

ST70 Service Manual

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Introduction

Safety notices



WARNING: Electrical safety

Make sure you have switched off the power supply before you service this product.

About this manual

This manual is intended to assist authorized Raymarine Service Engineers when servicing Raymarine ST70 Instruments and Pilot Controllers. As much of this information is commercially sensitive, it should not be disclosed to anyone other than Raymarine employees and authorized Raymarine service agents.

To the best of our knowledge, the information in this manual was correct when it was published. However, as details of product build, components etc can change at short notice, in pursuance of our policy of continuous product improvement, this manual may not always reflect the build state of the product being serviced, and so is provided on an 'information only' basis. If there is any doubt about the applicability of the information in this manual to the product being serviced, refer to the Raymarine Technical Support Department for clarification.

Raymarine cannot accept liability for any inaccuracies or omissions in this manual.

Product disposal



Waste Electrical and Electronic (WEEE) Directive

The European WEEE Directive requires that waste electrical and electronic equipment is recycled.

Products carrying the crossed out wheeled bin symbol (illustrated above) must not be disposed of in general waste or landfill, but in accordance with local regulations for such products.

Although the WEEE Directive does not apply to all Raymarine products, we support its policy and ask you to be aware of the correct method for disposing of such products.

Please contact your local dealer, national distributor or Raymarine Technical Services for information on product disposal.

Chapter 1: Diagnostics & Software Upgrades

Use this chapter to investigate faults and to upgrade software on ST70 instruments and pilot controllers.

1.1 Diagnostics

In the unlikely event that a problem occurs with an ST70 product, use this section to resolve the situation.

First considerations

If an ST70 product is not performing as it should:

- Ensure it is being operated in accordance with the relevant Operating Guide:
- Ensure that any data that seems to be missing is actually available to the product. For example, if wind data is not available, there will be no wind-related data either.
- If specific data types are missing or incorrect:
 - Check the relevant Transducer and Pod, including the connections between them and to the system.
 - If speed readings are missing or obviously wrong, the speed transducer paddle wheel could be fouled and need cleaning
- Take into account any changes that may have been made to any associated electrical system. Such changes could affect the performance of an ST70 product.
- Be aware that radio signals transmitted in the proximity of an ST70 product could affect the performance of the product.

If you are satisfied that the problem is not due to any of the above, use the diagnostic tools below to isolate the cause of the problem.

Diagnostics tools

The following tools are available to aid diagnosis:

- About Display function.
- Self test function
- Diagnostic charts

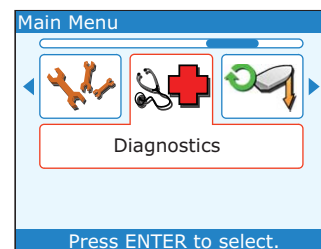
About Display

The About Display function provides information about the instrument on which it is run. Before seeking technical assistance, please use the About Display function whenever possible to find out the relevant:

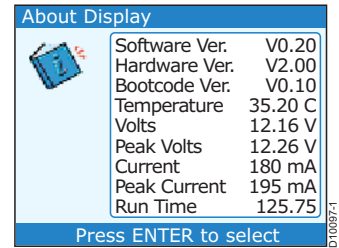
- Software Version Number
- Hardware Version Number
- Bootloader Version Number
- Temperature
- Voltage
- Peak voltage
- Current
- Peak current
- Total hours run

To run the About Display function:

1. With the instrument switched on, press MENU to display the Main Menu, then use < or > to select the **Diagnostics** option.
2. Press ENTER to display the **Diagnostics** menu.



3. With the **Diagnostics** menu displayed, use < or > to select the **About display** option, then press ENTER. Note that the:
 - **Temperature** should be in the range -30° C to +70° C
 - **Volts** should be in the range 9 V to 16 V
 - **Peak Volts** should be in the range 9 V to 16 V
 - **Current** and **Peak Current** should be not greater than 220 mA
4. Make a note of any data you need then press ENTER:
 - If you have seen all the available data the display shows the **Diagnostics** menu.
 - If there is more data to be displayed, the next page of About Display data is displayed. Repeat step 4 until the display shows the **Diagnostics** menu.

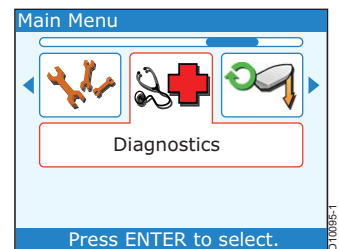


Self test

The self test function checks basic display, button and buzzer functions. Note that messages displayed during self test are in Hungarian, to enable production staff to use the test.

To run a self test, ensure the product is switched on, then:

1. With the instrument switched on, press MENU to display the **Main Menu**, then use < or > to select the **Diagnostics** option.
2. Press ENTER to display the **Diagnostics** menu.
3. Use < or > to select the **Self Test** option.



You are now about to start the self test. The initial stages of the self test occur automatically, so ensure you are ready to observe them.

When you are ready:

1. Press ENTER to initiate the self test. Check that the following tests run successfully:
 - i. NVM test. Screen message is **Memoria Teszt NVM Teszt**. Shows either **PASS** or **FAIL**.
 - ii. Flash test. Screen message is **Memoria Teszt FLASH Teszt**. Shows either **PASS** or **FAIL**.
 - iii. RAM test. Screen message is **Memoria Teszt RAM Teszt**. Shows either **PASS** or **FAIL**.
2. After the above tests, a button test screen is displayed as follows. Press each front panel button in turn and check that a tick is displayed for each button pressed. If this occurs, the display shows a pass.



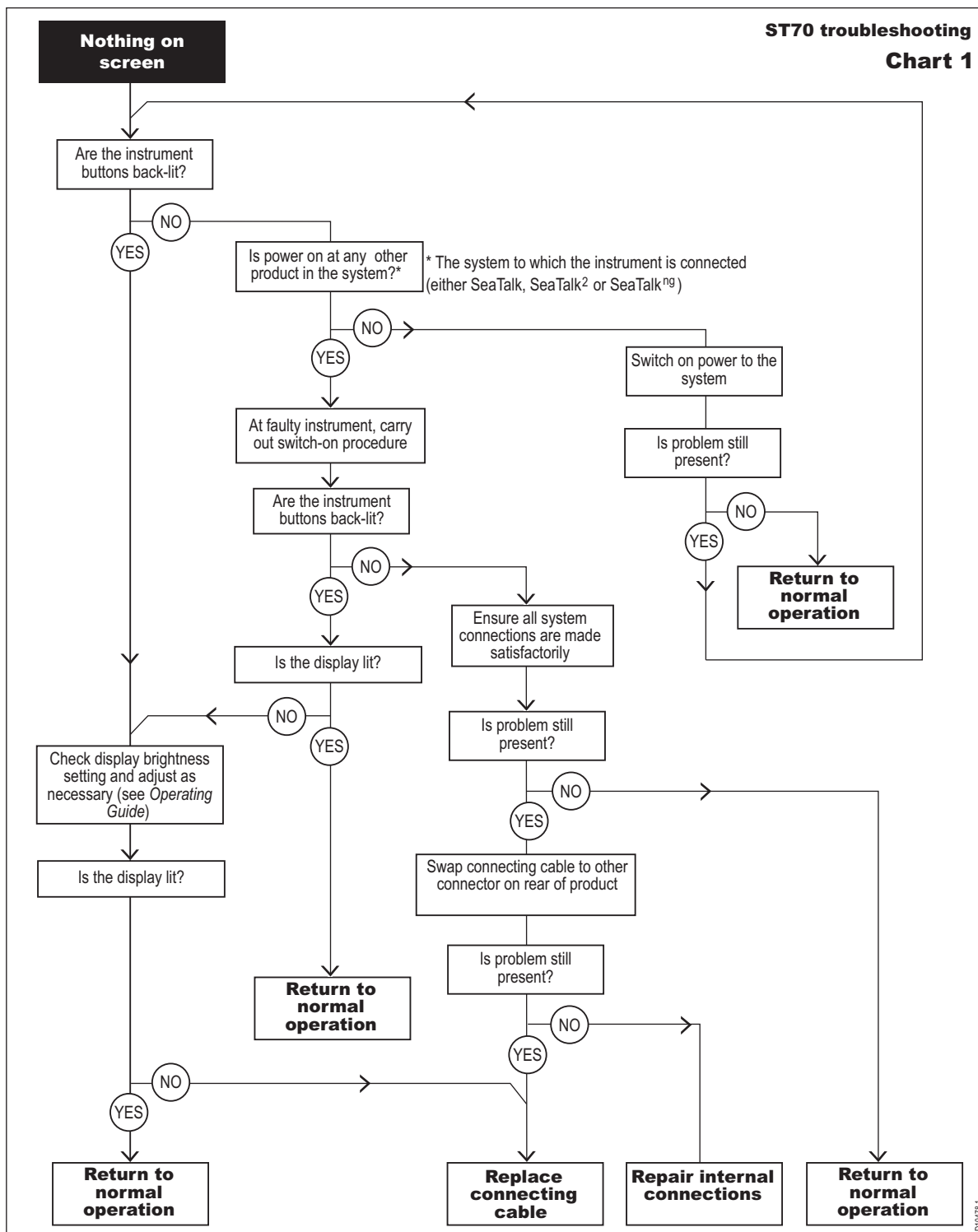
Note: If the buttons are not pressed, this screen times out and shows **FAIL**, after approximately 15 seconds.

3. Press MENU. Ensure that the next screen is all RED. If there are any black dots, pixels are missing and the LCD screen should be replaced.
4. Press ENTER. Ensure that the screen changes to all BLUE. If there are any black dots, they are missing and the LCD screen should be replaced.
5. Press ENTER. Ensure that the screen changes to all GREEN. If there are any black dots, pixels are missing and the LCD screen should be replaced.
6. Press ENTER. Ensure that the screen comprises vertical black and white lines. If there are any black dots or missing lines, the LCD screen should be replaced.
7. Press ENTER. Ensure that the screen comprises horizontal black and white lines. If there are any black dots or missing lines, the LCD screen should be replaced.
8. Press ENTER. The screen shows the color palette.
9. Press ENTER. Ensure that the screen comprises a black screen with a white border. Check that the display is symmetrical and is square within the display aperture.
10. Press ENTER. Ensure the buzzer sounds.
11. Press ENTER. Check that the screen brightness increases in steps, from black to full brightness.
12. Press ENTER to complete the self test and return to the **Diagnostics** menu.
13. Press CANCEL to return to the **Main Menu**.
14. Press CANCEL to return to the operational page.

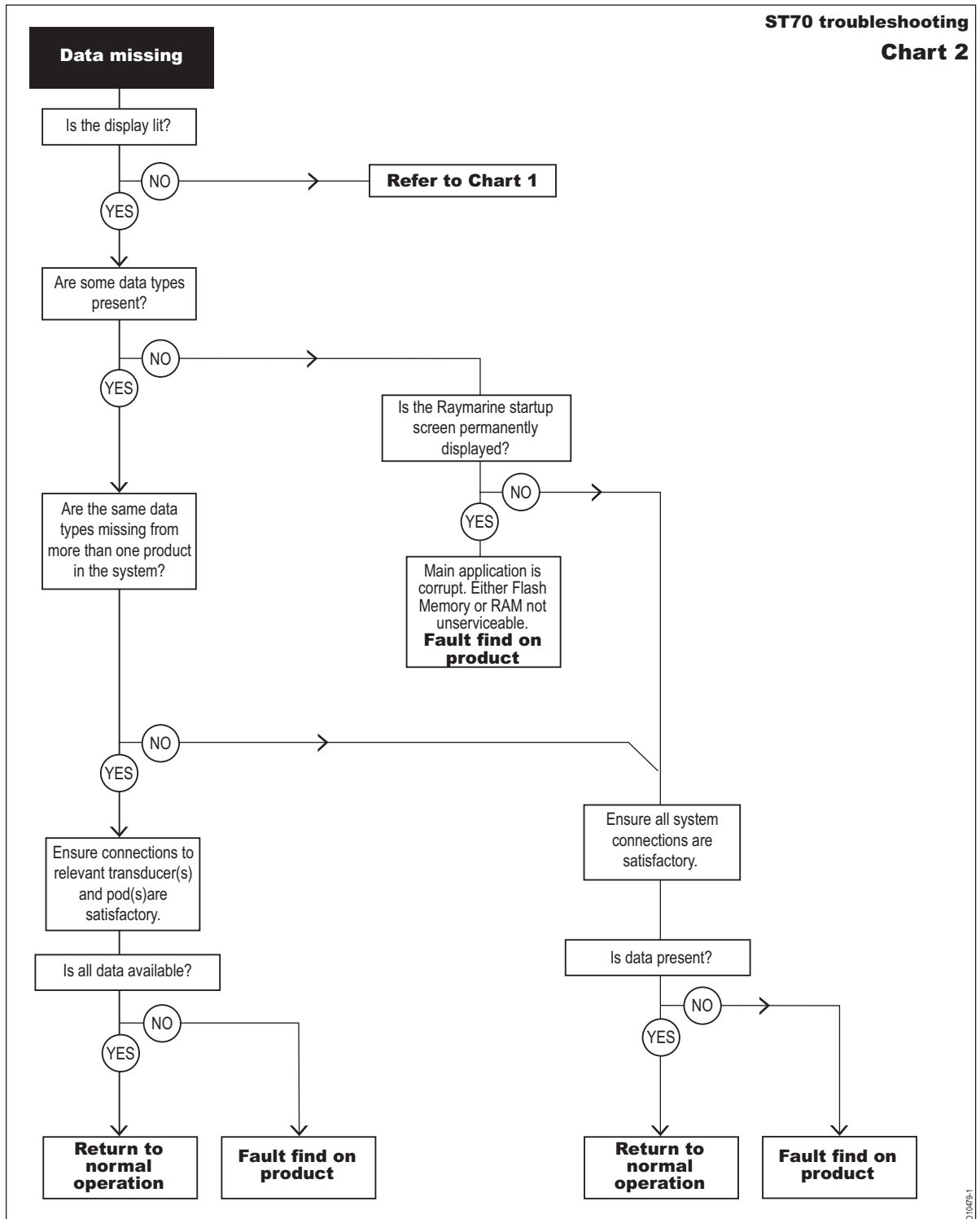
Diagnostic charts

If it appears that an ST70 product is not operating satisfactorily, use the following charts to determine how to resolve the problem:

- If there is nothing on the screen - refer to Chart 1.
- If data is missing from the screen - refer to Chart 2.



**ST70 troubleshooting
Chart 2**



D10495-1

1.2 Upgrading ST70 software

You can download ST70 software upgrades from the Raymarine web site at raymarine.com. This section describes how to download the software upgrade files, unzip them, transfer them to a CompactFlash memory card, then install the software in ST70. To do this, you need:

- A Raymarine SeaTalk system which includes a Raymarine E-Series Display.
- A personal computer (PC).
- A blank CompactFlash card
- A USB CompactFlash reader.

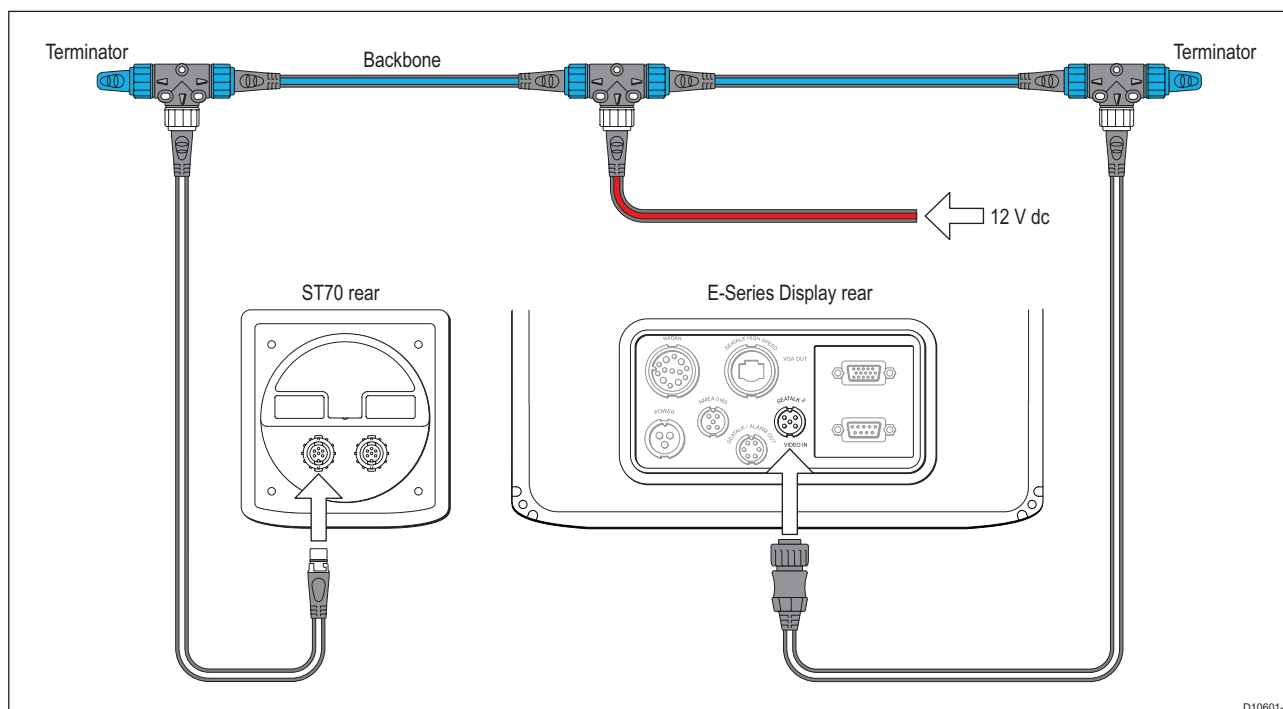
Carry out the procedures in sequence for:

- Getting started.
- Downloading software upgrades.
- Unpacking the upgrade files.
- Transferring the upgrade files.
- Installing the upgrade.

System requirement

When carrying out a software upgrade, you can use either

- An existing operational SeaTalk system to which the Raymarine E-Series Display and ST70 are both connected.
- or
- A discrete SeaTalk² or SeaTalk^{h9} terminated backbone from which the Raymarine E-Series Display and ST70 are spurred off, as in the following illustration.



Getting started

Prepare the CompactFlash for use as follows:

1. Plug the CompactFlash memory card into the CF card slot on the CompactFlash card reader. The card and reader are keyed so the CF card will only fit in the slot one way. Ensure it is correctly oriented.
2. Connect the CompactFlash card reader to a spare USB connector on your PC.
3. Your PC will recognize the card reader as a Removable Disk, and assign it a drive letter. Your computer may also display a window identifying the newly recognized removable disk. If such a window is displayed, the window's title bar will specify the removable disk drive letter, e.g. Removable Disk (E:).

Downloading software upgrades

Find and download the relevant software upgrade files as follows:

1. Go to Raymarine's web site at www.raymarine.com and click on the **Login or create an account** link, to display the log in and create an account page.
2. Using your login ID and password, log into your account.

Note: If you do not have a login ID, click on the **CREATE AN ACCOUNT** button, then follow the on-screen instructions.

3. When you have logged in, click on the **Customer Support** button at the top of the page.
4. Click on the link for **Software and Firmware Upgrades**, to go to the Raymarine.com technical support Knowledge Base.
5. Use the Knowledge Base to determine which upgrade you need.
6. Click on the relevant upgrade then follow the on-screen instructions to download the software upgrade file to your hard disk. Note the file name of the upgrade and the location to which you are saving it.
7. Log out of your Raymarine account.

Unpacking the upgrade files

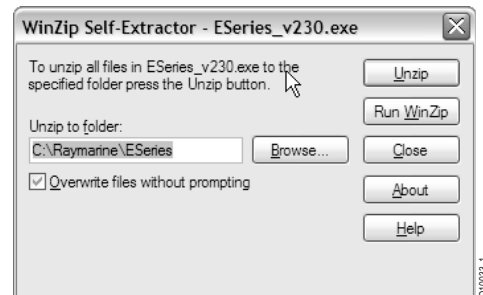
To unpack your software upgrade:

1. Locate the downloaded file on the PC.
2. Double-click the downloaded file, to open the WinZip self-extract application for that file.

Note: Do not change the default **Unzip to folder** field in this dialog.

3. Click on the **Unzip** button to unpack the upgrade files to your PC's hard drive.

By default the upgrade files unpack to: **C:\Raymarine\[Product Family]\[Software Version]**.



Transferring the upgrade files

Transfer the upgrade files to the CompactFlash card as follows:

1. Ensure the CompactFlash card reader is connected to your PC as described under *Getting started* above.
2. At your PC, open the directory described at step 3 under *Unpacking the upgrade files* above. This contains two files:
 - An autorun file, **autorun.dob**
 - The upgrade file which has the product name and software version as part of the filename, and a '**pkg**' extension.
3. Highlight both files then copy them (Ctrl/C in Windows).
4. Open the drive that was assigned to your CompactFlash reader in step 3 of *Getting started* above.
5. Paste both files (Ctrl/V in Windows) into the CompactFlash reader root directory.
6. Remove the CompactFlash memory card from your CompactFlash reader. The card is now ready for upgrading your ST70.

Installing the upgrade

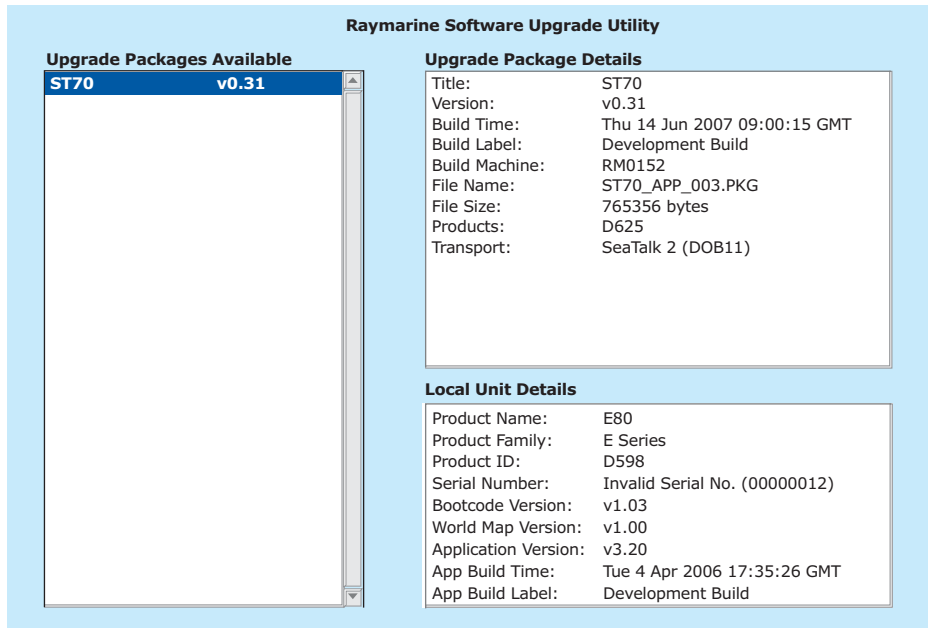


WARNING: Disruption to system operation

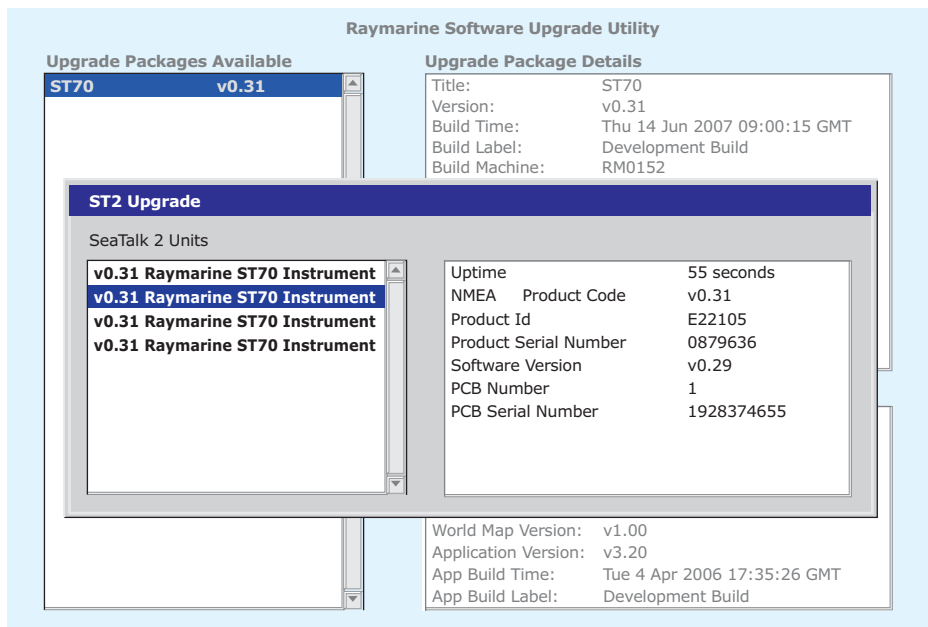
Do NOT attempt to install software in a system that is being used for navigation. The software installation process could result in unreliable data for the period of the upgrade process.

To install your ST70 upgrade:

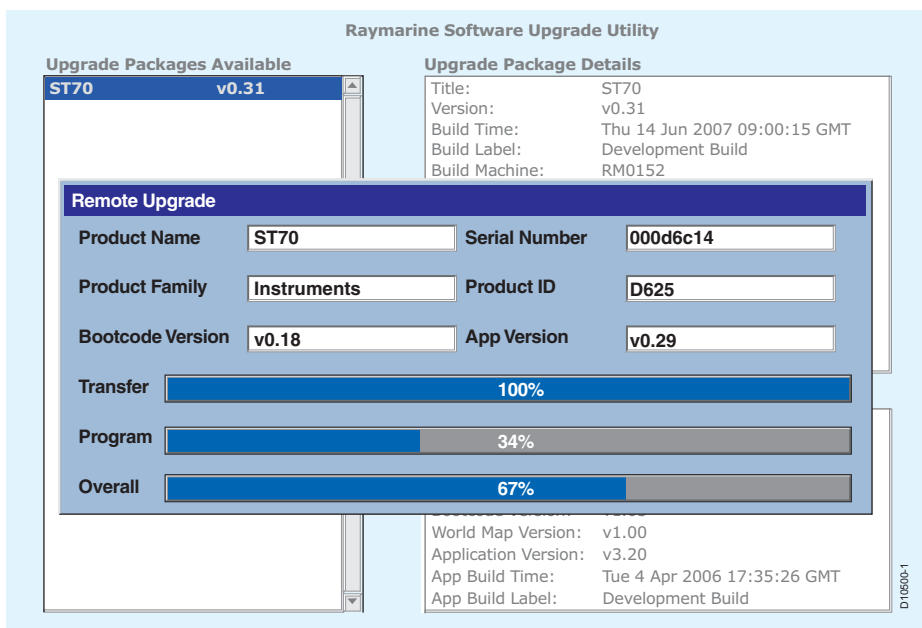
1. Choose a Raymarine E-Series Display connected to the same system as the ST70 product you want to upgrade, to use for the upgrade procedure. This E-Series Display will be referred to as 'the display' throughout the rest of this procedure.
2. Switch off the power to the display. and, if a CompactFlash card is fitted, remove it.
3. Insert the CompactFlash card containing the software upgrade into the display card reader.
4. Switch on power to the display.
5. When the display is powered up, Software Upgrade Utility screen similar to the one below, is displayed.



6. In the **Upgrade Packages Available** column the software you transferred to the CompactFlash card should be highlighted. If it is not, use the directional track pad to highlight it.
7. Click on the **Upgrade Remote Unit** soft key.
8. Click on the **Upgrade Remote Unit on ST2** soft key, to display the ST2 Upgrade dialog box.



9. In the left-hand column, select the product you want to upgrade. The right-hand column shows the details of the selected product.
10. Click on the Upgrade Unit soft key. The upgrade process starts, with progress indicated by on-screen progress bars.



11. When the upgrade is complete remove the CompactFlash card from the card reader and disconnect the card reader.

12. Press the **Reboot** soft key. The instrument then restarts automatically using the new software.

Upgrading tips

If you experience any problems completing the installation of your software upgrade, switch off all products connected to the network, except for the power supply, the instrument you are upgrading and the display.

Chapter 2: Servicing

2.1 Construction

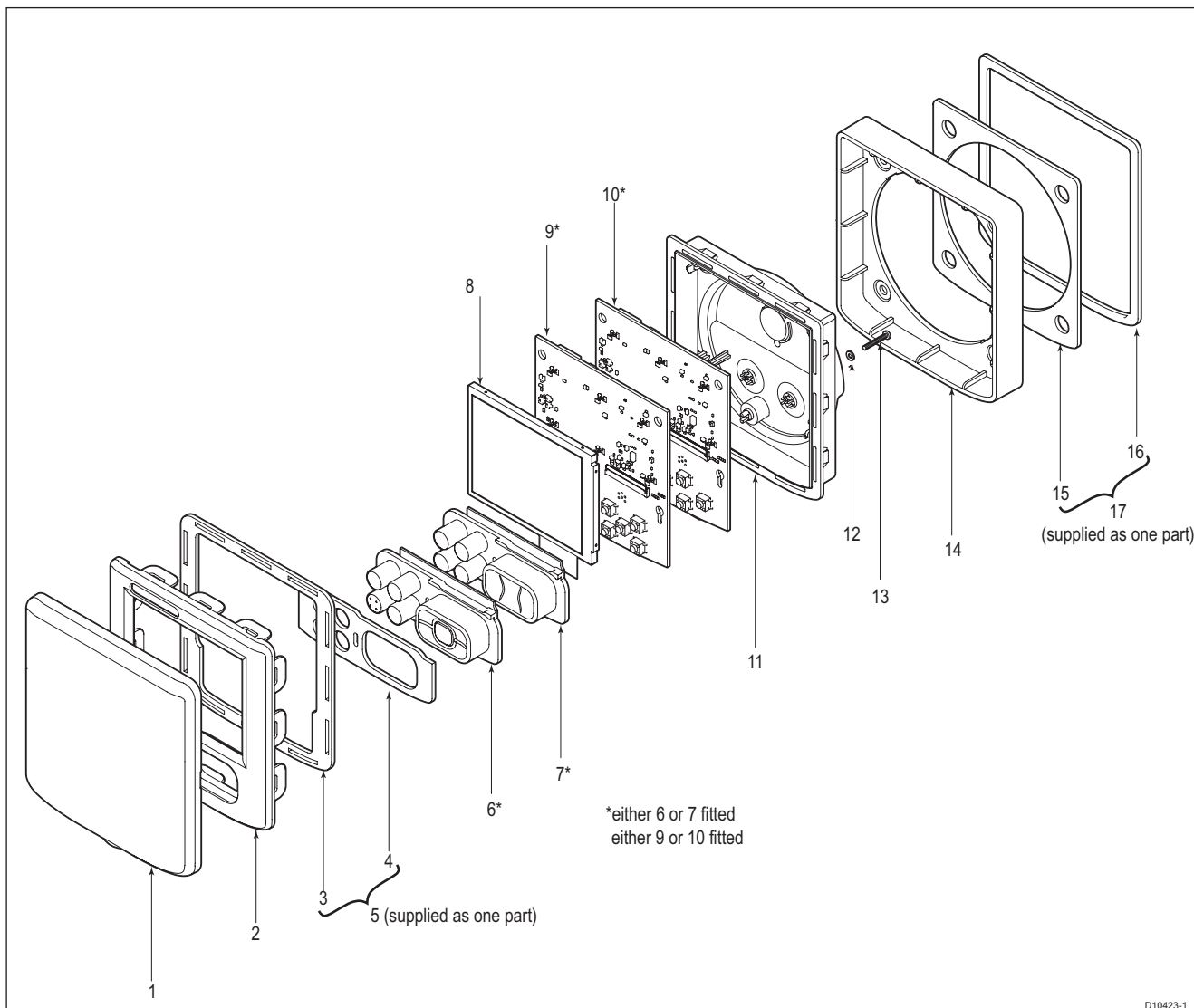


Figure 2-1: ST70 exploded view

Parts list

| Item | Description | Part Number | Item | Description | Part Number |
|------|---|-------------|------|--|-------------|
| - | ST70 Instrument | E22105 | 9 | Pilot Controller PCB | R18149 |
| - | ST70 Pilot Controller | E12196 | 10 | Instrument PCB | R28192 |
| 1 | Sun Cover | R28198 | 11 | Rear Case Assembly | R28197 |
| 2 | Bezel | R28194 | 12 | Sealing Washer | - |
| 5 | Seal (comprises case seal (3) and keypad seal (4)). | R28196 | 13 | Case Screw | - |
| 6 | Pilot Controller Keypad | R18150 | 14 | Mounting Bracket | R28199 |
| 7 | Instrument Keypad | R28193 | 17 | Panel Seal (comprises surface mount (15) and flush mount (16) panel seals) | R28200 |
| 8 | LCD | R28195 | | | |

2.2 Disassembly

The sealing washer, keypad seal and case seal must not be re-used, so before disassembling an ST70 Instrument or pilot controller, ensure you have a new sealing washer, keypad seal and case seal to hand.

When disassembling an ST70 instrument or pilot controller, always take note of how the product is assembled, to facilitate reassembly.

Referring to the exploded view on page 9:

1. Remove case screw and sealing washer from rear of unit. Retain the case screw but discard the sealing washer.

CAUTION: Take care when unclipping bezel

Do not exert excessive pressure to the bezel clips as this could damage them.

2. Carefully unclip each bezel clip in turn working progressively around the perimeter of the product. At the same time carefully apply pressure to separate the rear case from the bezel.



WARNING: Sharp edges

Do not touch the spring connectors on the front of the PCB, as these have sharp edges and could cause injury.

3. Raise the locking bar on the Flexi connector and carefully extract the flexi tail.
4. Remove the LCD from the rear case assembly.
5. Remove the PCB from the rear case assembly. You will feel some slight resistance until the PCB SeaTalk^{ng} connectors separate from the connectors on the rear case assembly.

2.3 Reassembly

When reassembling an ST70 Instrument or pilot controller always fit a new sealing washer, keypad seal and case seal.

Reassemble as follows:

1. Place the PCB assembly into the rear case assembly and press it home until the SeaTalk^{ng} connectors on the PCB are fully engaged with the connectors on the rear case assembly.
2. Replace the LCD as follows:
 - i. Ensure the locking bar on the Flexi connector is raised, then fully insert the flexi.
 - ii. Lower the locking bar fully to secure the flexi tail.
 - iii. If the LCD has a protective film, remove it
3. Fit the keypad seal then, ensuring that the top flange of the keypad is located under the bottom of the LCD, place the keypad in position on the keys.
4. Remove any protective films from the bezel window.
5. Ensure that the case seal is correctly oriented, then place it in position on the bezel.
6. Firmly press the rear case assembly and the bezel together to fully engage all the clips. Pay particular attention to the clips at the bottom of the product, to ensure they are engaged.
7. Secure the rear case assembly with the case screw and a new sealing washer. Torque the screw to 2 pound inches (0.22 Nm).

2.4 PCB

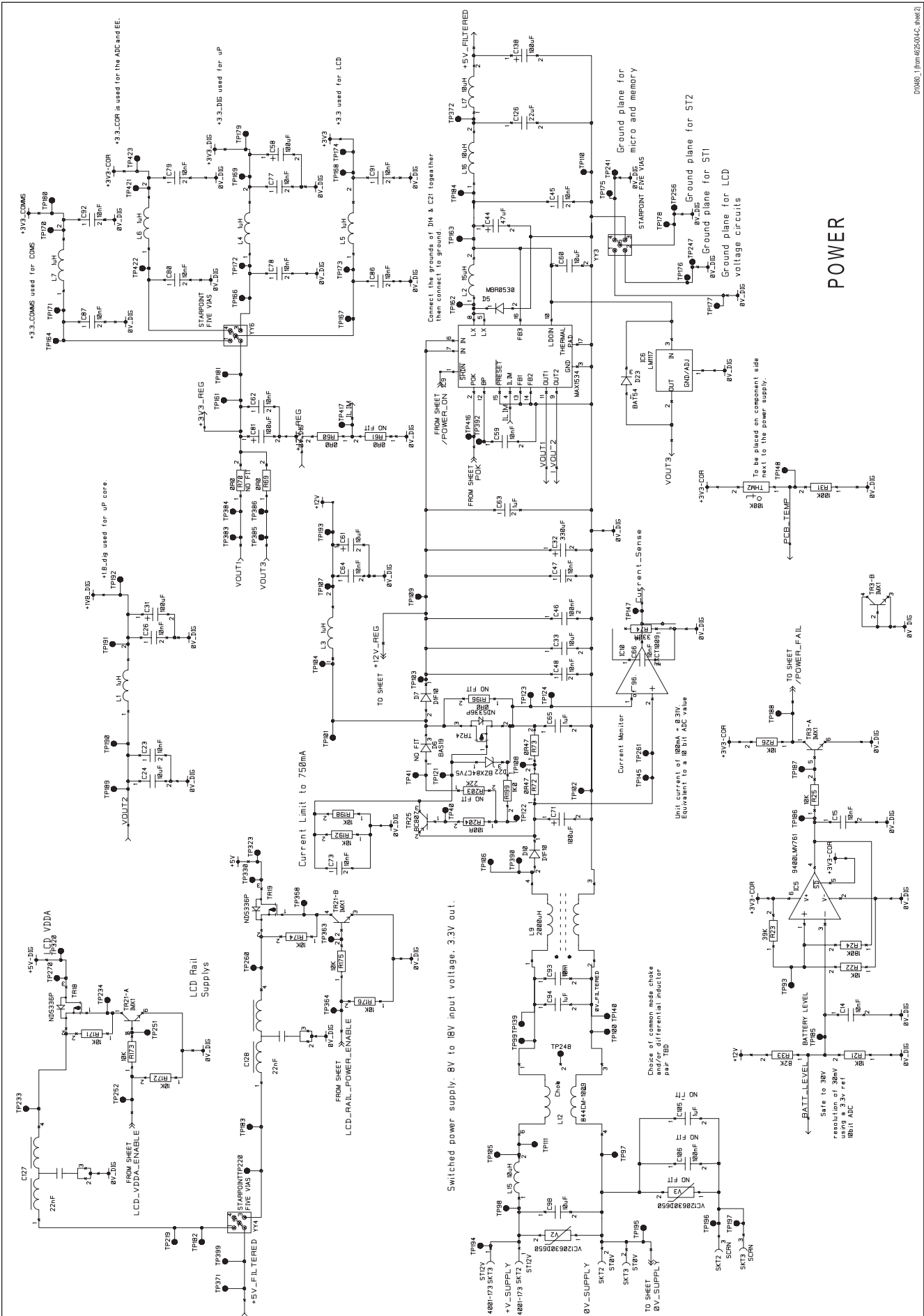


Figure 2-2: ST70 circuit diagram, sheet 1

D10480_1 (from 45504C_shec2)

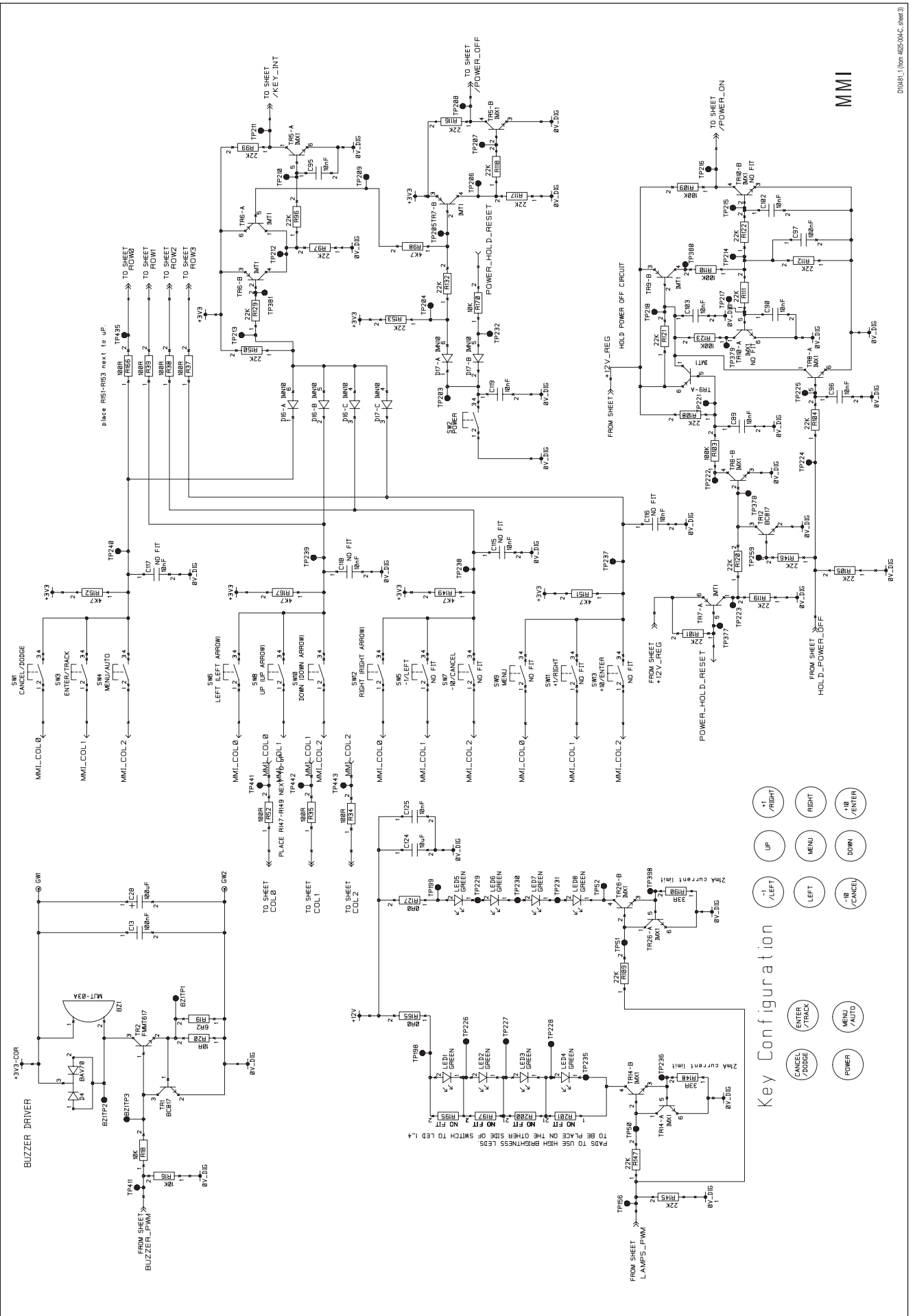
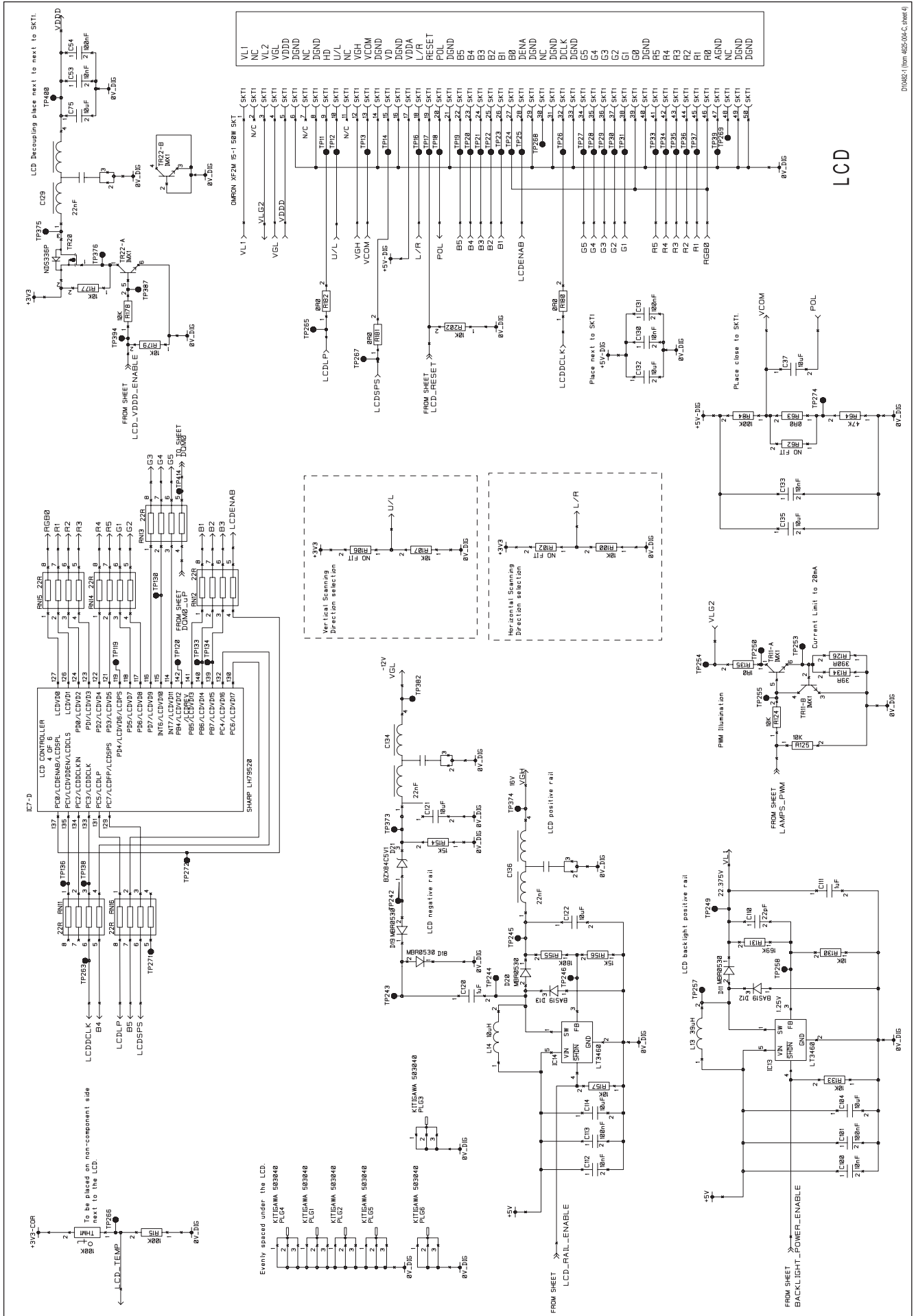


Figure 2-3: ST70 circuit diagram, sheet 2



010482-1 (from 4625-004-C, sheet 4)

Figure 2-4: ST70 circuit diagram, sheet 3

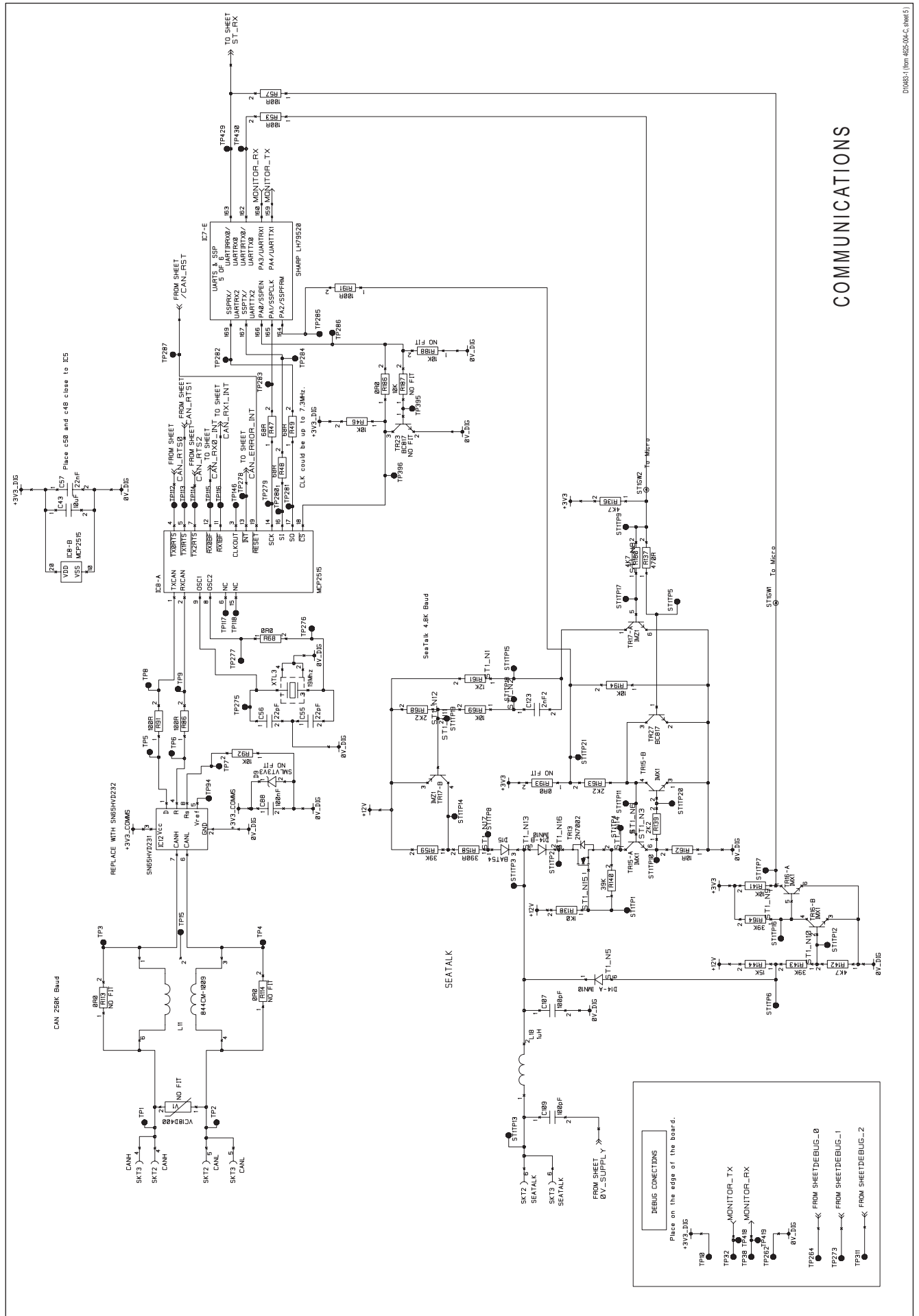


Figure 2-5: ST70 circuit diagram, sheet 4

D10485-1 (Rev 4625-004-C, sheet 5)

COMMUNICATIONS

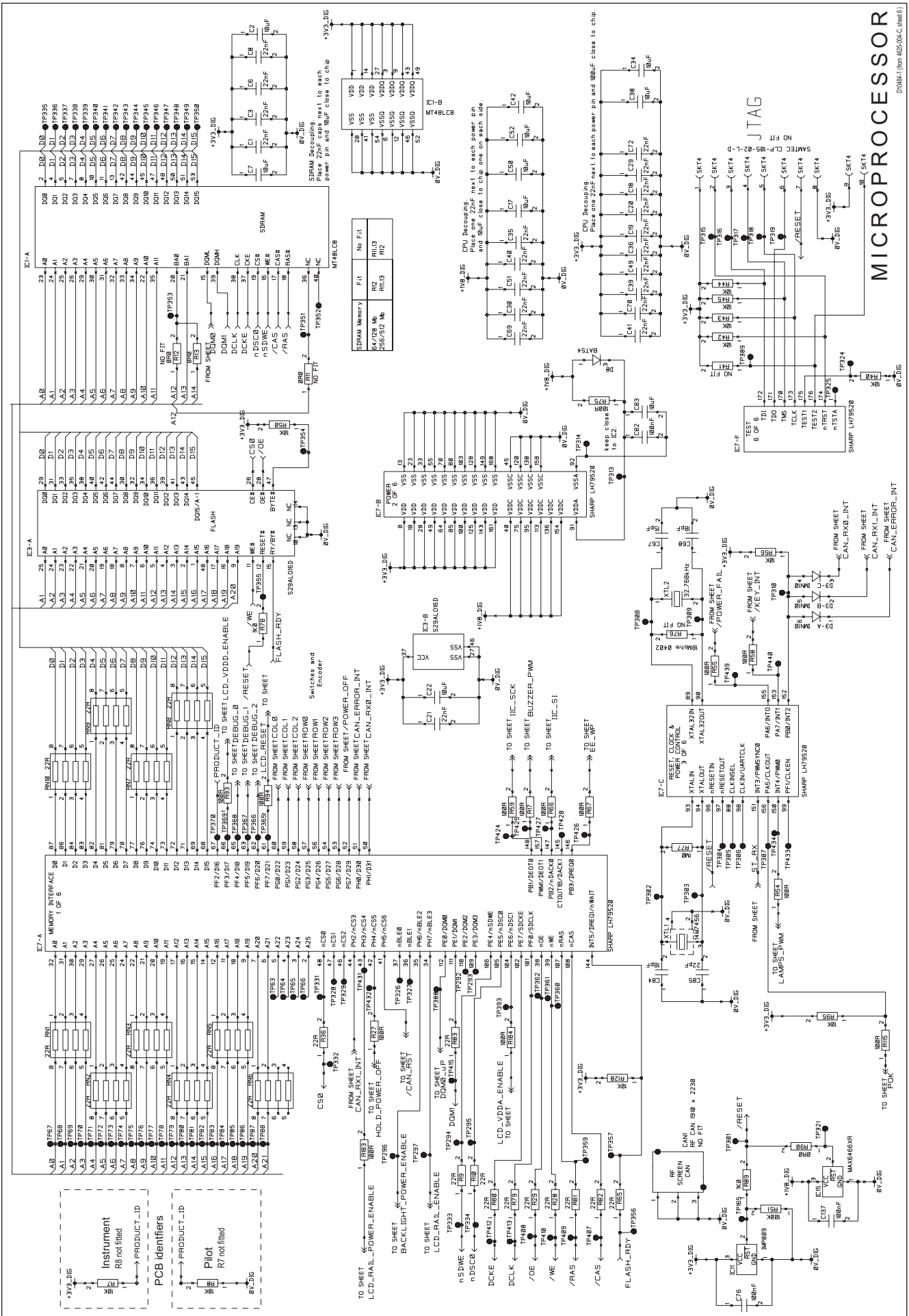
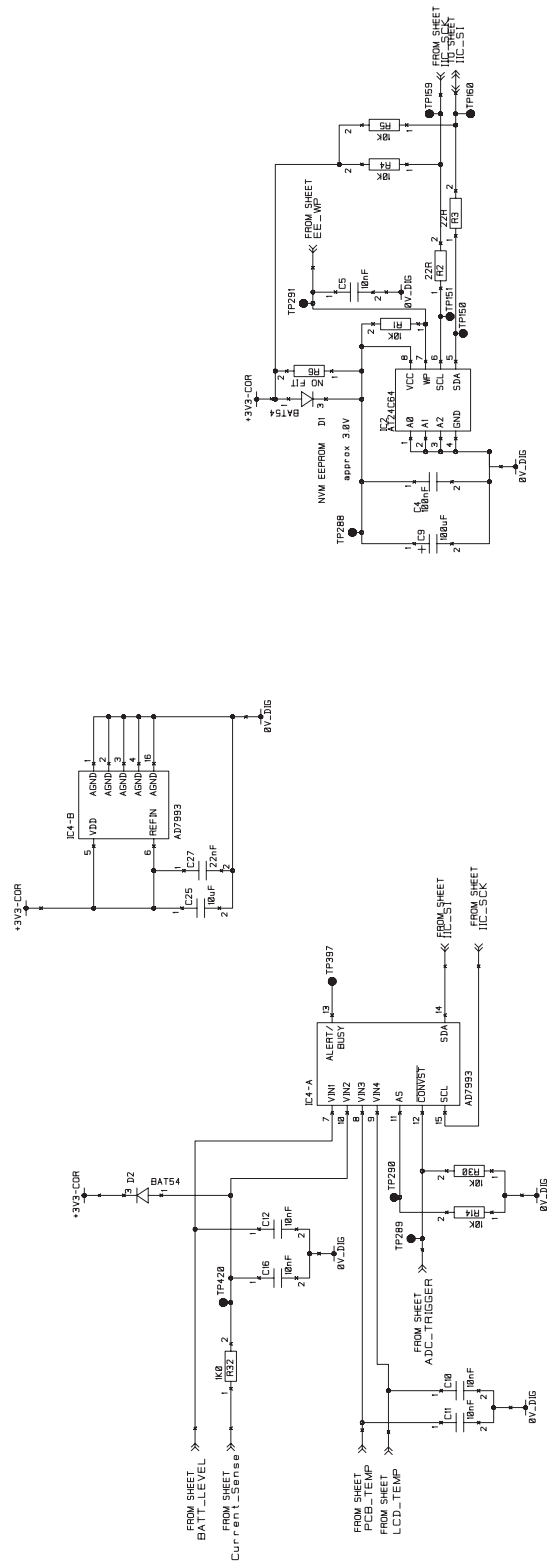


Figure 2-6: ST70 circuit diagram, sheet 5



NVM & ADC

Figure 2-7: ST70 circuit diagram, sheet 6

Components

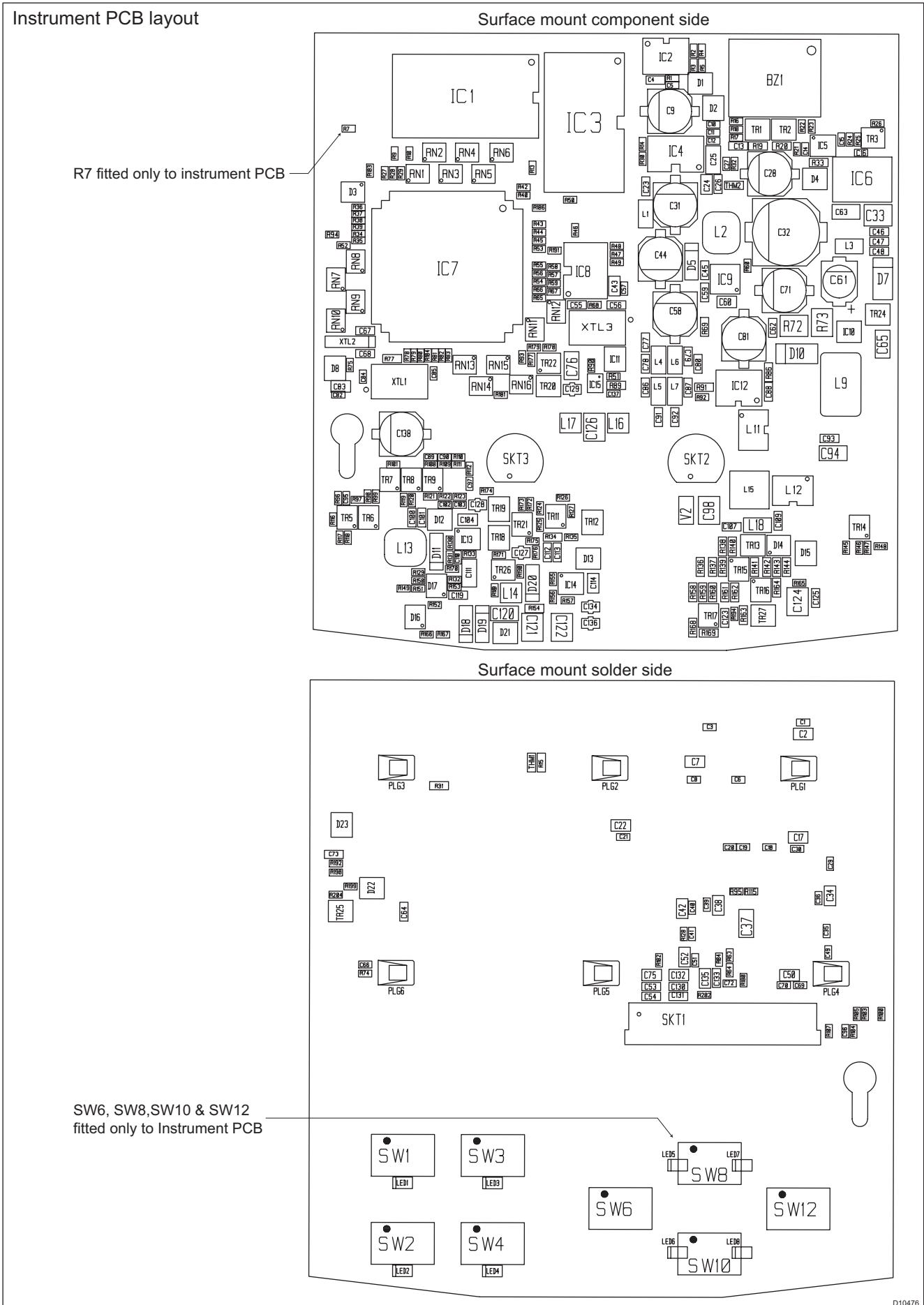


Figure 2-8: Instrument PCB

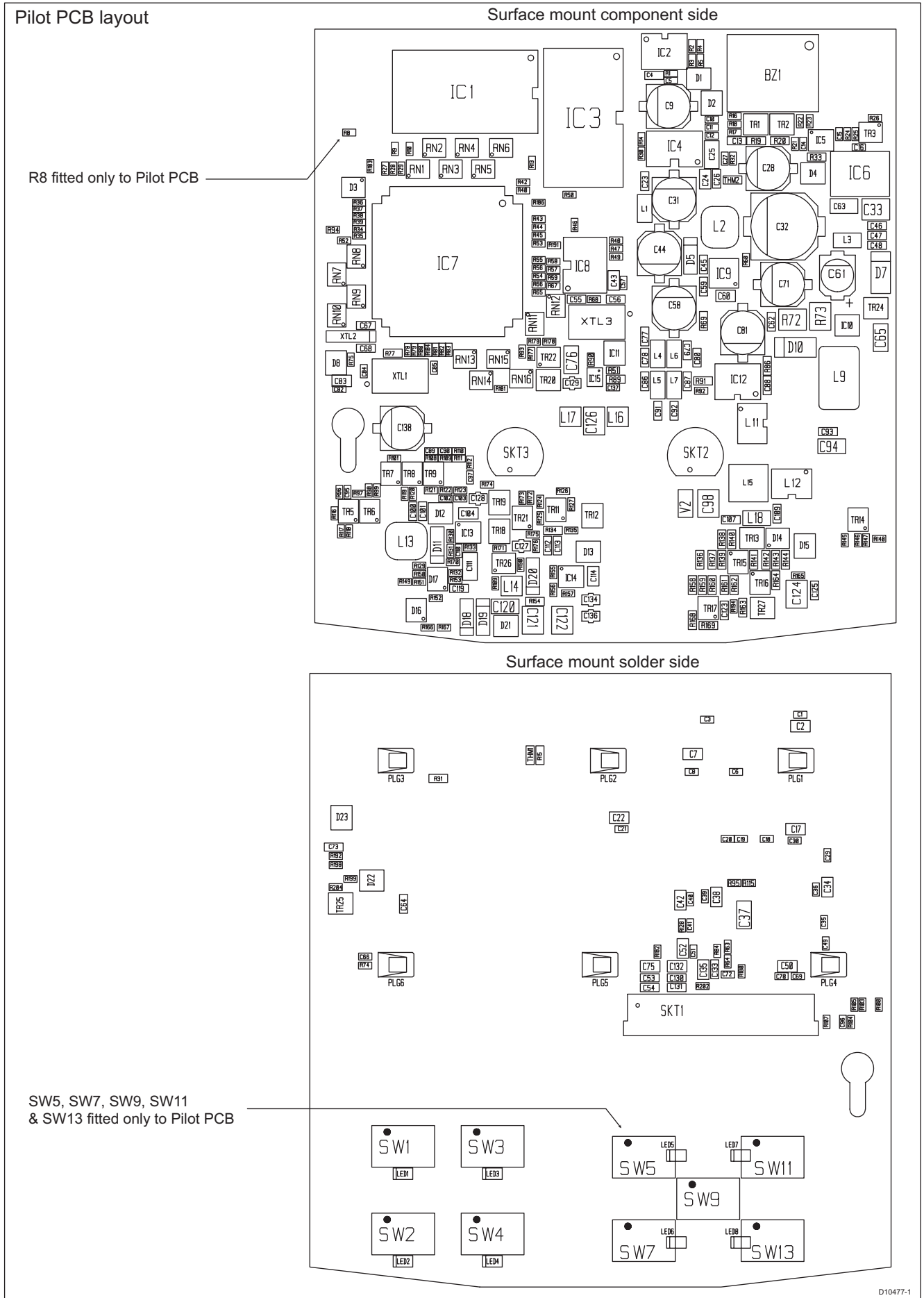


Figure 2-9: Pilot PCB

Parts list

| Reference | Part Number | Description |
|-----------|--------------|------------------------------------|
| BZ1 | 9600BUZZER2 | BUZZER 3V, 3.2KHz |
| C1 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C2 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C3 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C4 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C5 | 93QDEB10N | CAPACITOR 10NF (0402) |
| C6 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C7 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C8 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C9 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| C10 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C11 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C12 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C13 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C14 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C15 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C16 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C17 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C18 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C19 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C20 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C21 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C22 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C23 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C24 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C25 | 93CDDDB10U | CAPACITOR 10 MFD 10V,10%,1206 |
| C26 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C27 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C28 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| C29 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C30 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C31 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| C32 | 93ZEFEXX330U | CAPACITOR 330uF 25V 20% |
| C33 | 93DDFIXX10U | CAPACITOR 10uF X5R |
| C34 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C35 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C36 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C37 | 93CDDDB10U | CAPACITOR 10 MFD 10V,10%,1206 |

| Reference | Part Number | Description |
|-----------|--------------|-------------------------------------|
| C38 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C39 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C40 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C41 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C42 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C43 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C44 | 93JEEEXX47U | CAPACITOR 47uF ELECT. |
| C45 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C46 | 93ADFB100N | CAPACITOR 100NF 25V 0603 |
| C47 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C48 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C49 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C50 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C51 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C52 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C53 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C54 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C55 | 93ACHAXXX22P | CAPACITOR SM,22pF,50V,5%,0603 |
| C56 | 93ACHAXXX22P | CAPACITOR SM,22pF,50V,5%,0603 |
| C57 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C58 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| C59 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C60 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C61 | 93IEFEXX10U | CAPACITOR 10uF 25V 20% ELECTROLYTIC |
| C62 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C63 | 93261U | CAPACITOR Y5V 1206 1uF 50V |
| C64 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C65 | 93261U | CAPACITOR Y5V 1206 1uF 50V |
| C66 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C67 | 93ACHAXXX15P | CAPACITOR COG 15PF 50V 5% 0603 |
| C68 | 93ACHAXXX18P | CAPACITOR, 18pF, 50V, 5%, 0603 |
| C69 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C70 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C71 | 93KEGEXX100U | CAPACITOR 100uF 35VOLT 20% |
| C72 | 93QDEB22N | CAPACITOR 22nF 16V X7R 0402 10% |
| C73 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C75 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C76 | 93070U1 | CAPACITOR 0.1uF, 1206 |
| C77 | 93ADHBXX10N | CAPACITOR 10nF XR7 |

| Reference | Part Number | Description |
|-----------|--------------|------------------------------------|
| C78 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C79 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C80 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C81 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| C82 | 93QDDI100N | CAPACITOR 100NF (0402) |
| C83 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C84 | 93QCHA18P | CAPACITOR 18pF,50V,0402 |
| C85 | 93QCHA22P | CAPACITOR 22PF (0402) |
| C86 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C87 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C88 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C89 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C90 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C91 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C92 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C93 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C94 | 93261U | CAPACITOR Y5V 1206 1uF 50V |
| C95 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C96 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C97 | 93QDDI100N | CAPACITOR 100NF (0402) |
| C98 | 93DDFIXXX10U | CAPACITOR 10uF X5R |
| C100 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C101 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C102 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C103 | 93QDFB10N | CAPACITOR 10nF +/-10% 25V X7R 0402 |
| C104 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C107 | 93ACHAXX100P | CAPACITOR SM,100pF,50V,5%,0603 |
| C109 | 93ACHAXX100P | CAPACITOR SM,100pF,50V,5%,0603 |
| C110 | 93QCHA22P | CAPACITOR 22PF (0402) |
| C111 | 93261U | CAPACITOR Y5V 1206 1uF 50V |
| C112 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C113 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C114 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C119 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C120 | 93261U | CAPACITOR Y5V 1206 1uF 50V |
| C121 | 93DDFIXXX10U | CAPACITOR 10uF X5R |
| C122 | 93DDFIXXX10U | CAPACITOR 10uF X5R |
| C123 | 93ADHBXX2N2 | CAPACITOR 2.2nF 0603 |
| C124 | 93DDFIXXX10U | CAPACITOR 10uF X5R |

| Reference | Part Number | Description |
|-----------|---------------|--------------------------------|
| C125 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C126 | 93DDBIXXX22U | CAPACITOR 22uF 6.3V 1210 |
| C127 | 93LEHGXXX22N | CAPACITOR FEED/T SM 22nF 50V |
| C128 | 93LEHGXXX22N | CAPACITOR FEED/T SM 22nF 50V |
| C129 | 93LEHGXXX22N | CAPACITOR FEED/T SM 22nF 50V |
| C130 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C131 | 93AFFDXX100N | CAPACITOR 100nF, 0603 |
| C132 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C133 | 93ADHBXX10N | CAPACITOR 10nF XR7 |
| C134 | 93LEHGXXX22N | CAPACITOR FEED/T SM 22nF 50V |
| C135 | 93BDBI10U | CAPACITOR 10UF 6.3V 10% (0805) |
| C136 | 93LEHGXXX22N | CAPACITOR FEED/T SM 22nF 50V |
| C137 | 93QDDI100N | CAPACITOR 100NF (0402) |
| C138 | 93ZEEEXX100U | CAPACITOR 100uF 16V 20% |
| D1 | 9200BAT54 | BAT54 SCHOTTKY DIODE |
| D2 | 9200BAT54 | BAT54 SCHOTTKY DIODE |
| D3 | 9206IMN10 | TRIPLE DIODE ARRAY - ISOLATED |
| D4 | 9200BAV70 | DIODE BAV70 |
| D5 | 9200MBR0530 | DIODE SM SCHOTTKY MBR0530 |
| D7 | 9204D1F10 | DIODE RECTIFIER 1A / 100V |
| D8 | 9200BAT54 | BAT54 SCHOTTKY DIODE |
| D10 | 9204D1F10 | DIODE RECTIFIER 1A / 100V |
| D11 | 9200MBR0530 | DIODE SM SCHOTTKY MBR0530 |
| D12 | 9200BAS19 | DIODE SOT23 BAS19 |
| D13 | 9200BAS19 | DIODE SOT23 BAS19 |
| D14 | 9206IMN10 | TRIPLE DIODE ARRAY - ISOLATED |
| D15 | 9200BAT54 | BAT54 SCHOTTKY DIODE |
| D16 | 9206IMN10 | TRIPLE DIODE ARRAY - ISOLATED |
| D17 | 9206IMN10 | TRIPLE DIODE ARRAY - ISOLATED |
| D18 | 9200MBR0530 | DIODE SM SCHOTTKY MBR0530 |
| D19 | 9200MBR0530 | DIODE SM SCHOTTKY MBR0530 |
| D20 | 9200MBR0530 | DIODE SM SCHOTTKY MBR0530 |
| D21 | 9203BZX84C3V9 | DIODE ZENER 3V9 SOT23 |
| D22 | 9203BZXC7V | ZENER DIODE - BZX7V5-ZDSOT23 |
| D23 | 9200BAT54 | BAT54 SCHOTTKY DIODE |
| IC1 | 940048LC8M16 | IC SM DRAM 3.3V 133MHZ 128Mb |
| IC2 | 9401AT24C64 | IC EEPROM 24C64 SOIC-8 |
| IC3 | 9401S29AL016D | FLASH PROGRAMMED ST70 INSTRUM |
| IC4 | 9400AD7993 | 10 BIT 4 CHANNEL ADC |

| Reference | Part Number | Description |
|-----------|--------------|--------------------------------|
| IC5 | 9400LMV761 | IC COMPARATOR 2.7 TO 5V |
| IC6 | 9400LM1117 | LIN.REGULATOR - LM1117MPX-3.3 |
| IC7 | 9400LH79520 | IC SM ARM 7 SHARP MICRO |
| IC8 | 9400MCP2515 | CAN CONTROLLER |
| IC9 | 9400MAX1534 | REGULATOR 5V |
| IC10 | 9400ZXCT1009 | CURRENT SENSE AMP ZXCT1009-FTA |
| IC11 | 9400IMP809 | IC SOT23 RESET CONTROLLER |
| IC12 | 940065HVD231 | HIGH SPEED CAN TRANSCEIVER |
| IC13 | 9400LT3460 | DC TO DC CONVERTER |
| IC14 | 9400LT3460 | DC TO DC CONVERTER |
| IC15 | 9401MAX6466 | IC(SM) RESET CONTROLLER 1.2-6V |
| L1 | 9600L1 | CHIP INDUCTOR |
| L2 | 9600CAD15U | INDUCTOR 15u 1.3A |
| L3 | 9600L1 | CHIP INDUCTOR |
| L4 | 9600L1 | CHIP INDUCTOR |
| L5 | 9600L1 | CHIP INDUCTOR |
| L6 | 9600L1 | CHIP INDUCTOR |
| L7 | 9600L1 | CHIP INDUCTOR |
| L9 | 9600WURTH2M | IND C M CHOKE WE 744221 SM |
| L11 | 9600TOKOCM1 | COMMON MODE CHOKE |
| L12 | 9600TOKOCM1 | COMMON MODE CHOKE |
| L13 | 9600CAD39U | INDUCTOR 39u 0.6A |
| L14 | 9600MAGF10U | INDUCTOR 10UH |
| L15 | 9600L29 | INDUCTOR 10uH 1.19A 0.11R |
| L16 | 9600MAGF10U | INDUCTOR 10UH |
| L17 | 9600MAGF10U | INDUCTOR 10UH |
| L18 | 9600L1 | CHIP INDUCTOR |
| LED1 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED2 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED3 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED4 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED5 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED6 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED7 | 9200NO170UGC | LED GREEN 0805 20MA |
| LED8 | 9200NO170UGC | LED GREEN 0805 20MA |
| PLG1 | 9600KITAG3 | GROUNDING SPRING |
| PLG2 | 9600KITAG3 | GROUNDING SPRING |
| PLG3 | 9600KITAG3 | GROUNDING SPRING |
| PLG4 | 9600KITAG3 | GROUNDING SPRING |

| Reference | Part Number | Description | |
|-----------|-------------|---------------------------------|-------------------------------|
| PLG5 | 9600KITAG3 | GROUNDING SPRING | |
| PLG6 | 9600KITAG3 | GROUNDING SPRING | |
| R1 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R2 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R3 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R4 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R5 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R7 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | Fitted only to Instrument PCB |
| R8 | 91QAA10K | RES 10K 1% 0.063W 0402 | Fitted only to Pilot PCB |
| R9 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R10 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R13 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 | |
| R14 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R15 | 91AAAXX100K | RESISTOR 100K, 1%, 0.063W, 0603 | |
| R16 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R17 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R18 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R19 | 91ACBXXX6R2 | RESISTOR MFILM 6R2 5% 0603 | |
| R20 | 91AAAXXX10R | RESISTOR 10R,1%,0.063W,0603 | |
| R21 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R22 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R23 | 91QAA39K | RESISTOR 39K 1% 0.063W 0402 | |
| R24 | 91QAA180K | RESISTOR 180K 1% 0.063W 0402 | |
| R25 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R26 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R27 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R28 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R29 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R30 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |
| R31 | 91AAAXX100K | RESISTOR 100K, 1%, 0.063W, 0603 | |
| R32 | 91QAA1K | RESISTOR 1K0 1% 0.063W 0402 | |
| R33 | 91AAAXXX82K | RESISTOR 82K, 1%, 0.063W, 0603 | |
| R34 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R35 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R36 | 91QAA22R | RESISTOR 22R 1% 0402 | |
| R37 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R38 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R39 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 | |
| R40 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 | |

| Reference | Part Number | Description |
|-----------|-------------|---------------------------------|
| R42 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R43 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R44 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R45 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R46 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R47 | 91QAA68R | RESISTOR 68R 0402 1% |
| R48 | 91QAA68R | RESISTOR 68R 0402 1% |
| R49 | 91QAA68R | RESISTOR 68R 0402 1% |
| R50 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R51 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R52 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R53 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R54 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R55 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R56 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R57 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R58 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R59 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R60 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R636 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R64 | 91QAA47K | RESISTOR 47K 1% 0.063W 0402 |
| R65 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R66 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R67 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R68 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R69 | 91010R0 | ZERO OHM LINK, 0603 PACKAGE |
| R72 | 91040R47 | RESISTOR 0.47ohm, 1210 SIZE |
| R73 | 91040R47 | RESISTOR 0.47ohm, 1210 SIZE |
| R74 | 91QAA330R | RESISTOR 330R 0402 |
| R75 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R77 | 91AAAXXX1M | RESISTOR 1M,1% 0.063W 0603 |
| R78 | 91QAA1K | RESISTOR 1K0 1% 0.063W 0402 |
| R79 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R80 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R81 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R82 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R83 | 91QAA22R | RESISTOR 22R 1% 0402 |
| R84 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R86 | 91AAAXX100R | RESISTOR 100R, 1%, 0.063W, 0603 |

| Reference | Part Number | Description |
|-----------|-------------|------------------------------------|
| R89 | 91AAAXX1K0 | RESISTOR 1.0K,1% 0.063W 0603 |
| R90 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R91 | 91AAAXX100R | RESISTOR 100R, 1%, 0.063W, 0603 |
| R92 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R93 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R94 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R95 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R96 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R97 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R98 | 91QAA4K7 | RESISTOR 4K7 0402 1% |
| R99 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R100 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R101 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R103 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R104 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R105 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R107 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R108 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R109 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R110 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R111 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R112 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R115 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R116 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R117 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R118 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R119 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R120 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R121 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R122 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R123 | 91QAA100K | RESISTOR 100K 1% 0.063W 0402 |
| R124 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R125 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R126 | 91QAA390R | RESISTOR MFILM 390R 1% 0.063W 0402 |
| R127 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R128 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R129 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R130 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R131 | 91QAA169K | RESISTOR 169K 0402 1% 0.063W |

| Reference | Part Number | Description |
|-----------|-------------|----------------------------------|
| R132 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R133 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R134 | 91AAAXX39R | RESISTOR FILM 39R 1% 0.063W 0603 |
| R135 | 91QCA1R0 | RESISTOR 1R 0402 5% 0.063W |
| R136 | 91AAAXX4K7 | RESISTOR 4.7K,1% 0.063W 0603 |
| R137 | 91AAAXX470R | RESISTOR 470R,1% 0.063W 0603 |
| R138 | 91AAAXX1K0 | RESISTOR 1.0K,1% 0.063W 0603 |
| R139 | 91AAAXX2K2 | RESISTOR 2.2K,1% 0.063W 0603 |
| R140 | 91AAAXX39K | RESISTOR 39K,1% 0.063W 0603 |
| R141 | 91AAAXX10K | RESISTOR 10K,1% 0.063W 0603 |
| R142 | 91AAAXX4K7 | RESISTOR 4.7K,1% 0.063W 0603 |
| R1434 | 91AAAXX39K | RESISTOR 39K,1% 0.063W 0603 |
| R144 | 91AAAXX15K | RESISTOR 15K 1% 0.063W 0603 |
| R145 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R146 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R147 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R148 | 91QAA33R | RESISTOR 33R 1% 0.063W 0402 |
| R149 | 91QAA4K7 | RESISTOR 4K7 0402 1% |
| R150 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R151 | 91QAA4K7 | RESISTOR 4K7 0402 1% |
| R152 | 91QAA4K7 | RESISTOR 4K7 0402 1% |
| R153 | 91QAA22K | RESISTOR 22K, 1%, 0.063W, 0402 |
| R154 | 91AAAXX4K7 | RESISTOR 4.7K,1% 0.063W 0603 |
| R155 | 91QAA180K | RESISTOR 180K 1% 0.063W 0402 |
| R156 | 91QAAXX15K | RESISTOR 15K, 1%, 0402, 0.063W |
| R157 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R158 | 91AAAXX390R | RESISTOR 390R, 1%, 0.063W, 0603 |
| R159 | 91AAAXX39K | RESISTOR 39K,1% 0.063W 0603 |
| R160 | 91AAAXX4K7 | RESISTOR 4.7K,1% 0.063W 0603 |
| R161 | 91AAAXX12K | RESISTOR 12K 1% 0.063W 0603 |
| R162 | 91AAAXX10R | RESISTOR 10R,1%,0.063W,0603 |
| R163 | 91AAAXX2K2 | RESISTOR 2.2K,1% 0.063W 0603 |
| R164 | 91AAAXX39K | RESISTOR 39K,1% 0.063W 0603 |
| R165 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R166 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R167 | 91QAA4K7 | RESISTOR 4K7 0402 1% |
| R168 | 91AAAXX2K2 | RESISTOR 2.2K,1% 0.063W 0603 |
| R169 | 91AAAXX10K | RESISTOR 10K,1% 0.063W 0603 |
| R170 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |

| Reference | Part Number | Description |
|-----------|-------------|------------------------------|
| R171 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R172 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R173 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R174 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R175 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R176 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R177 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R178 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R179 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R180 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R181 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R182 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R183 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R184 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R186 | 91QAA0R0 | RESISTOR 0R0 1% 0.063W 0402 |
| R189 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R190 | 91QAA33R | RESISTOR 33R 1% 0.063W 0402 |
| R191 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| R192 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R194 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R198 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R199 | 91QAA1K | RESISTOR 1K0 1% 0.063W 0402 |
| R202 | 91QAA10K | RESISTOR 10K 1% 0.063W 0402 |
| R204 | 91QAA100R | RESISTOR 100R 1% 0.063W 0402 |
| RN1 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN10 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN11 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN12 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN13 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN14 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN15 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN16 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN2 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN3 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN4 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN5 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN6 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN7 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| RN8 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |

| Reference | Part Number | Description |
|-----------|---------------|---|
| RN9 | 91ZCAXXX22R | RESISTOR NETWORK 4 X 22R |
| SKT1 | 9601OMRON50 | CON SKT XF2M-5015-1A |
| SKT2 | 4001-173-B | SEATALK NG SOCKET CONNECTOR |
| SKT3 | 4001-173-B | SEATALK NG SOCKET CONNECTOR |
| SW1 | 9600BOURNS620 | SWITCH, SM, TACTILE |
| SW2 | 9600BOURNS620 | SWITCH, SM, TACTILE |
| SW3 | 9600BOURNS620 | SWITCH, SM, TACTILE |
| SW4 | 9600BOURNS620 | SWITCH, SM, TACTILE |
| SW5 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Pilot PCB |
| SW6 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Instrument PCB |
| SW7 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Pilot PCB |
| SW8 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Instrument PCB |
| SW9 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Pilot PCB |
| SW10 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Instrument PCB |
| SW11 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Pilot PCB |
| SW12 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Instrument PCB |
| SW13 | 9600BOURNS620 | SWITCH, SM, TACTILE Fitted only to Pilot PCB |
| THM1 | 9108104KT603 | THERMISTER, 0603 |
| THM2 | 9108104KT603 | THERMISTER, 0603 |
| TR1 | 9500BC817 | BC817 |
| TR11 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR12 | 9500BC817 | BC817 |
| TR13 | 95002N7002 | 2N7002 MOSFET |
| TR14 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR15 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR16 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR17 | 9500IMZ1 | DUAL TRANSISTOR ARRAY |
| TR18 | 9500NDS336P | TRANSISTOR |
| TR19 | 9500NDS336P | TRANSISTOR |
| TR2 | 9500FMMT617 | TRANSISTOR 15V 3A |
| TR20 | 9500NDS336P | TRANSISTOR |
| TR21 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR22 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR24 | 9500NDS336P | TRANSISTOR |
| TR25 | 9500BC807 | BC807 |
| TR26 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR27 | 9500BC817 | BC817 |
| TR3 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR5 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |

| Reference | Part Number | Description |
|-----------|------------------|-------------------------------|
| TR6 | 9500IMT1 | DUAL TRANSISTOR ARRAY |
| TR7 | 9500IMT1 | DUAL TRANSISTOR ARRAY |
| TR8 | 9500IMX1 | DIGITAL TRANSISTOR ARRAY |
| TR9 | 9500IMT1 | DUAL TRANSISTOR ARRAY |
| V2 | 9108VC120630D650 | SUPRESSOR, TRANSIENT, 30V |
| XTL1 | 9601CR14M7456 | CRYSTAL 14.7456MHz |
| XTL2 | 9602CR32P768 | CRYSTAL 32.768KHZ 7X1.4X1.5MM |
| XTL3 | 9601CR19 | CRYSTAL 19MHZ |

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