Safe Marine Ltd.

Product Test Specification for

PCB3027 Issue 4 Mod 0
Using Test apparatus GAS5052

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Document Change History

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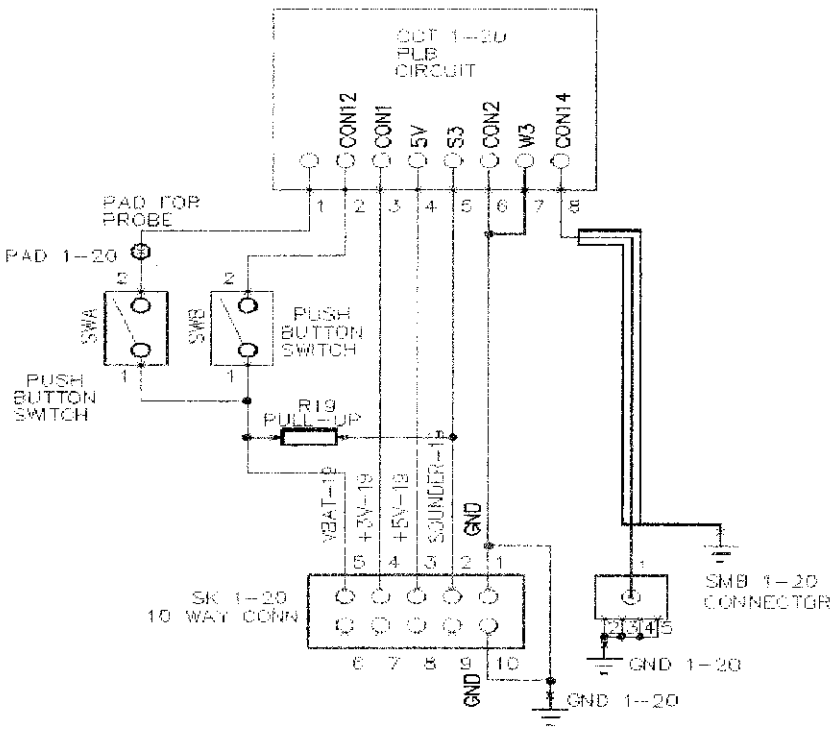
CONTENTS

1. Overview

To facilitate the production of the PLB PCBs, 20 boards were arranged in a single panel for component placing and testing. A test-jig was designed to be able to interface each PLB PCB on a panel. Once a panel is inserted and secured in the test-jig, probe pins make contact on specific points on each of the PLB PCB's. Each PCB has its independent set of probe pins, which can be accessed via an IDC and a SMB connector. The IDC connector is used to supply power to the board as well as connections to monitor the Sounder waveforms and the +5 Volt output of the DC-DC converter on an Oscilloscope. The SMB connector is used for RF verification, using a RF Communications Monitor.

2. Test Apparatus

The Following is an electrical diagram of each circuit interface:



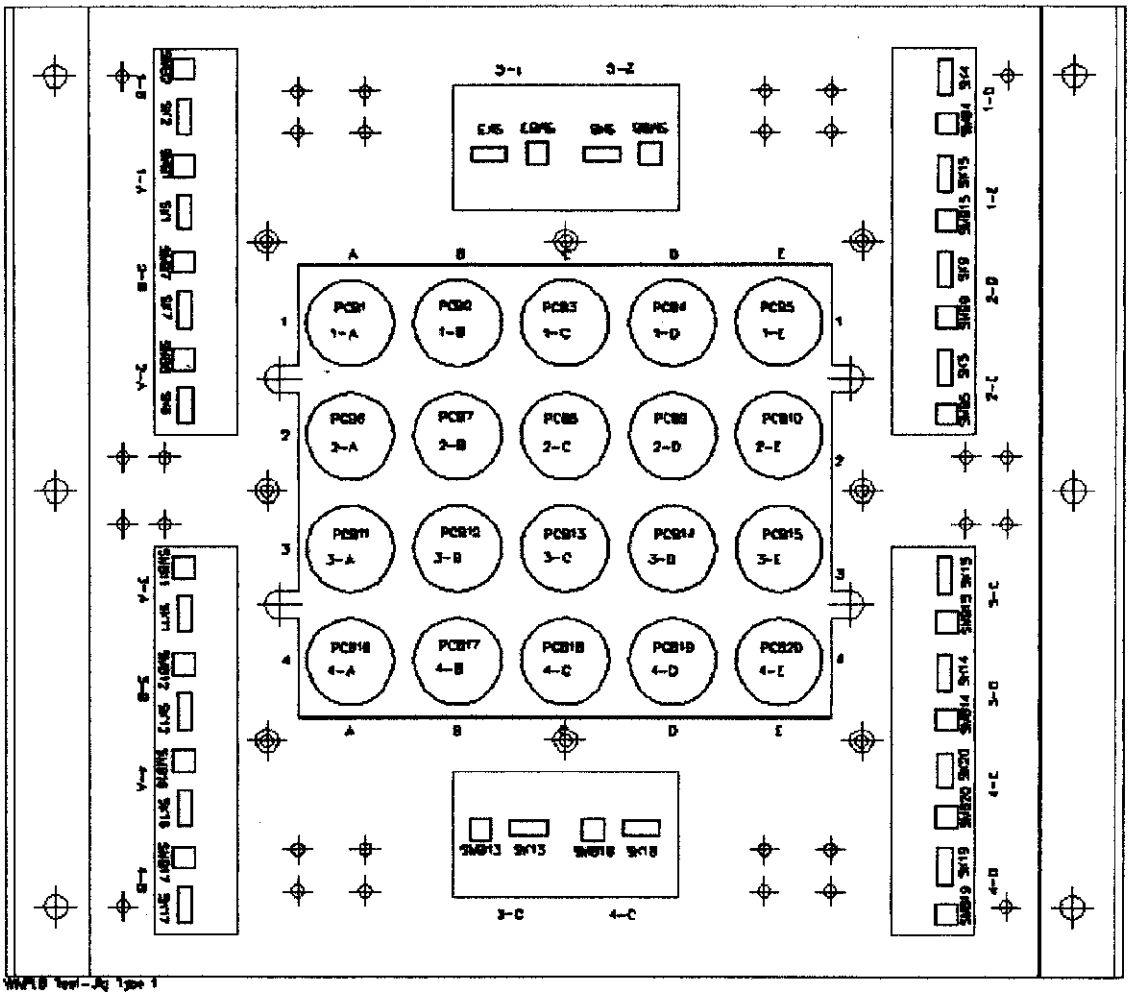
- SWA (n) Red and SWB (n) Green, are push buttons that are used to activate and control functions on its respective PCB.
- SK (n) is the interface connector for its respective PCB.
- SMB (n) is the RF interface connector for its respective PCB.

Special cable harness will be used to connect to the Test Equipment.

3.1 Test Apparatus Grid

The following diagram shows the Test-jig with the locations of the PLB PCBs and its corresponding interface connectors:

GAS5052



The following is a table that corresponds to each of the circuits:

PLB Circuit	Location	Interface	RF	Circuit
PCB1	1-A	SK1	SMB1	CCT1
PCB2	1-B	SK2	SMB2	CCT2
PCB3	1-C	SK3	SMB3	CCT3
PCB4	1-D	SK4	SMB4	CCT4
PCB5	1-E	SK5	SMB5	CCT5
PCB6	2-A	SK6	SMB6	CCT6
PCB7	2-B	SK7	SMB7	CCT7
PCB8	2-C	SK8	SMB8	CCT8
PCB9	2-D	SK9	SMB9	CCT9
PCB10	2-E	SK10	SMB10	CCT10
PCB11	3-A	SK11	SMB11	CCT11
PCB12	3-B	SK12	SMB12	CCT12
PCB13	3-C	SK13	SMB13	CCT13
PCB14	3-D	SK14	SMB14	CCT14
PCB15	3-E	SK15	SMB15	CCT15
PCB16	4-A	SK16	SMB16	CCT16
PCB17	4-B	SK17	SMB17	CCT17
PCB18	4-C	SK18	SMB18	CCT18
PCB19	4-D	SK19	SMB19	CCT19
PCB20	4-E	SK20	SMB20	CCT20

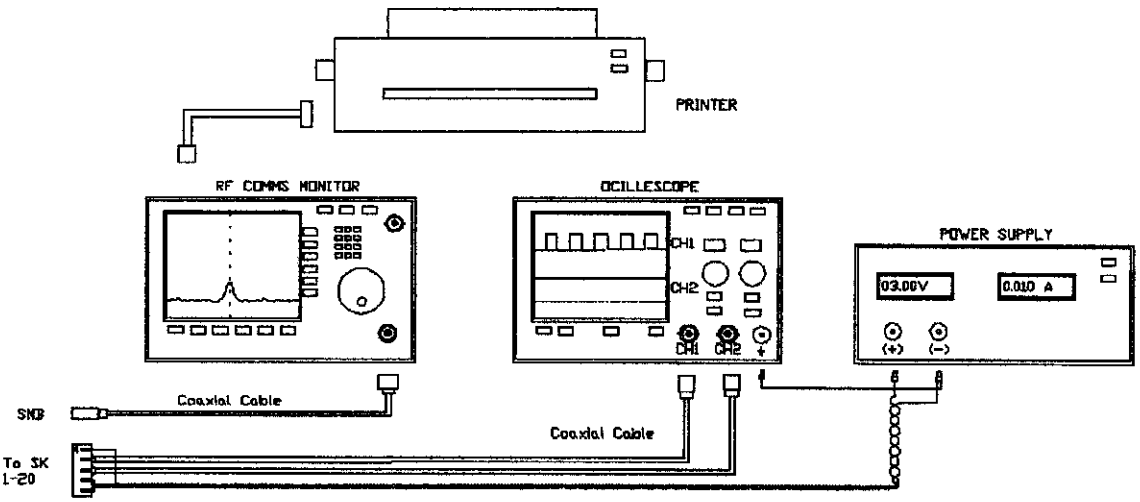
3. TEST Equipment Connections

A special harness CAB4204 is used to connect to various tests equipment used for the EUT.

The test cable harness connect to the following equipment:

- 2 Channel Oscilloscope
- 3V power supply with current monitor
- RF Communications Monitor

The following diagram shows the Test Equipment layout:



For the purpose of this test only one harness will be used, however multiple harnesses could be used, but additional Test equipment would have to be acquired.

4. TEST Equipment Settings

Configure the following settings on the Test Equipment:

4.1 Communications Monitor settings:

A. Centre Frequency: 121.5000MHz, (121.6500Mhz for GAS6060)
B. Modulation: AM, De-emphasis – OFF
C. IF BW: 15KHz
D. Span: 1MHZ
E. Resolution: 30KHz
F. Video Filter: OFF
G. Reference Level: 21dBm, 10dB/div
H. Set Marker to Centre Frequency

4.2 Scope settings:

A. Ch 1: 2V/div, 1ms/div
B. Ch 2: 2V/div, 1ms/div
C. Set both channels to x1 Scale

4.3 Power Supply Settings:

Configure the Power Supply to the following settings:

A. Set Voltage to 3.00 Volts DC
B. Adjust the Current limit to 500mA.

Note: The Power Supply is left "ON" while testing is in progress. Care must be taken to ensure that the settings remain fixed.

5 EUT Procedures

Check panel has serial number tag, and is supplied with its corresponding History Sheet. Check that the History Sheet has had the appropriate sections signed off. If not return to Inspection Department.

Record the results from the following tests on the attached Test Result Sheets.

Write down the Serial Number of the Panel at the top the chart. Write "P" for Pass or "F" for Fail in the appropriate box as you proceed with the test. Sign and date the Test Sheet when finished:

6.1 Visual Inspection

Make a visual inspection on all the PCBs. Make sure all components are aligned and secured. Make sure all PCBs are cleaned, i.e. Solder Flux etc.

6.2 Set-up Connections

With no Cable Harness attached to the Test Unit, insert a PLB PCB Panel. Make a visual inspection to make sure the test pins line-up, insert the reinforcing plate and secure the panel by lowering the clamps.

Connect the Test Cable Harness to SK (n) on the Test Unit. This will test the corresponding PLB PCB(n) see the table above.

WARNING:
With no buttons pressed, make sure the current meter on the Power Supply reads < 0.001A. If there is readings of ≥ 0.001A on the meter then remove the cable harness, write "Fail" and the current measured on the appropriate boxes on the test sheet and proceed with the next unit. If current meter reads < 0.001A, then proceed with connecting the RF cable to the appropriate SMB (n) and continue with the procedures.

6.3 Low RF Transmission

Press and hold the "Green" pushbutton. This will activate low power RF transmission while the button is pressed. Mark the appropriate boxes on section 6.3 on the test sheet as the following items are observed:

A. The Marker on the COMMS Monitor reads: –12.00 dBm ±2dBm.
B. Make sure the RF "Bell" curve is uniformed and centred on the COMMS Monitor.
C. The Power Supply reads: Min 9mA, Max 12mA

D. Channel 1 on the Scope will show: Swept Square Wave pulsed 4 times in 5 seconds and OFF for 3 seconds.
E. Channel 2 on the Scope will show: 0V, ±0.001V

6.4 High RF Transmission

Press and hold the "Green" and "Red" buttons together for 5 seconds, then release. This will activate full RF power transmission. Mark the appropriate boxes on section 6.4 on the test sheet as the following items are observed:

A. The COMMS Monitor reads: +16.5dBm ±0.5dBm.
B. Make sure the RF "Bell" curve is uniformed and centred on the COMMS Monitor. A solid "Bell" curve will appear every 4 seconds followed by a 4 seconds modulated "Bell". Make sure there are no "Spurs" left or right of the "Bell" when its solid.
C. Make sure the LED Flashes. The LED will flash 4 times in 4 seconds and then will be off for 4 seconds (cycle time 8 seconds). This cycle will then repeat.
D. The Power Supply will read: Min 90mA, Max 115mA
E. Channel 1 on the Scope will show: Swept Square Wave for 4 seconds and "Flat" for 4 seconds.
F. Channel 2 on the Scope will show: 5.00V ±0.15V
G. Push the "Display Hold" button to freeze the display on the COMMS Monitor and make a printout by pressing the Print function. Once the printer starts printing, push the "Display Hold" once again to change the Display back to normal.
H. Write the panel Serial Number and the ID of the PLB PCB on the printout sheet. Eg. XXXX_XX 1-A, etc.

6.5 Deactivation of RF Transmission

Press and hold the "Green" and "Red" buttons for 5 seconds once again. This will deactivate the RF transmission. Mark the appropriate boxes on section 6.5 on the test sheet as the following items are observed:

A. The COMMS Monitor will show: "Flat Line".
B. The Power Supply reads: < 0.001A
C. Channel 1 on the Scope will show: "Flat Line" at 5.00V ±0.15V
D. Channel 2 on the Scope will show: "Flat Line" at 0V ±0.001V
E. Disconnect the Test Cable Harness and proceed with the next EUT.

Once all the PCBs are tested, disconnect the test cable harness, lift the clamps, remove the reinforced plate and remove the PLB panel.

Place the panel on an appropriate PCB tray.

Fill out the appropriate sections of the History Sheet.

Make sure all printout sheets are attached to the test sheets and travel together with the history sheet.

Serial Number:	1-A	1-B	1-C	1-D	1-E	2-A	2-B	2-C	2-D	2-E
"P" (Pass) / "F" (Fail)	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F
6.1 Visual										
Components aligned and secured										
PCBs cleaned, i.e. solder Flux ?										
6.2 Set-up										
Current reads < 0.001A										
If FAIL Note Amp Reading:	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA
6.3 Low RF Power Transmission										
A. RF Power: –12.00dBm +/- 2dBm										
B. Transmission Bell Centred										
C. Current: Min 9mA, Max 12mA										
D. Scope Ch 1: Swept Tone sq/wave										
E. Scope Ch 2: 0V +/- 0.001V										
6.4 High RF Power Transmission										
A. RF Power: +16.5dBm +/- 0.5dBm										
B. RF Bell Uniformed and No "Spurs"										
C. LED Flash every 4 seconds										
D. Current: Min 90mA, Max 115mA										
E. Scope Ch 1: Swept Tone sq/wave										
F. Scope Ch 2: 5V +/- 0.15V										
G. Print:										
H. Write the S/N on Printout										
6.5 Deactivate RF Transmission										
A. RF Power Reading is: Flat Line										
B. Current Reading is: < 0.001A										
C. Scope Ch 1: Flat Line 5V +/- 0.15V										
D. Scope Ch 2: Flat Line 0V +/- 0.001V										
E. Disconnect & proceed with next EUT										

Tested By : _____ **DATE :** ____/____/_____

Serial # Applied By : _____ **DATE :** ____/____/_____

Serial Number:	3-A	3-B	3-C	3-D	3-E	4-A	4-B	4-C	4-D	4-E
"P" (Pass) / "F" (Fail)	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F	P / F
6.1 Visual										
Components aligned and secured										
PCBs cleaned, i.e. solder Flux ?										
6.2 Set-up										
Current reads < 0.001A										
If FAIL Note Amp Reading:	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA
6.3 Low RF Power Transmission										
A. RF Power: ~12.00dBm +/- 2dBm										
B. Transmission Bell Centred										
C. Current: Min 9mA, Max 12mA										
D. Scope Ch 1: Swept Tone sq/wave										
E. Scope Ch 2: 0V +/- 0.001V										
6.4 High RF Power Transmission										
A. RF Power: +16.5dBm +/- 0.5dBm										
B. RF Bell Uniformed and No "Spurs"										
C. LED Flash every 4 seconds										
D. Current: Min 90mA, Max 115mA										
E. Scope Ch 1: Swept Tone sq/wave										
F. Scope Ch 2: 5V +/- 0.15V										
G. Print:										
H. Write the S/N on Printout										
6.5 Deactivate RF Transmission										
A. RF Power Reading is: Flat Line										
B. Current Reading is: < 0.001A										
C. Scope Ch 1: Flat Line 5V +/- 0.15V										
D. Scope Ch 2: Flat Line 0V +/- 0.001V										
E. Disconnect & proceed with next EUT										

Tested By : _____ **DATE :** ____/____/_____

Serial # Applied By : _____ **DATE :** ____/____/_____