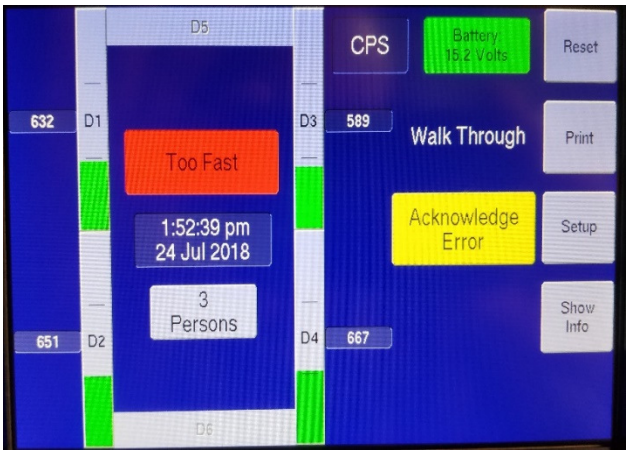


SETUP SCREEN

ALL SCREENS DISPLAY COUNT RATES IN CPS (COUNTS PER SECOND)

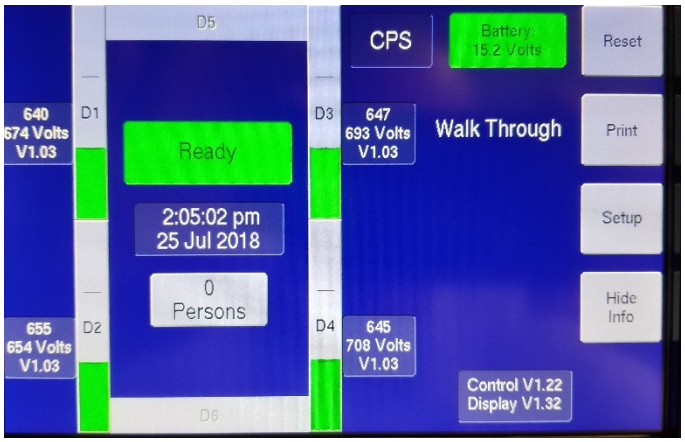
This screen will appear when the operator touches the SETUP button on the HOME SCREEN. The following functions are available on this screen:

A. MODE : TIME COUNT OR WALK THROUGH
B. MINIMUM TIME OCCUPIED: Time person must be in portal to obtain a satisfactory measurement
C. BACKGROUND TIME: (FACTORY SET) Counting time required to obtain a satisfactory **background**
D. MAX BACKGROUND: Max Background counts for normal operation
E. MIN BACKGROUND: Minimum counts system should indicate in nominal background
F. ALARM (above background): Counts above background indicating contamination
(115 CPS = approximately 1µCi of Cs 137)
F. SOUND LEVEL: Verbal Command loudness – soft, medium or loud



HOME SCREEN - TOO FAST (person passing through portal)

This screen appears if the person passing through the portal does not occupy the portal for at least the time that was set on the SETUP SCREEN – MINIMUM TIME OCCUPIED. This will cause the Ready area to turn RED, light the alarm light and issue a verbal command TOO FAST SEE OPERATOR. This alarm must be reset and the person must pass through the portal to obtain an accurate measurement.



HOME SCREEN - NORMAL OPERATING – NO ALARM – MAX DATA DISPLAY

This screen appears when the operator touches the INFO BUTTON and system has completed all internal and background checks and is ready for NORMAL OPERATION. The screen shows the pertinent data utilized to operate the system:

A. Count rate of each detector
B. Number of persons that have passed through the portal
C. Correct time and date
D. Power supply (battery voltage if batteries are being used)

7.0 MAINTENANCE

7.1 GENERAL

The AM-801 is not designed to be serviced in the field due to the difficulty of servicing a weather resistant instrument and maintaining its weather resistant integrity. Johnson recommends this instrument only be serviced in areas with a controlled environment by personnel familiar with the weather resistant features of the instrument. Johnson recommends the AM-801 be returned to the factory for any servicing that requires replacement of the systems primary components i.e. scintillator assemblies, detector printed circuit boards, etc. The replacement of all these assemblies require a technician with an in depth understanding of each assemblies operational characteristic, the programming utilized by the microprocessor to operate these components and how to reseal the system and maintain its weather resistant characteristics.

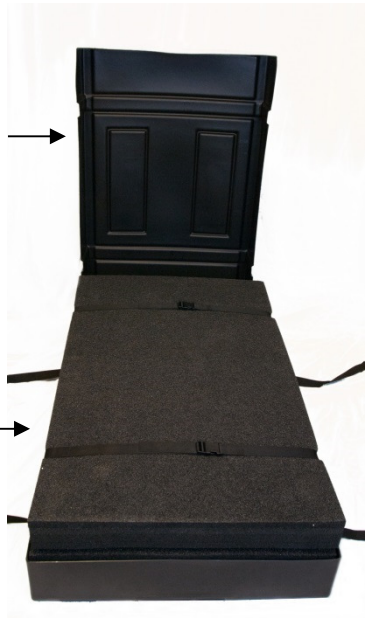
7.2 STORAGE

Johnson recommends the AM-801 be dried thoroughly after each use and stored in the carrying case supplied with instrument. Johnson recommends the batteries be removed from the instrument after each use and be stored in a separate area to prevent a failure of the batteries housing that could cause corrosion to the AM-801. The AM-801 will maintain all of the settings utilized when the instrument was last utilized for up to 10 years. However Johnson recommends the instrument be setup before using and fully tested if it has been in storage for over 6 months.

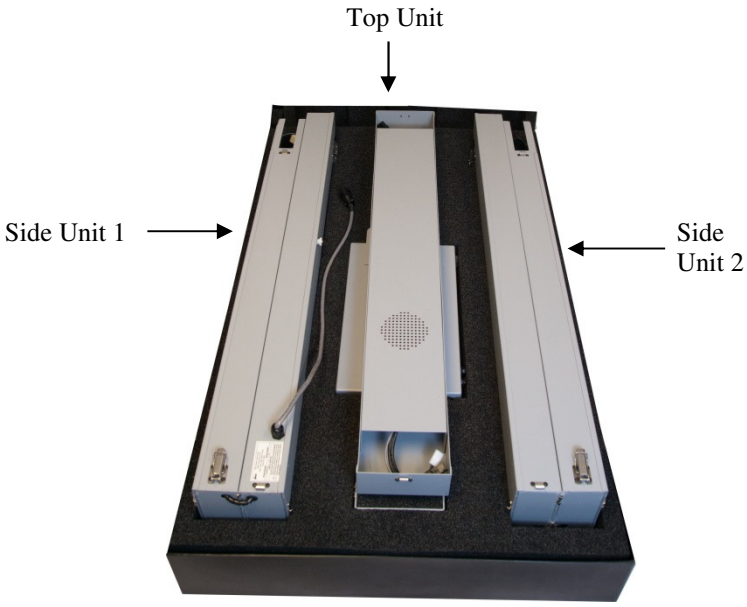
7.3 ASSEMBLY & PACKING INSTRUCTIONS AM-801-5-B/AM-801-6

The model AM-801-5-B is provided in a heavy duty plastic case that can be utilized to ship and store the instrument. The case contains a custom heavy duty dense foam insert with storage areas that protect each of the instruments major components during shipping and handling. The shipping case is equipped with large casters and a handle to facilitate the transportation and handling of the AM-801-5-B. The AM-801-5-B can be quickly assembled and disassembled without any tools i.e. pliers, screwdrivers or wrenches.

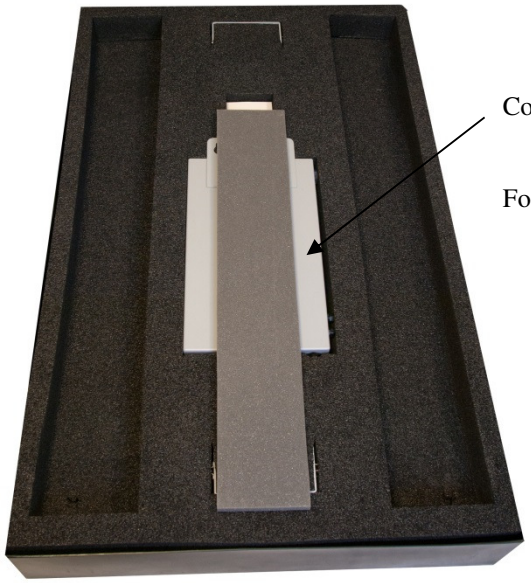
7.4 MAIN COMPONENTS IN CASE AND UNPACKING



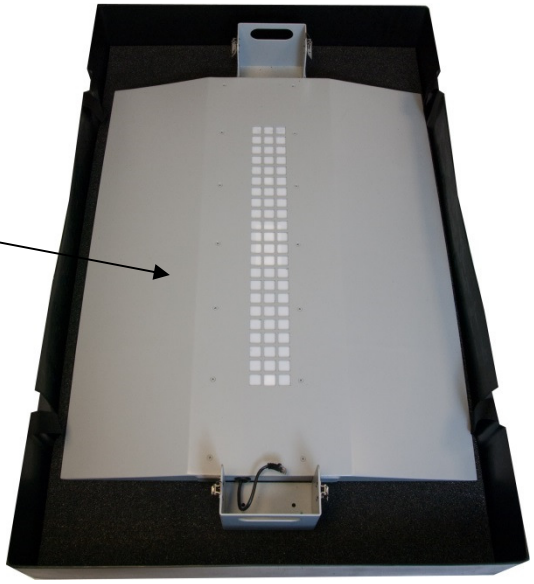
Top of Case Removed Foam Still Buckled



Top Layer of Foam Removed



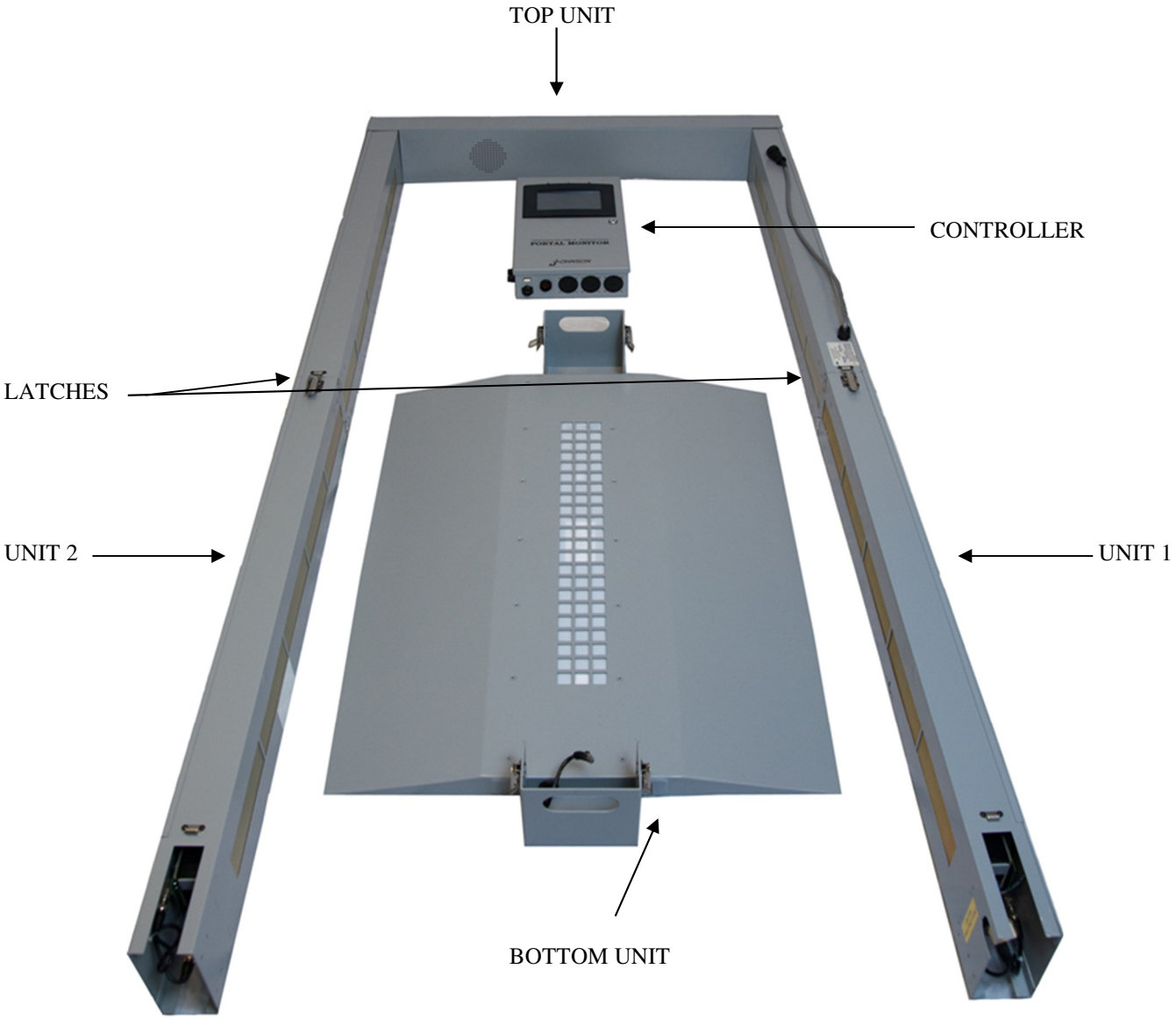
Top and Side Units Plus 2nd Layer of Foam Removed



Controller and 3rd Layer of Foam Removed

REVERSE ORDER TO PACK MONITOR

7.5 MAIN COMPNENTS READY FOR ASSEMBLY



7.6 ASSEMBLY

7.6.1 Remove the side upright U1 in FIGURE A and unfold until the center ends meet as shown in Figure A. Engage the lever type fasteners (3 total) on each side and rear of the upright located near the center of the upright as shown in FIGURE A.

7.6.2 Remove the side upright U2 (side with cable sticking out) as shown on Figure A and unfold until the center ends meet as shown in FIGURE A. Engage the lever type fasteners (3 total) on each side and rear of the upright located near the center of the upright as shown in FIGURE A.

7.6.3 Remove the Top Unit from the case and place on top of both uprights as shown in Figure A - connect to U1 and U2 as described in Steps A-D below

FIGURE B

A. TWO (2) CABLES WILL BE PRESENT AT THE END OF **U1 UPRIGHT**. **U2 UPRIGHT** WILL HAVE ONE (1) CABLE. THE END OF THE **"TOP UNIT"** WITH 2 CABLES IS THE SIDE THAT MUST BE CONNECTED TO THE **U1 UPRIGHT** THAT HOLDS THE CONTROLLER UNIT.

B. CONNECT THE ETHERNET CABLE TOGETHER ON EACH UPRIGHT TO THE ETHERNET CABLES IN THE **"TOP UNIT"**.

C. CONNECT THE REMAINING 4 PIN CONNECTOR FROM THE **U1 UPRIGHT** AND **"TOP UNIT".**

D. **CAREFULLY shove the wiring into the Top Unit and slide the Top Unit on to the 2 uprights (U1 & U2). Engage the lever type fasteners on both sides to securely connect the top and sides together.**

7.6.4 Attach the Bottom Detector Housing by first connecting the single connector to U1 then insert U1 and U2 into the bottom support. Engage the lever type fasteners.

7.6.5 The main frame of the portal monitor is now complete. Check all fasteners to be sure they are securely connected.

7.6.6 Standing at the top of the portal grasp and raise until the portal is upright.

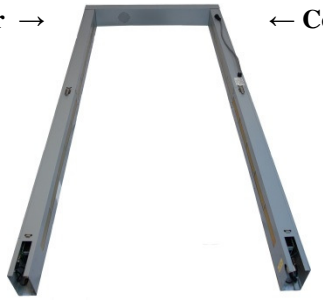
7.6.7 Remove the "CONTROLLER UNIT" from the shipping case and place on the hangers of the U1 Upright.

7.6.8 Connect the 16 pin cable from the U1 Upright to the connector in the bottom of the CONTROLLER UNIT.

This completes the assembly of the portal monitor – FIGURE C demonstrates the above Assembly Instructions.

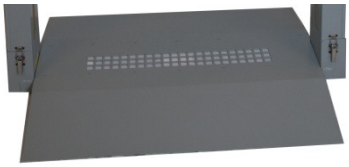
AM-801-5-B SET UP PROCEDURE

Connector → **← Connectors**



STEP 1 - "CAREFULLY" - Unfold and **Lock** both **"SIDE"** Pieces – Lay on Flat Surface and Connect to **"TOP"** Piece (3 Connector **"SIDE"** To 3 Connector **"TOP"** and 2 Connector **"SIDE"** to 2 Connector **"TOP")** as Shown in Step 2

STEP 2 - Completed **"TOP"** and **"SIDES"**



STEP 3 - Attach **"BOTTOM"** Section with 1 Connector to **"SIDE"** Piece Connector (U1) of Completed **"TOP"** and **"SIDES"** as Shown in **STEP 4**

STEP 4 (Completed **UNIT** is Still Lying Down on Floor)

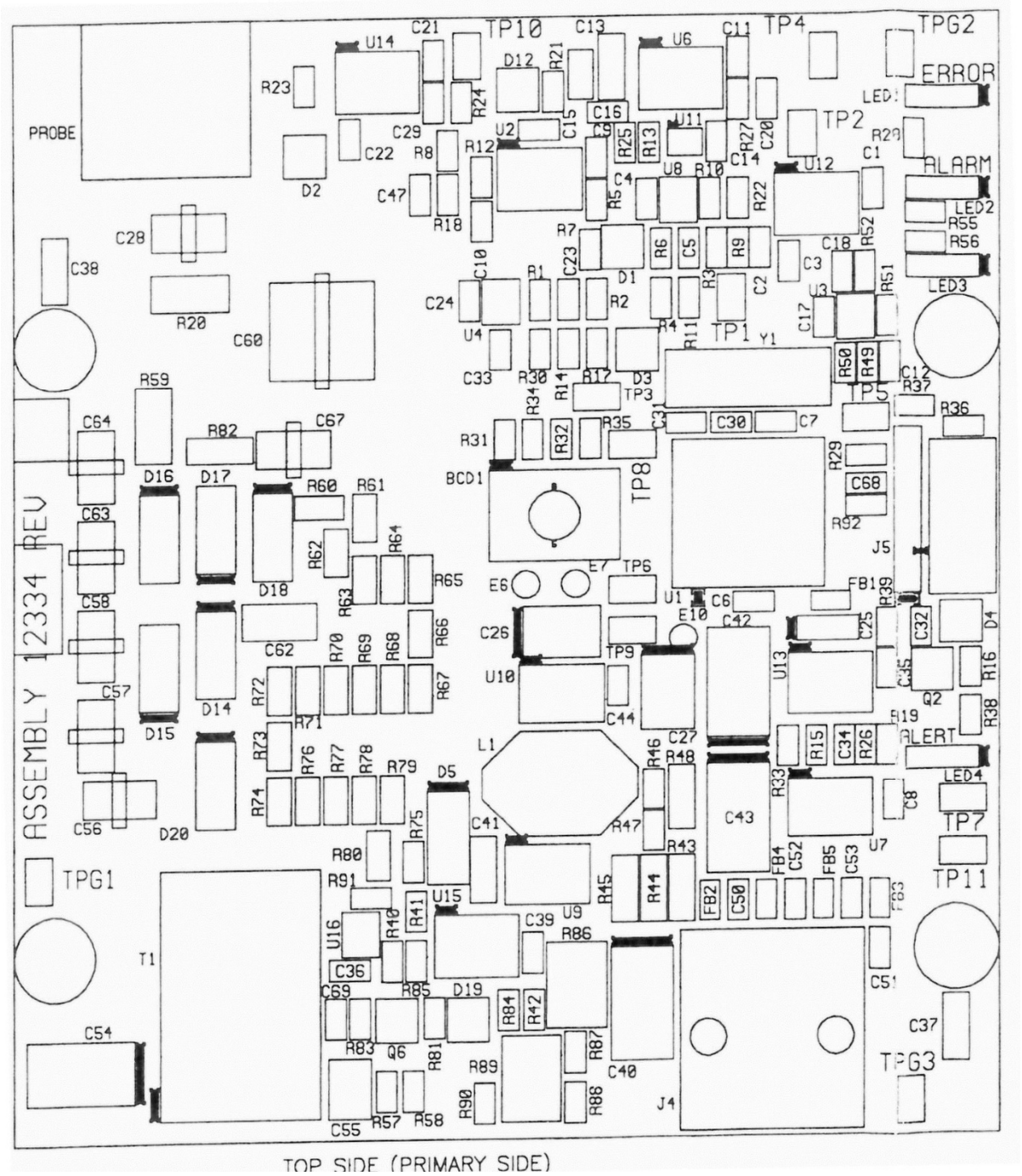
STEP 5 – "CAREFULLY" Raise **UNIT** to a **Standing** Position

STEP 6 – Attach **ELECTRONIC CONTROLLER to** Side of **UNIT –** then Attach **AC Power UNIT** is now Ready to **Turn On**

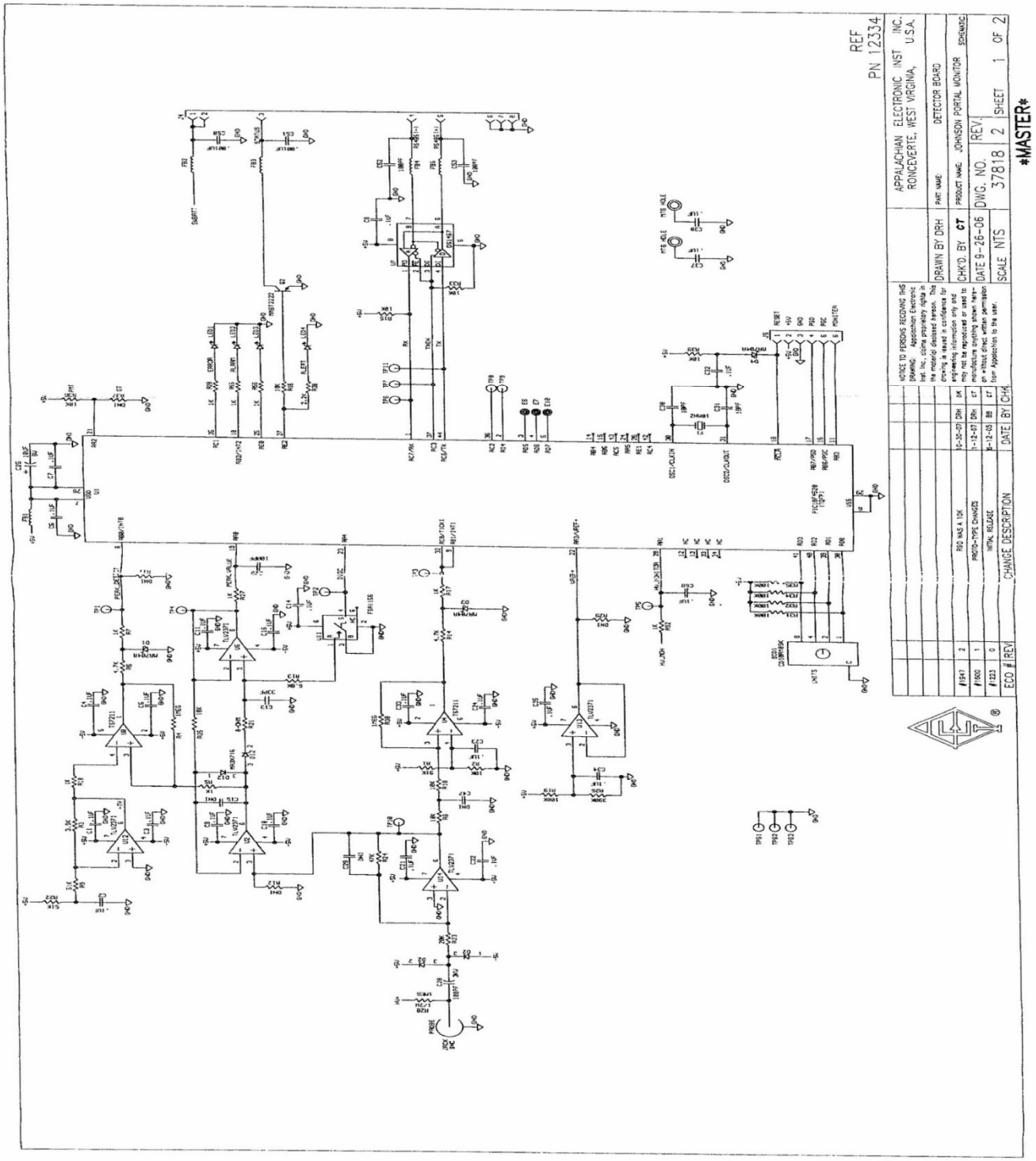
FIGURE C

"TO UNASSEMBLE REVERSE THE SETUP INSTRUCTIONS"

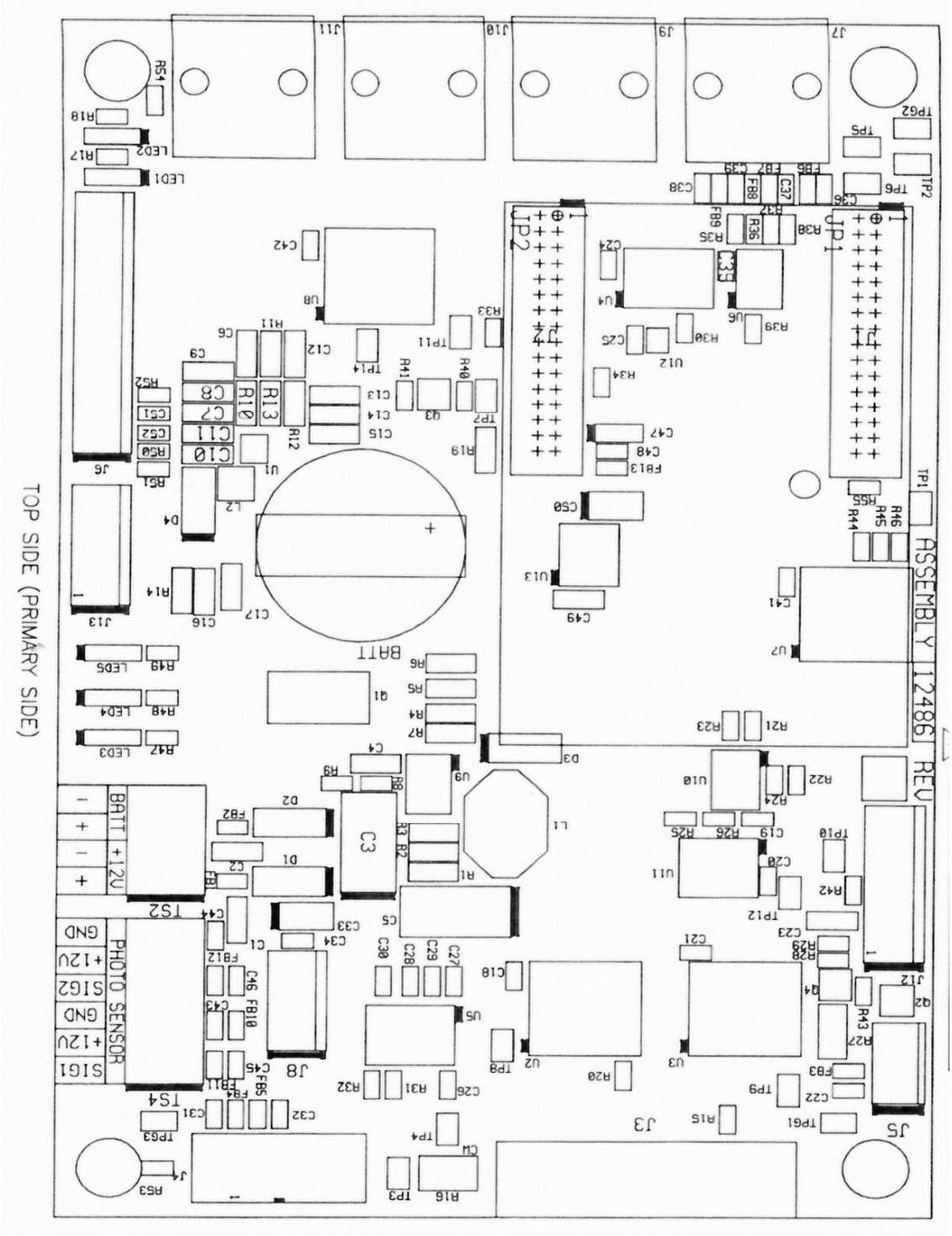
7.2 DETECTOR BOARD AND MAIN BOARD COMPONENT LAY OUT AND SCHEMATIC



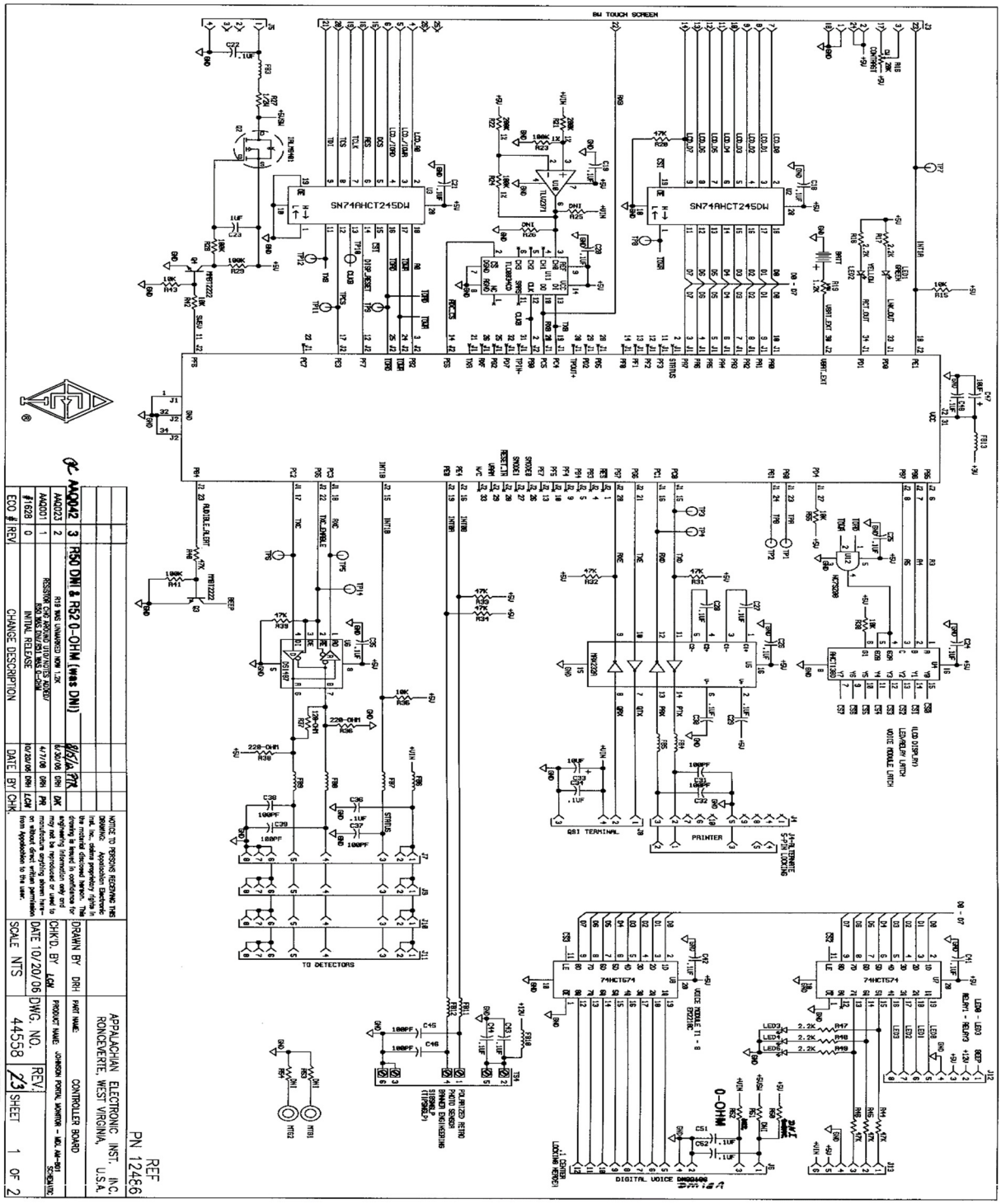
AM-801 DETECTOR BOARD COMPONENT LAYOUT



AM-801 DETECTOR BOARD SCEMATIC



AM-801 MAIN BOARD COMPONENT LAYOUT



AM-801 MAIN BOARD SCHEMATIC