XA2610-01 Alarm Interface

Service Manual

MAS-02610-01-01
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Contents

Preface

Scope of Manual

This manual contains information on servicing the XA2610-01 Alarm Interface, released with two PCB versions. It also provides circuit descriptions and PCB layout drawings for both variants.

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Associated Documentation

TB8100 Installation and Operation Manual.

TB8100 Installation Guide (a subset of the Installation and Operation Manual.).

TB8100 Specifications Manual.

TB8100 Service Kit and Alarm Center User's Manuals and online Help.

TB8100 Calibration Kit User's Manual and online Help.

Technical notes are published from time to time to describe applications for Tait products, to provide technical details not included in manuals, and to offer solutions for any problems that arise.

Document Conventions

Within this manual, four types of alerts are given to the reader: Warning, Caution, Important and Note. The following paragraphs illustrate each type of alert and its associated symbol.

Warning!! **This alert is used when there is a potential risk of death or serious injury.**

Caution **This alert is used when there is a risk of minor or moderate injury to people.**

Important This alert is used to warn about the risk of equipment damage or malfunction.

Note This alert is used to highlight information that is required to ensure procedures are performed correctly.

Publication Record

Issue	Publication Date	Description
1	June 2006	first release

1 Safety and Servicing Information

This chapter contains general information on safety and servicing procedures for the Alarm Interface:

You will find specific safety and servicing information in the appropriate chapters.

1.1 Equipment Safety

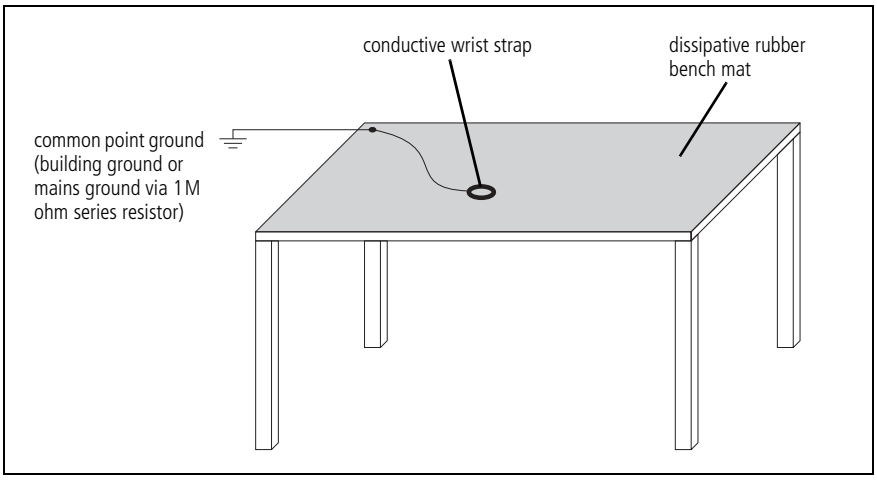
1.1.1 ESD Precautions

Important This equipment contains devices which are susceptible to damage from static charges. You must handle these devices carefully and according to the procedures described in the manufacturers' data books.

We recommend you purchase an antistatic bench kit from a reputable manufacturer and install and test it according to the manufacturer's instructions. Figure 1.1 shows a typical antistatic bench set-up.

You can obtain further information on antistatic precautions and the dangers of electrostatic discharge (ESD) from standards such as ANSI/ESD S20.20-1999 or BS EN 100015-4 1994.

Figure 1.1 Typical antistatic bench set-up



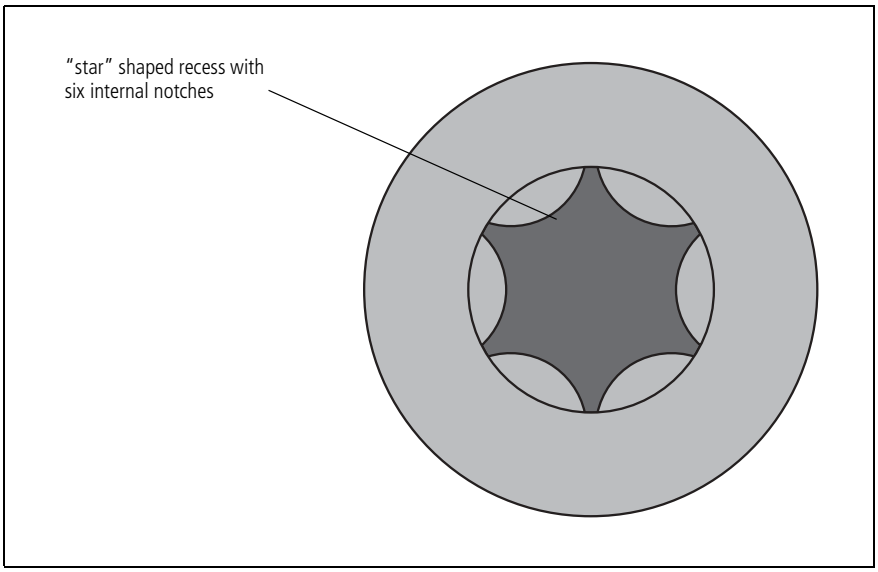
1.2 Identifying Screw Types

1.2.1 Torx Recess Head Screws

Torx recess head screws are the standard type of screw used in all XA2610-01equipment, although Pozidriv and Allen recess head screws are also used in a few special applications.

Figure 1.2 below shows a typical Torx recess head screw (actual hardware may differ slightly from this illustration due to variations in manufacturing techniques).

Figure 1.2 Identifying Torx screws



1.2.2 Pozidriv Recess Head Screws

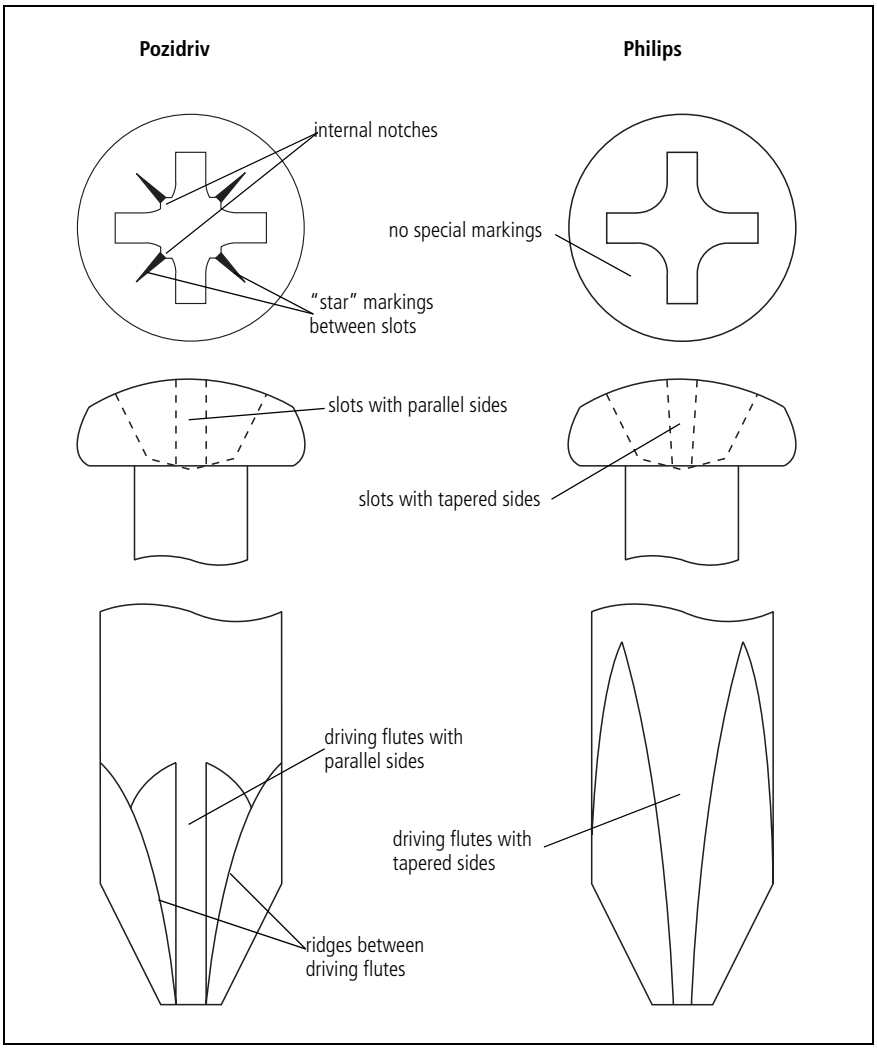
Pozidriv recess head screws are used in XA2610-01equipment in a few special applications. It is important that you use the correct type and size screwdriver to avoid damaging the screw head.

It is particularly important that you do not use Philips screwdrivers on Pozidriv screw heads as the tapered driving flutes of the Philips screwdriver do not engage correctly with the parallel-sided slots in the Pozidriv screw head. This can result in considerable damage to the screw head if the screwdriver tip turns inside the recess.

Note If you find you need excessive downwards pressure to keep the screwdriver tip in the Pozidriv screw head, you are probably using the wrong type or size screwdriver.

Figure 1.3 below shows the main differences between typical Pozidriv and Philips screw heads and screwdriver tips (actual hardware may differ slightly from these illustrations due to variations in manufacturing techniques).

Figure 1.3 Identifying Pozidriv and Philips screws and screwdrivers



1.3 Recommended Tools

It is beyond the scope of this manual to list every tool that a service technician should carry. However, the tools specifically required for servicing the XA2610-01 are listed in the table below. You can also obtain the TBA0ST2 tool kit from your nearest Tait Dealer or Customer Service Organisation. It contains the basic tools needed to install, tune and service XA2610-01equipment.

Driver/ Spanner	Size	Location / Function
Torx T10[a]	M3	all M3 screws
Torx T20[a]	M4	all M4 screws
Pozidriv PZ3	M6	DC input terminals on the PMU

a. Included in the TBA0ST2 tool kit.

1.4 Replacing Components

Ensure that any replacement components are of the same type and specifications as the originals. This will prevent the performance and safety of the XA2610-01equipment from being degraded.

1.4.1 Surface Mount Devices

Important Surface mount devices (SMDs) require special storage, handling, removal and replacement techniques. This equipment should be serviced only by an approved Tait Dealer or Customer Service Organisation equipped with the necessary facilities. Repairs attempted with incorrect equipment or by untrained personnel may result in permanent damage. If in doubt, contact your nearest Tait Dealer or Customer Service Organisation.

1.4.2 Leaded Components

Whenever you are doing any work on the PCB that involves removing or fitting components, you must take care not to damage the copper tracks or pads. The two satisfactory methods of removing components from plated-through hole (PTH) PCBs are detailed below.

Desoldering Iron Method

This method requires the use of a desoldering station.

1. Place the tip over the lead and, as the solder starts to melt, move the tip in a circular motion.
2. Start the suction and continue the movement until three or four circles have been completed.
3. Remove the tip while continuing suction to ensure that all solder is removed from the joint, then stop the suction.
4. **Before** pulling the lead out, ensure it is not stuck to the plating.
5. If the lead is still not free, resolder the joint and try again.

Note The desoldering iron does not usually have enough heat to desolder leads from the ground plane. Additional heat may be applied by holding a soldering iron on the tip of the desoldering iron (this may require some additional help).

Component Cutting Method

1. Cut the leads on the component side of the PCB.
2. Heat the solder joint **sufficiently** to allow **easy** removal of the lead by drawing it out from the component side: do **not** use undue force.
3. Fill the hole with solder and then clear with solderwick.

1.5 Regulatory Information

Any modifications you make to this equipment which are not authorised by Tait Electronics Ltd may invalidate your compliance authority's approval to operate the equipment.

1.6 PCB Information

All PCBs are identified by a unique 10 digit IPN (internal part number) which is printed onto the PCB (usually on the top side), as shown in the example below.

The last two digits of this number define the issue status, which starts at 01 and increments through 02, 03, 04 etc. as the PCB is updated.

2 Description

2.1 Features

The XA2610-01 Alarm Interface is a single PCB board, mounted to the rear of the TB8100 Reciter fitted with an isolated E&M SIF (System Interface) board.

The TB8100 Interface board provides audio connections, digital inputs and internal alarm monitoring for third party devices. All the digital inputs and outputs are accessed by the Task Manager software.

The board provides an opto isolated interface for the TB8100 inputs DIG_1_IN to DIG_5_IN.

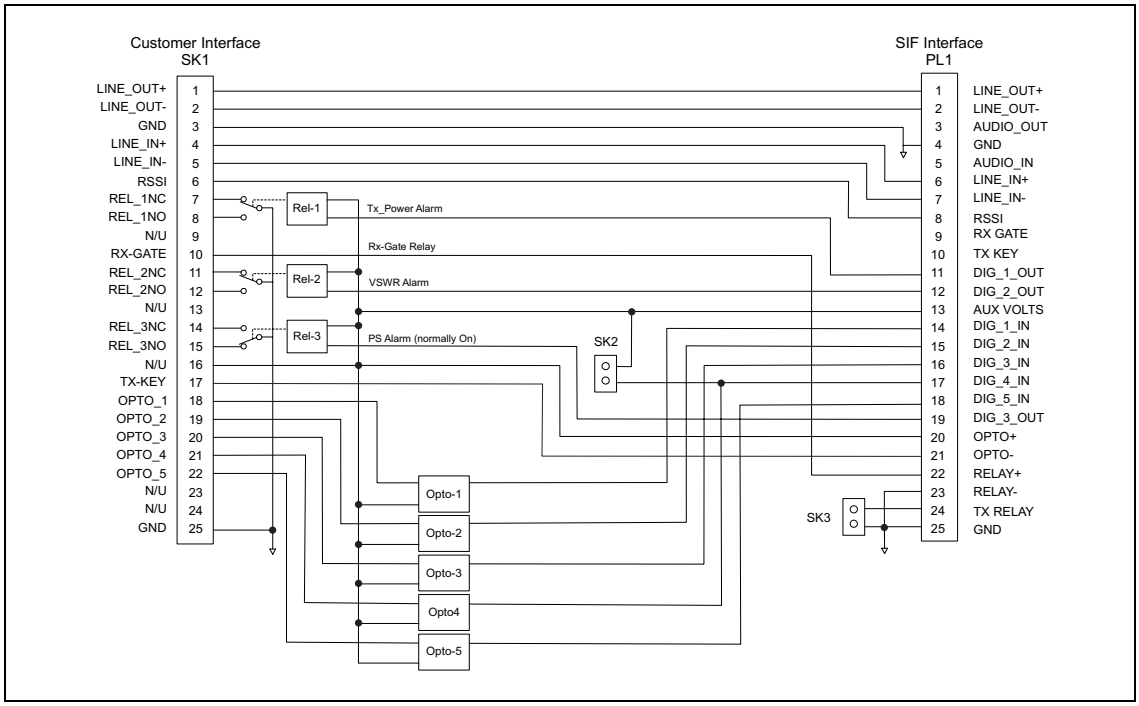
It has three relay outputs that can be controlled by the TB8100 outputs DIG_1_OUT, DIG_2_OUT and DIG_3_OUT.

The DIG_ 4_IN & Tx relay are both accessible through connector blocks SK2 & SK3 respectively.

The XA2610-01 has been released in two versions easily identifiable by the IPN on the PCB.

- First release with modification: 228-26101-00
- Second release with added functionality: 228-26101-01

Figure 2.1 block diagram



2.1.1 Digital Inputs

The four digital inputs are optically isolated and fed to the base station under control of the Task Manager. The digital inputs are used to select the base station operating channel.

A dedicated Tack Manager script has been written to satisfy the following customer specific channel selection.

Input status					**Action**
DIG_1_IN	DIG_2_IN	DIG_3_IN	DIG_4_IN	DIG_5_IN	
1	0	0	0	X	Selection of 1st operating channel 1 Freq. TX= TX1; Freq. Rx = RX1
0	1	0	0	X	Selection of 2nd operating channel 2 Freq. TX= TX2; Freq. Rx = RX2
0	0	1	0	X	Selection of 3rd operating channel 3 Freq. TX= TX3; Freq. Rx = RX3
1 0 0 0	0 1 0 0	0 0 1 0	1 1 1 1	X	Selection of 4th operating channel 4 Freq. TX= Freq. Rx = TX1
0	0	0	0	x	No Channel selected (no signal on Line Out)

DIG_5_IN is currently not assigned

Regardless of the state of DIG_1_IN to DIG_3_IN, when DIG_4_IN is activated the base station will switch to channel 4.

2.1.2 Digital Outputs

The three digital outputs are solid state relays. The functionality described below is specific to one particular customer. The Task Manager script can be re-written for different functionality except for the Supply Alarm.

Tx Power Low The trigger level for a low transmit power is defined in the Task Manager.
Status: active only when an alarm condition present.

VSWR (ROS) The trigger level for this alarm is set by the Task Manager. This alarm can be found as a contact to GND on pin 12 of SK1.
Status: active only when an alarm condition present.

Supply Alarm This relay is de-activated when the supply is switched off or fails. During normal operation the NO contact is connected to GND at pin 15 of SK1 and goes high impedance when there is no supply.

Note Both contacts NO and NC of all three relays are brought out to the customer interface SK1.

Note Each digital input and each digital output can individually be set to either active high or active low via the Task Manager Script.

Note The Task Manager sees the supply alarm (DIG_3_OUT) as digital output 6 in the software.

Note The TB8100 documentation describes pin 19 on the SIF as DIG_6_IN. This pin can also act as an output called DIG_3_OUT. There are voltage and current limitations associated with this output as it is shared with DIG_6_IN. Refer to the TB8100 documentation for more details.

2.1.3 Other Outputs

RSSI has been linked through to pin 6 on SK1.

Rx gate is passed via the SIF internal relay to pin 10 on SK1.

Line out is passed through to pins 1 and 2 on SK1.

2.1.4 Other Inputs

Tx key is passed from pin 17 on SK1 to the SIF internal optocoupler.

Line in is passed from pins 4 and 5 to the SIF.

2.2 Operation

If the base station has as VSWR fault, relay 2 will activate connecting ground to Pin 12 of SK1. The base station will be in this state until it has a hard reset (i.e Turn base station off then back on again).

If output TX power is lower than the Task Manager set threshold, relay 1 will connect to ground Pin 8 of SK1. The base station will be in this state until it has a hard reset (i.e turn base station off then back on again).

If there is a fault with the PMU, relay 3 will connect to ground pin 14 of SK1. The base station will be in this state until it has a hard reset (i.e turn base station off then back on again).

If DIG_1_IN is activated, the base station will change to the programmed channel number 001, where it will stay until another digital input is activated.

If DIG_2_IN is activated, the base station will change to the programmed channel number 002, where it will stay until another digital input is activated.

If DIG_3_IN is activated, the base station will change to the programmed channel number 003, where it will stay until another digital input is activated.

With XA2610-01-PBA Rev 001 If DIG_4_IN is activated, the base station will change to the programmed Channel number 004, where it will stay until another digital input is activated.

With XA2610-01-PBA Rev 003 If DIG_4_IN is activated, the base station will change to the programmed channel number 004, where it will stay regardless of the state of DIG_IN_1 to DIG_IN_3.

2.3 XA2610-01 Connectors

XA2610-01 Interface PL1 to Isolated E+M

pin	Signal Name	Signal Type	Notes
1	Line_Out+	Audio output	The balanced audio output is a 600ohm audio interface. The output level can be set over the range –20dBm to +10dBm, for 60% modulation. This output is transformer isolated.
2	Line_Out-	Audio output	
3	AUDIO_OUT	Not used	
4	GROUND	GROUND	
5	AUDIO_IN	Not used	
6	LINE IN+	Audio input	The balanced audio input is a 600 ohm audio interface. The input level can be set over the range –20dBm to +10dBm, for 60% modulation. This input is transformer isolated.
7	LINE_IN-	Audio input	
8	RSSI_OUT	RSSI	The RSSI output is DC coupled and provides a voltage proportional to the received signal strength with a user-defined characteristic.
9	RX_GATE_OUT	Not used	
10	TX_KEY_IN	Not used	
11	DIG_1_OUT	Drives Relay_1	The digital outputs are open collector outputs. The maximum current rating of these outputs is 100mA. The maximum voltage that should be applied to these outputs is 30V.
12	DIG_2_OUT	Drives Relay_2	
13	AUX_V	Power for Relays and Optos	+13.65 VDC and is current limited to 3A.
14	DIG_1_IN	Opto isolated input	The digital inputs have 5V logic thresholds and are active low.
15	DIG_2_IN	Opto isolated input	

pin	Signal Name	Signal Type	Notes
16	DIG_3_IN	Opto isolated input	
17	DIG_4_IN	Opto isolated input	
18	DIG_5_N	Opto isolated input	
19	DIG_OUT_3	Drives Relay_3	DIG_OUT_3 drives relay_3 and is activated using Task Manager. **Note: The Task Manager see this as DIG_6_IN, it has voltage and current limitations.**
20	OPTO_+	To +Aux V via 1k5	Tx Key input electrically isolated. The input may be driven with a voltage in the range ±10V to ±60V. The input current is regulated to 10mA.
21	OPTO_-	Tx-Key input Active low	
22	RELAY_+	Relay Output	Rx Gate output electrically isolated. Then maximum output current is 120mA. The maximum voltage that should be applied across this output is ±350V.
23	RELAY_-	Ground	
24	TX_RELAY	Optional use via a 2way connector block.	The Tx relay driver output is an open collector output. The maximum current rating of this output is 250mA. The maximum voltage that should be applied to this output is 30V.
25	GROUND	Ground	

TA2601-01 Interface SK1 Customer connector

pin	Signal Name	Signal Type	Notes
1	LINE_OUT+	Audio Output	The balanced audio output is a 600ohm audio interface. The output level can be set over the range –20dBm to +10dBm, for 60% modulation. This output is transformer isolated.
2	LINE_OUT-	Audio Output	
3	GND	Ground	
4	LINE_IN+	Audio Input	The balanced audio input is a 600ohm audio interface. The input level can be set over the range –20dBm to +10dBm, for 60% modulation. This input is transformer isolated.
5	LINE_IN-	Audio Input	
6	RSSI	RSSI Output	The RSSI output is DC coupled and provides a voltage proportional to the received signal strength with a user-defined characteristic.
7	REL_1_NC	Relay_1 Output	Relay has a nominal switching capacity of 2A @ 30VDC or 0.5A @ 125VAC
8	REL_1_NO	Relay_1 Output	
9	N/U	Not used	
10	RX_GATE	Opto-isolated output	Rx Gate output electrically isolated. The maximum output current is 120mA. The maximum voltage that should be applied across this output is ±350V.

pin	Signal Name	Signal Type	Notes
11	REL_2_NC	Relay_2 Output	Relay has a nominal switching capacity of 2A @ 30VDC or 0.5A @ 125VAC
12	REL_2_NO	Relay_2 Output	
13	N/U	Not used	
14	REL_3_NC	Relay_3 Output	Relay has a nominal switching capacity of 2A @ 30VDC or 0.5A @ 125VAC
15	REL_3_NO	Relay_3 Output	
16	AUX_VOLTS	+13.65VDC	Passed from PL1 pin 13 +13.65 VDC and is current limited to 3A.
17	TX-KEY	Opto-Isolated input	Tx Key input electrically isolated. The input is designed for an active low.
18	OPTO_1	Opto-isolated input	Opto isolated inputs that are used to activate the digital inputs 1 to 5 which are available to the Task Manager. The inputs are active low and require a sink current of >10mA to operate.
19	OPTO_2	Opto-isolated input	Opto isolated inputs that are used to activate the digital inputs 1 to 5 which are available to the Task Manager. The inputs are active low and require a sink current of >10mA to operate.
20	OPTO_3	Opto-isolated input	Opto isolated inputs that are used to activate the digital inputs 1 to 5 which are available to the Task Manager. The inputs are active low and require a sink current of >10mA to operate.
21	OPTO_4	Opto-isolated input	Opto isolated inputs that are used to activate the digital inputs 1 to 5 which are available to the Task Manager. The inputs are active low and require a sink current of >10mA to operate.
22	OPTO_5	Opto-isolated input	Opto isolated inputs that are used to activate the digital inputs 1 to 5 which are available to the Task Manager. The inputs are active low and require a sink current of >10mA to operate.
23	N/U	Not used	
24	N/U	Not used	
25	GND	Ground	

2.4 Circuit Description

The audio out lines from the TB8100 are straight through connections from PL1 to SK1.
The RSSI and E+M lines are also routed directly through from PL1 to SK1.
The TX Key is an opto-coupled input that is active low and turns on LED DS6 when it is activated at pin 17 of SK1.

The inputs DIG_1_IN to DIG_5_IN are isolated from external devices through opto-couplers DS1 to DS5; at least a 10mA-sink current is required

to activate each of the inputs.
The green LEDs DS7 to DS11 will turn on to indicate the corresponding opto coupler input has be activated.

Three relay outputs, each with corresponding normally open connection and normally closed connections are available at pins 7, 8, 11, 12, 14 & 15 of SK1.
The relays are driven by the outputs DIG_1_OUT, DIG_2_OUT and DIG_3_OUT on PL1 and are controlled by the TB8100 Task Manager.
The two red LEDs DS12 and DS13 will turn on to indicate the corresponding relay input has been activated. On the first release board DS14 does not operate because of the addition of the 560Ω resistor and removal of R15. On the second release board, the red LED DS14 will turn on to indicate the corresponding relay (relay 3) input has been deactivated.

Note Relay 3 is in active state when base station is in a non-fault condition.

The relays have a nominal switching capacity of 2A @ 30VDC or 0.5A @ 125V AC.

The board gets its 13V DC power supply from the auxiliary supply of the TB8100 PMU on pin 13 of PL1 and is also passed to the 13V DC supply on pin16 of SK1.

Note The maximum current load on this supply can not exceed 2A.

Capacitors C1 to C12 are used to reduce EMC interference to and from the interface Board.

All redundant pins on SK1, PL1 & relays 1-3, are connected to through hole plated vias so they are available for future use.

The second release board uses the transistor Q1 to allow DIG_3_OUT to switch relays with different manufactures tolerance levels. It also enables the use of the red LED DS14 for fault diagnosis.

3 First Release PCB Information

The XA2610-01 Alarm Interface has one board, for which PCB information is included in this section:

- XA2610-01-PBA Alarm Interface Board (PCB IPN 228-26101-00))

The following information is included for the board:

- PCB parts list and Grid references
- PCB layout drawings for both sides of the board
- Circuit diagram

3.1 XA2610-01-PBA Rev 001 Board

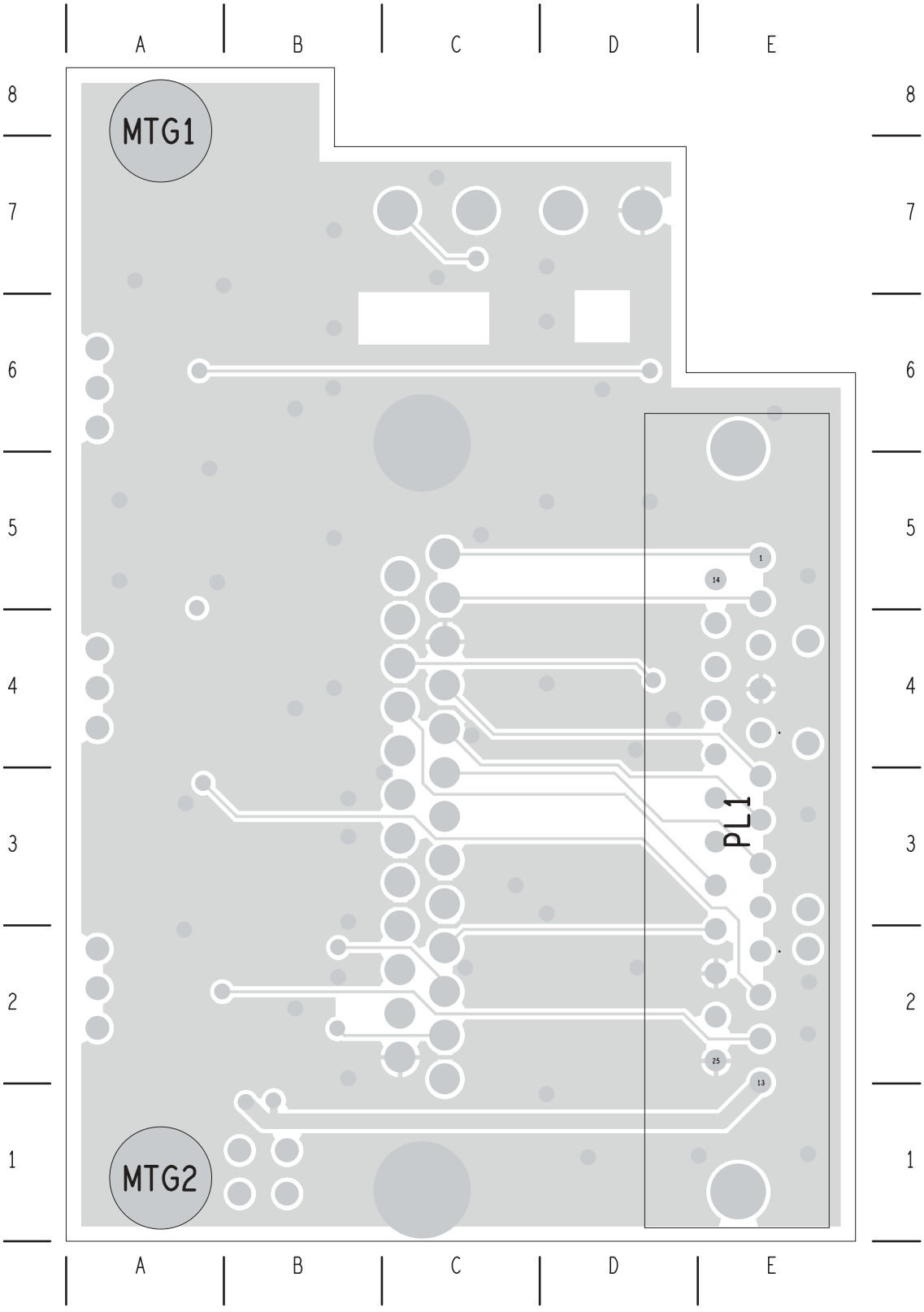
(PCB IPN 228-26101-00)

3.1.1 Parts List

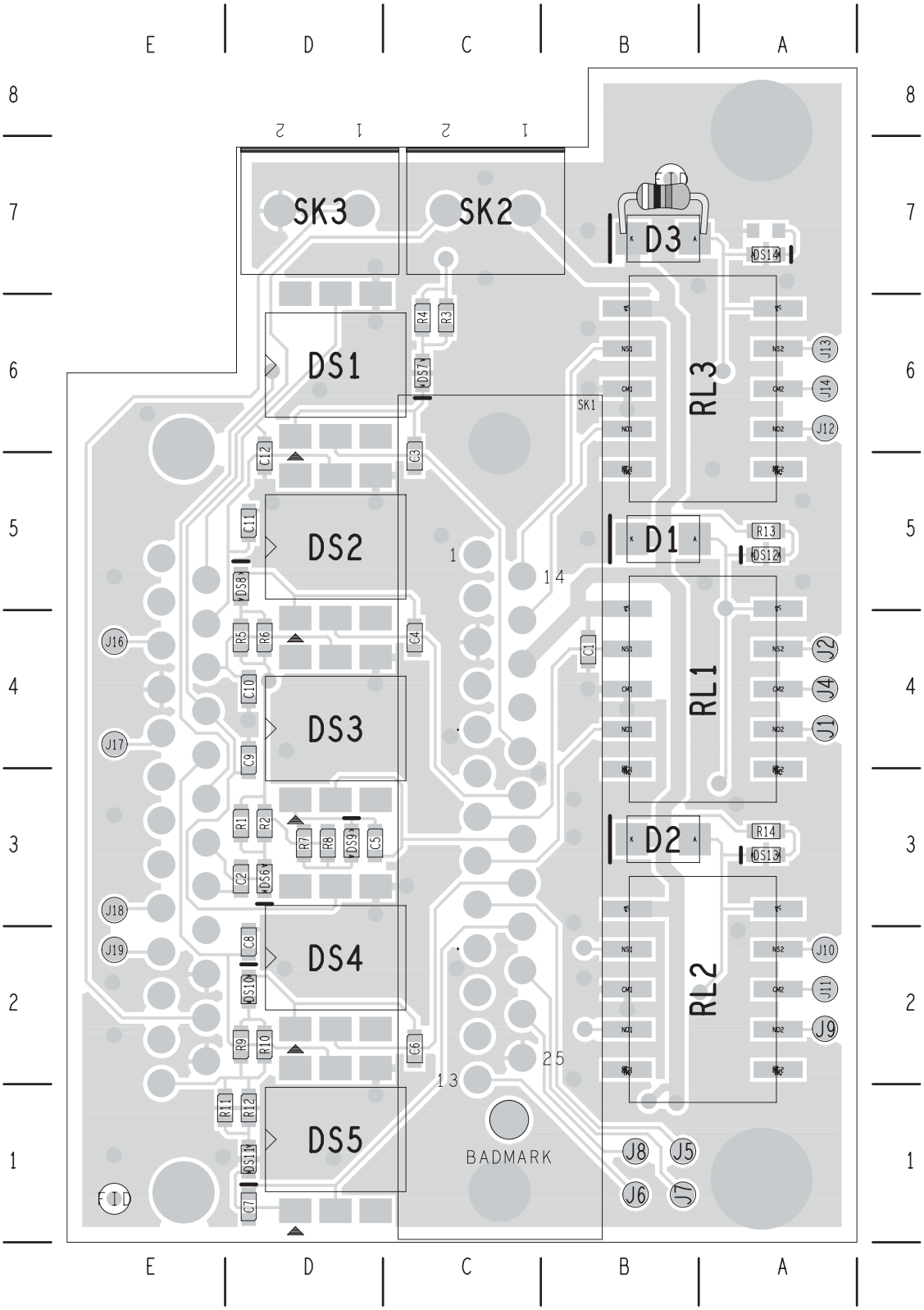
Part	IPN	Description	Layout	Circuit
C1	018-14100-00	CAP 0603 1n 50V X7R ±10%	B4	1E4
C2	018-14100-00	CAP 0603 1n 50V X7R ±10%	D3	1E5
C3	018-14100-00	CAP 0603 1n 50V X7R ±10%	C5	1E5
C4	018-14100-00	CAP 0603 1n 50V X7R ±10%	C4	1D5
C5	018-14100-00	CAP 0603 1n 50V X7R ±10%	D3	1D5
C6	018-14100-00	CAP 0603 1n 50V X7R ±10%	C2	1C5
C7	018-14100-00	CAP 0603 1n 50V X7R ±10%	D1	1C5
C8	018-14100-00	CAP 0603 1n 50V X7R ±10%	D2	1C6
C9	018-14100-00	CAP 0603 1n 50V X7R ±10%	D4	1C7
C10	018-14100-00	CAP 0603 1n 50V X7R ±10%	D4	1D7
C11	018-14100-00	CAP 0603 1n 50V X7R ±10%	D5	1D8
C12	018-14100-00	CAP 0603 1n 50V X7R ±10%	D5	1E8
D1	001-10011-74	DIODE MRA4004T3 1A/400V	B5	1F5
D2	001-10011-74	DIODE MRA4004T3 1A/400V	B3	1F5
D3	001-10011-74	DIODE MRA4004T3 1A/400V	B7	1E5
DS1	002-10020-51	IC 4N35 OPTO 6pin SODIP	D6	1E7
DS2	002-10020-51	IC 4N35 OPTO 6pin SODIP	D5	1D7
DS3	002-10020-51	IC 4N35 OPTO 6pin SODIP	D4	1D7
DS4	002-10020-51	IC 4N35 OPTO 6pin SODIP	D2	1C6
DS5	002-10020-51	IC 4N35 OPTO 6pin SODIP	D1	1C6
DS6	008-10004-00	LED 0603 grn KGKT Ultrabright	D3	1E5
DS7	008-10004-00	LED 0603 grn KGKT Ultrabright	C6	1E5
DS8	008-10004-00	LED 0603 grn KGKT Ultrabright	D5	1D5
DS9	008-10004-00	LED 0603 grn KGKT Ultrabright	D3	1D5
DS10	008-10004-00	LED 0603 grn KGKT Ultrabright	D2	1C5
DS11	008-10004-00	LED 0603 grn KGKT Ultrabright	D1	1C5
DS12	008-10002-00	LED 0603 red KRKT Ultrabright	A5	1F6
DS13	008-10002-00	LED 0603 red KRKT Ultrabright	A3	1F6
DS14	008-10002-00	LED 0603 red KRKT Ultrabright	A7	1E6
PL1	240-00021-22	PLG 25wy drng w/mtg H/W	E5	1F10
R1	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1E5
R2	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1E5
R3	038-14220-00	RES 0603 2k2 5% 1/10W	C6	1E5
R4	038-14220-00	RES 0603 2k2 5% 1/10W	C6	1E5
R5	038-14220-00	RES 0603 2k2 5% 1/10W	D4	1D5
R6	038-14220-00	RES 0603 2k2 5% 1/10W	D4	1D5
R7	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1D5
R8	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1D5
R9	038-14220-00	RES 0603 2k2 5% 1/10W	D2	1C5

Part	IPN	Description	Layout	Circuit
R10	038-14220-00	RES 0603 2k2 5% 1/10W	D2	1C5
R11	038-14220-00	RES 0603 2k2 5% 1/10W	E1	1C5
R12	038-14220-00	RES 0603 2k2 5% 1/10W	D1	1C5
R13	038-14270-00	RES 0603 2k7 5% 1/10W	A5	1F6
R14	038-14270-00	RES 0603 2k7 5% 1/10W	A3	1F6
R15	DNI	Do not insert	A7	1F6
RL1	237-10010-00	RELAY 12V DPDT 10pin SMD	A4	1F5 1F4 1B1
RL2	237-10010-00	RELAY 12V DPDT 10pin SMD	A2	1F4 1B2 1F5
RL3	237-10010-00	RELAY 12V DPDT 10pin SMD	A6	1E5 1F4 1B3
SK1	240-02020-20	SKT 25wy drng PCB + full H/W	C5	1F1
SK2	240-04030-09	TERM 2wy block PCB mtg 5mm	C7	1E9
SK3	240-04030-09	TERM 2wy block PCB mtg 5mm	D7	1E9
J1		Test Point	A4	1C1
J2		Test Point	A4	1B1
J4		Test Point	A4	1B1
J5		Test Point	B1	1F2
J6		Test Point	B1	1F2
J7		Test Point	B1	1E2
J8		Test Point	B1	1E2
J9		Test Point	A2	1C2
J10		Test Point	A2	1B2
J11		Test Point	A2	1B2
J12		Test Point	A6	1C3
J13		Test Point	A6	1B3
J14		Test Point	A6	1B3
J16		Test Point	E4	1G9
J17		Test Point	E4	1G9
J18		Test Point	E3	1F9
J19		Test Point	E2	1F9
MTG1		Mounting Hole	A8	1B4
MTG2		Mounting Hole	A1	1B4
Modification	030-53560-20	RES TH 4x1.6 560R 5% 0.4W	B7	E5

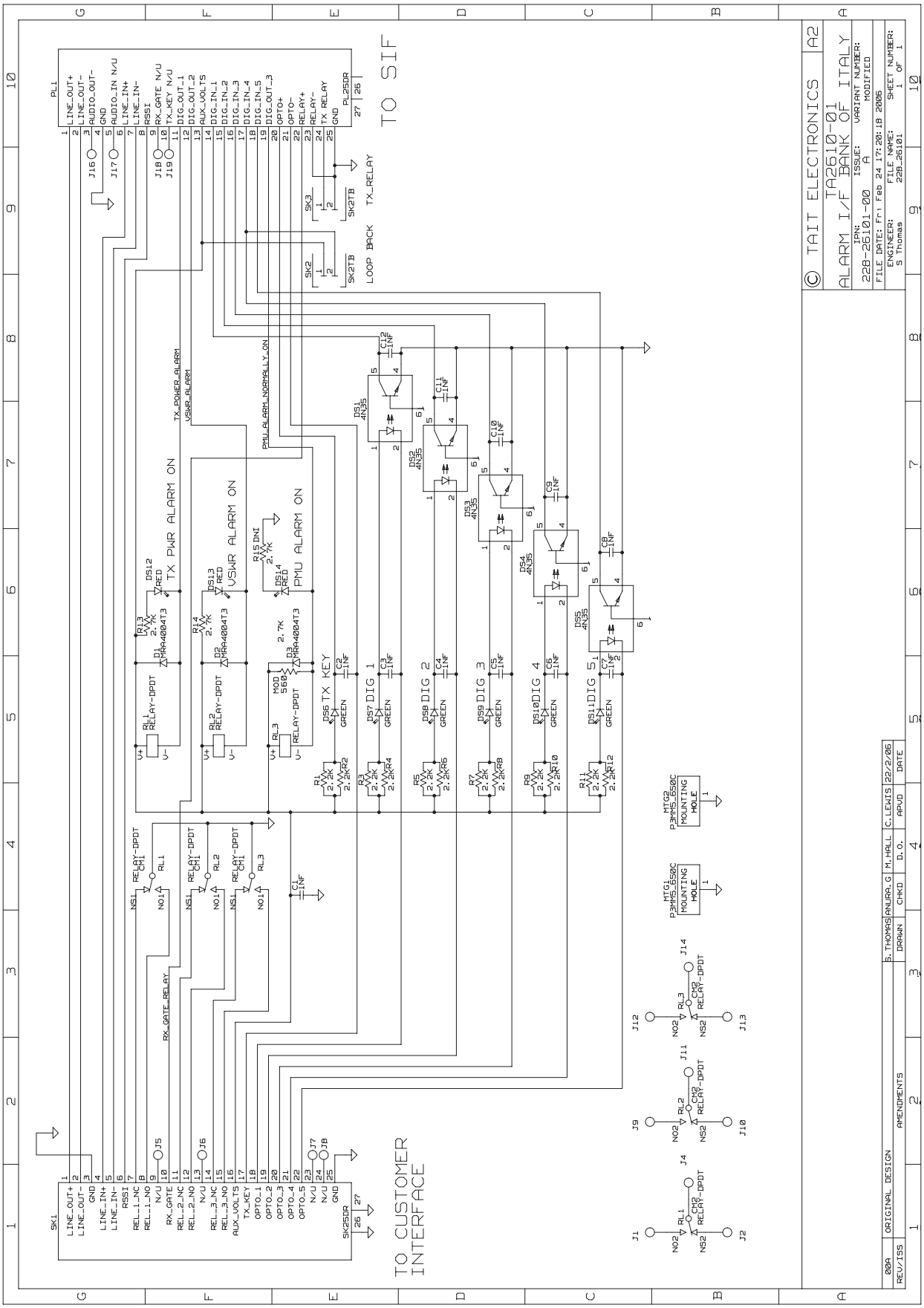
3.1.2 PCB Layout - top side



3.1.3 PCB Layout - bottom side



3.1.4 Circuit Diagram (page 1 of 1)



4 Second Release PCB Information

The XA2610-01 Alarm Interface has one board, for which PCB information is included in this section:

- XA2610-01-PBA Alarm Interface Board (PCB IPN 228-26101-01))

The following information is included for the board:

- PCB parts list and Grid references
- PCB layout drawings for both sides of the board
- Circuit diagram

4.1 XA2610-01-PBA Rev 003 Board

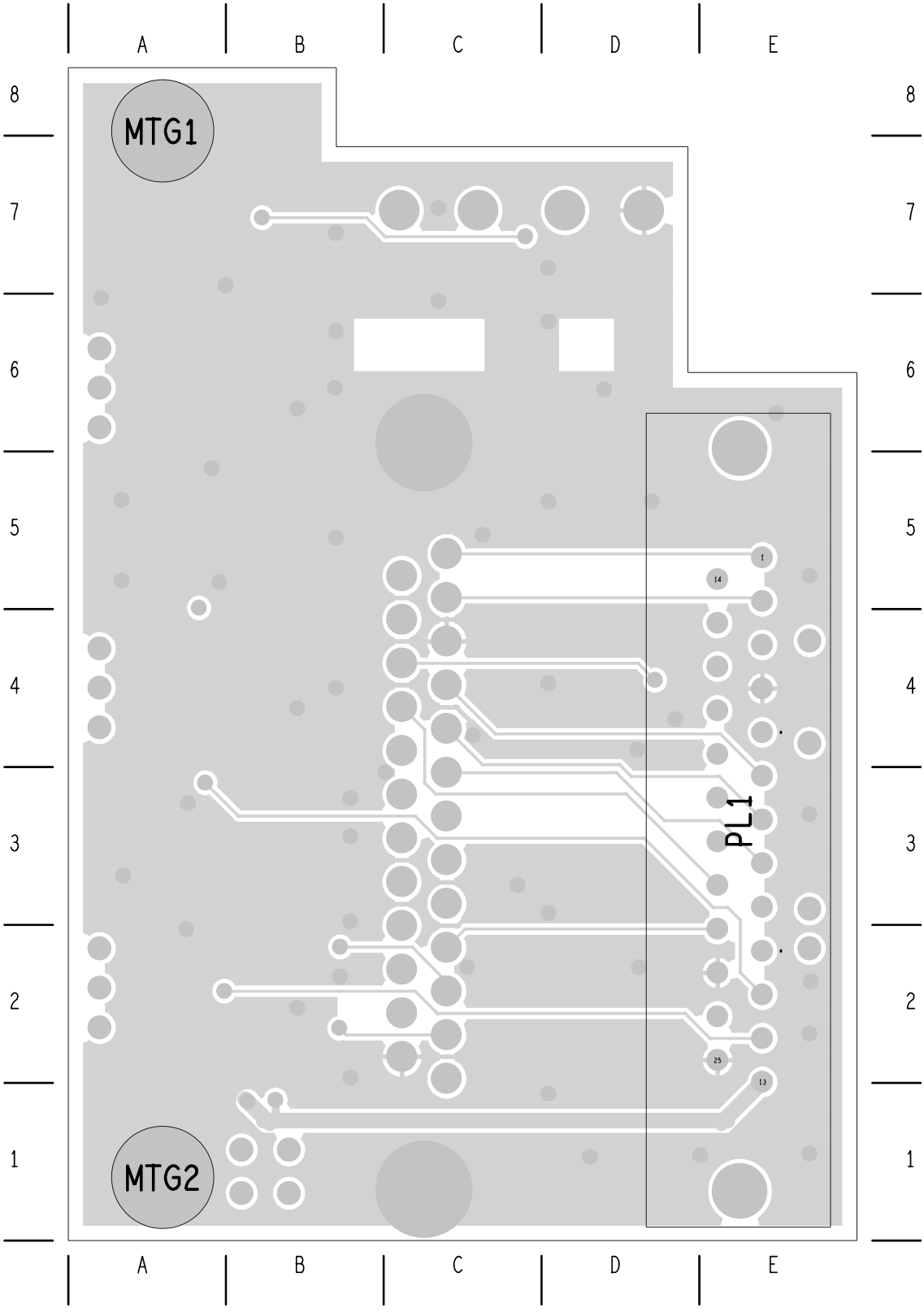
(PCB IPN 228-26101-01)

4.1.1 Parts List

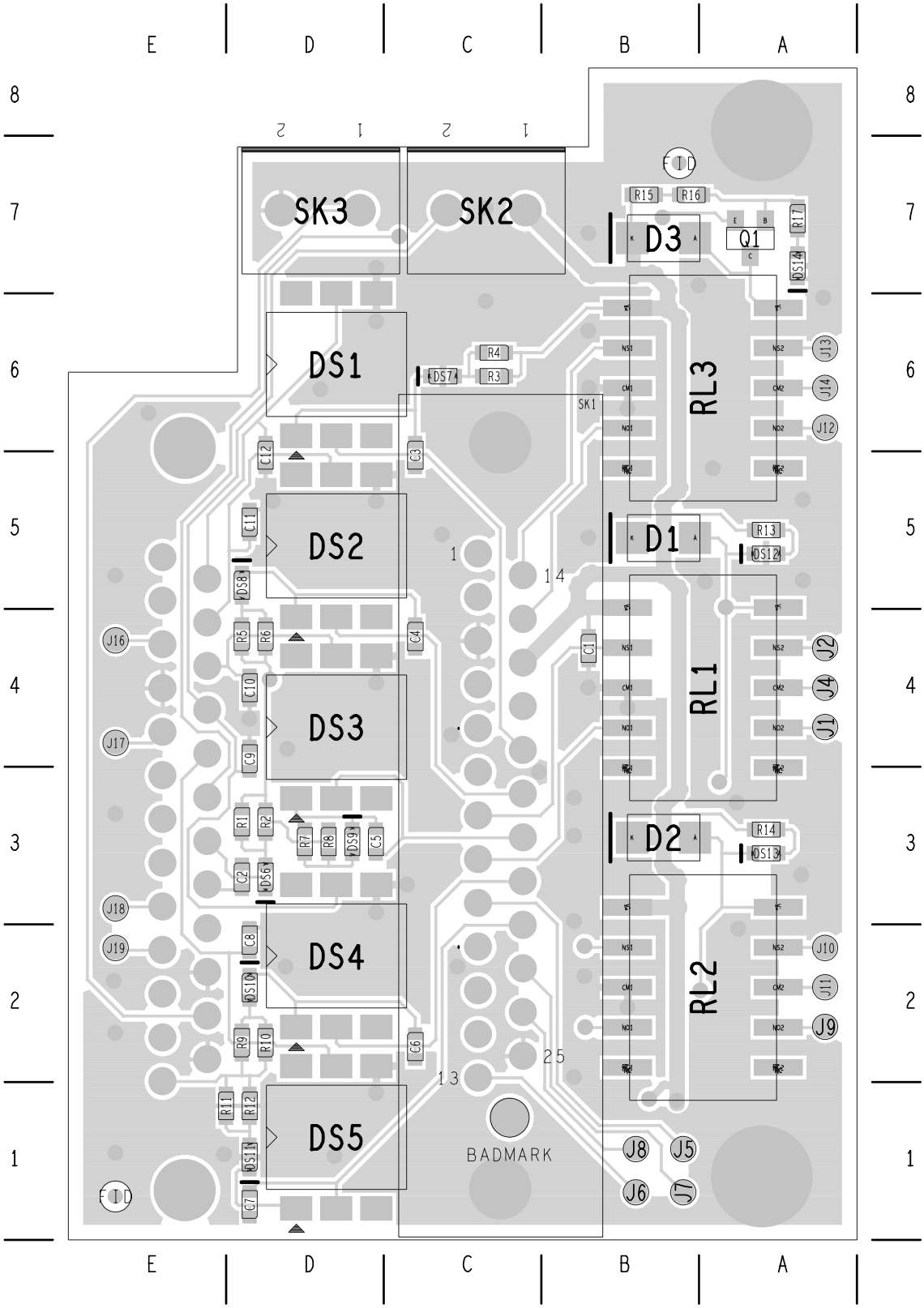
Part	IPN	Description	Layout	Circuit
C1	018-14100-00	CAP 0603 1n 50V X7R ±10	B4	1E4
C2	018-14100-00	CAP 0603 1n 50V X7R ±10%	D3	1D5
C3	018-14100-00	CAP 0603 1n 50V X7R ±10%	C5	1C5
C4	018-14100-00	CAP 0603 1n 50V X7R ±10%	C4	1C5
C5	018-14100-00	CAP 0603 1n 50V X7R ±10%	D3	1B5
C6	018-14100-00	CAP 0603 1n 50V X7R ±10%	C2	1B5
C7	018-14100-00	CAP 0603 1n 50V X7R ±10%	D1	1A5
C8	018-14100-00	CAP 0603 1n 50V X7R ±10%	D2	1A6
C9	018-14100-00	CAP 0603 1n 50V X7R ±10%	D4	1B6
C10	018-14100-00	CAP 0603 1n 50V X7R ±10%	D4	1B7
C11	018-14100-00	CAP 0603 1n 50V X7R ±10%	D5	1C7
C12	018-14100-00	CAP 0603 1n 50V X7R ±10%	D5	1C8
D1	001-10011-74	DIODE MRA4004T3 1A/400V	B5	1F6
D2	001-10011-74	DIODE MRA4004T3 1A/400V	B3	1F6
D3	001-10011-74	DIODE MRA4004T3 1A/400V	B7	1E5
DS1	002-10020-51	IC 4N35 OPTO 6pin SODIP	D6	1C7
DS2	002-10020-51	IC 4N35 OPTO 6pin SODIP	D5	1C7
DS3	002-10020-51	IC 4N35 OPTO 6pin SODIP	D4	1B6
DS4	002-10020-51	IC 4N35 OPTO 6pin SODIP	D2	1B6
DS5	002-10020-51	IC 4N35 OPTO 6pin SODIP	D1	1A5
DS6	008-10004-00	LED 0603 grn KGKT Ultrabright	D3	1D5
DS7	008-10004-00	LED 0603 grn KGKT Ultrabright	C6	1D5
DS8	008-10004-00	LED 0603 grn KGKT Ultrabright	D5	1C5
DS9	008-10004-00	LED 0603 grn KGKT Ultrabright	D3	1B5
DS10	008-10004-00	LED 0603 grn KGKT Ultrabright	D2	1B5
DS11	008-10004-00	LED 0603 grn KGKT Ultrabright	D1	1A5
DS12	008-10002-00	LED 0603 red KRKT Ultrabright	A5	1F6
DS13	008-10002-00	LED 0603 red KRKT Ultrabright	A3	1E6
DS14	008-10002-00	LED 0603 red KRKT Ultrabright	A7	1E7
PL1	240-00021-22	PLG 25wy drng w/mtg H/W	E5	1F10
Q1	000-10008-47	XSTR SMD BC847B NPN SOT23	A7	1D6
R1	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1D4
R2	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1D4
R3	038-14220-00	RES 0603 2k2 5% 1/10W	C6	1D4
R4	038-14220-00	RES 0603 2k2 5% 1/10W	C6	1C4
R5	038-14220-00	RES 0603 2k2 5% 1/10W	D4	1C4
R6	038-14220-00	RES 0603 2k2 5% 1/10W	D4	1C4
R7	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1C4
R8	038-14220-00	RES 0603 2k2 5% 1/10W	D3	1B4

Part	IPN	Description	Layout	Circuit
R9	038-14220-00	RES 0603 2k2 5% 1/10W	D2	1B4
R10	038-14220-00	RES 0603 2k2 5% 1/10W	D2	1B4
R11	038-14220-00	RES 0603 2k2 5% 1/10W	E1	1A4
R12	038-14220-00	RES 0603 2k2 5% 1/10W	D1	1A4
R13	038-14270-00	RES 0603 2k7 5% 1/10W	A5	1F6
R14	038-14270-00	RES 0603 2k7 5% 1/10W	A3	1F6
R15	038-14100-10	RES 0603 1k0 1% 1/10W	B7	1E6
R16	038-14120-10	RES 0603 1k2 1% 1/10W	B7	1E6
R17	038-13560-10	RES 0603 560R 1% 1/10W	A7	1E6
RL1	237-10010-00	RELAY 12V DPDT 10pin SMD	A4	1F5 1F4 1D9
RL2	237-10010-00	RELAY 12V DPDT 10pin SMD	A2	1F4 1B9 1F5
RL3	237-10010-00	RELAY 12V DPDT 10pin SMD	A6	1C9 1F4 1E5
SK1	240-02020-20	SKT 25wy drng PCB + full H/W	C5	1F1
SK2	240-04030-09	TERM 2wy block PCB mtg 5mm	C7	1E9
SK3	240-04030-09	TERM 2wy block PCB mtg 5mm	D7	1E9
J1			A4	1D9
J2			A4	1D9
J4			A4	1D10
J5			B1	1F2
J6			B1	1F2
J7			B1	1E2
J8			B1	1E2
J9			A2	1B9
J10			A2	1B9
J11			A2	1B10
J12			A6	1C9
J13			A6	1C9
J14			A6	1C10
J16			E4	1G9
J17			E4	1G9
J18			E3	1F9
J19			E2	1F9
MTG1			A8	1B1
MTG2			A1	1A1

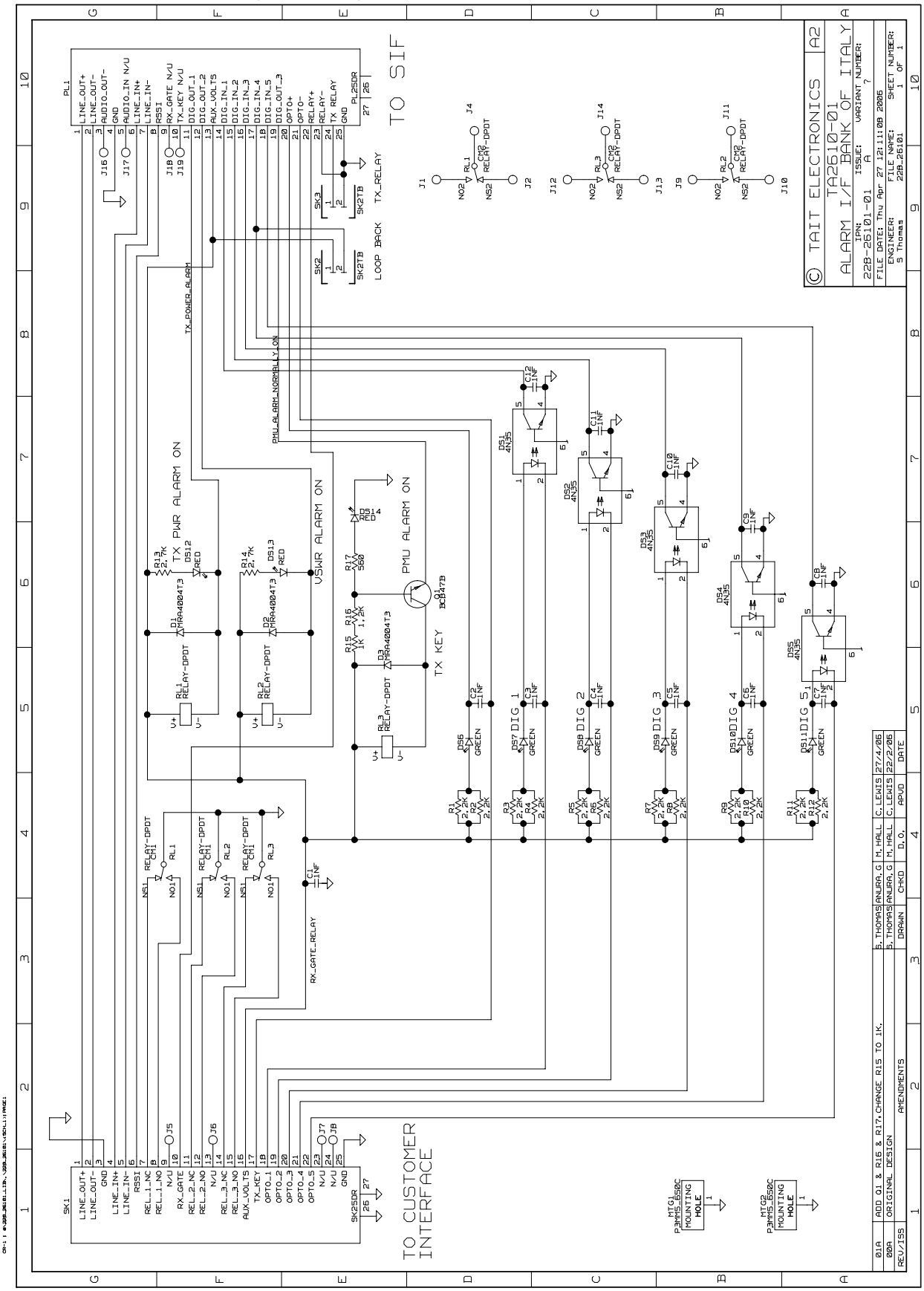
4.1.2 PCB Layout - top side



4.1.3 PCB Layout - bottom side



4.1.4 Circuit Diagram (page 1 of 1)



5 Servicing

Important This equipment contains devices which are susceptible to damage from static charges. Refer to "ESD Precautions" on page 7 for more information on antistatic procedures when handling these devices.

This chapter provides information on how to identify issues and repair if possible.

5.1 Identifying the Reciter

Note The Alarm Interface will only work on the isolated E+M system interface.

You can identify the model and hardware configuration of a reciter by referring to the product code printed on a label on the rear panel. The meaning of each character in the product code is explained in the table below.

Note This explanation of reciter product codes is not intended to suggest that any combination of features is necessarily available in any one reciter. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models and options.

Product Code	Description
TBA**X**XXX-XXXX	4 = reciter
TBA4**X**XX-XXXX	0 = default
TBA4X**XX**-XXXX	**Frequency Band and Sub-band** B2 = 136MHz to 156MHz B3 = 148MHz to 174MHz C1 = 174MHz to 193MHz C2 = 193MHz to 225MHz H1 = 400MHz to 440MHz H2 = 440MHz to 480MHz H3 = 470MHz to 520MHz K2 = 762MHz to 870MHz[a]
TBA4XXX-**XXX**X	**System Interface PCB** 000 = no system interface PCB fitted 0A0 = standard 0B0 = isolated **0C0 = isolated E & M (must have)** 0T1 = TaitNet
TBA4XXX-XXX**X**	0 = default

a. The actual frequency coverage in this band is:
Transmit: 762 MHz to 776 MHz, and 850 MHz to 870 MHz
Receive: 792 MHz to 824 MHz

5.2 Disassembly and Reassembly

5.2.1 Screw Torque Settings

The recommended torque settings for the screws and nuts used in the reciter are as follows:

Location / Function	Torque	Driver/ Spanner	Size
■ securing the XA2610-01 to the reciter	0.5 N·m / 4.5 lbf·in	T10	M3

5.2.2 Removing the Alarm Interface

1. Unscrew the two M3 pozidriv screws securing the rear of the XA2610-01
2. Lift PL1 away from the SIF connector.

5.2.3 Fitting the Alarm Interface

1. Fit the two spacers to the rear of the SIF and tighten.
2. Fit the XA2610-01 plug PL1 to the SIF.
3. Fit the two M3 pozidriv screws through the rear of the XA2610-01 into the spacers and tighten.

5.2.4 Servicing the board.

Please refer to the TB8100 Service Kit Users Manual (MBA-00010-03, September 2004) Part H, Diagnosing, page 149 to set up the Service Kit.

Log on to the base station and put the base station into standby mode, go to the diagnose screen and go to Reciter>Digital I/O, Click on start test as in the TB8100 Service Kit Users Manual page 159.

In this mode the TB8100 service kit has the ability to diagnose digital inputs and outputs.

Test Results

Service Kit function	Function on the TA2610	Pins on external connectors SK1 & PL1
Toggle DIG_1_OUT	Operates RL1, DS12 red LED lit	Pin 11 PL1, 7&8 SK1
Toggle DIG_2_OUT	Operates RL2, DS13 red LED lit	Pin 12 PL1, 11&12 SK1
Toggle DIG_6_OUT	Operates RL3 Second release: DS14 red LED off	Pin 19 PL1, 14&15 SK1
DIG_1_IN will go green when activated	Opto-Isolated digital input, DS6 LED lit	Pin 14 PL1, 18 SK1
DIG_2_IN will go green when activated	Opto-Isolated digital input, DS7 LED lit	Pin 15 PL1, 19 SK1
DIG_3_IN will go green when activated	Opto-Isolated digital input, DS8 LED lit	Pin 16 PL1, 20 SK1
DIG_4_IN will go green when activated	Opto-Isolated digital input, DS9 LED lit	Pin 17 PL1, 21 SK1
DIG_5_IN will go green when activated	Opto-Isolated digital input, DS10 LED lit	Pin 18 PL1, 22 SK1

Note For the Task Manager script to run, the base station must be in Run mode.

5.3 Fault Finding

Relays 1 or 2 not switching.

Check that there is approximately 13.5VDC on pin 13 SK1, if not at least 13V then check problems with the PMU auxiliary supply and connectors. See the TB8100 Service Manual for PMU information.

The appropriate LEDs (DS12 or DS13) are not turning on or off when base station is in a fault condition, this will indicate the digital output of the TB8100 SIF is not operating correctly. Check that the base station is in a fault/alarm condition, use the service kit's diagnostics tool to test digital outputs 1 or 2, if in the field, try to create a fault condition. If a fault/alarm condition has occurred, the base station requires a Hard Reset to clear the alarm.

The resistance across the D1 or D2 should be approximately 1K ohm, replace relay if not.

Relay3 not switching.

Check that there is approximately 13.5VDC on pin 13 SK1, if not at least 13V out then check problems with the PMU auxiliary supply and connectors. See the TB8100 Service Manual for PMU information.

The resistance across D3 should measure approximately 360 ohms, and not 1Kohms. Make sure there is a 560 ohm resistor is across D3 and that it is soldered correctly.

Use the service kit's diagnostics tool to test DIG_6_OUT (not DIG_3_OUT), attempt to create a fault condition. If a fault/alarm condition has occurred, the base station requires a hard reset to clear the alarm.

Digital Input(s) are not working.

Check that there is approximately 13.5VDC on pin 13 SK1, if not at least 13V out then check problems with the PMU auxiliary supply and connectors. See the TB8100 Service Manual for PMU information.

The LEDs, DS7 to DS11 will be on if their respective input has been activated, therefore if the LEDs are not on, there is a problem with the device connected to SK1. If the LEDs are on, the fault will be the opto-couplers or the base station. The opto-coupler output will go logic low when the LEDs are on, if not, then replace the faulty opto-coupler.

The base station's digital inputs can be tested with the Service Diagnostics tool, if the inputs can be seen working, then check that the Task Manager script is installed and the base station is in run mode.

The LEDs that are on the XA2610-01 can be used to help with testing or fault diagnostics.

.

Part number	Colour	Function
DS6	Green	ON when input TX KEY is activated
DS7	Green	ON when input OPTO_1 is activated
DS8	Green	ON when input OPTO_2 is activated
DS9	Green	ON when input OPTO_3 is activated
DS10	Green	ON when input OPTO_4 is activated
DS11	Green	ON when input OPTO_5 is activated
DS12	Red	ON when input REL_1 is activated (output on DIG_1_OUT)
DS13	Red	ON when input REL_2 is activated (output on DIG_2_OUT)
DS14	Red	First release: Not Used, second release: ON when input REL_3 is **NOT** activated (no output on DIG_3_OUT)

Note 'Activated' is a grounded input.

5.4 Task Manager

The Task Manager add on script is displayed completely below for reference only.

ENABLED COMMENTGeneral Setup

ENABLEDTASKIF Base station in run mode THEN Enable auxiliary supply
ENABLEDTASKIF Base station in run mode THEN Enable receiver
ENABLEDTASKIF Base station in run mode THEN Enable transmitter

ENABLED COMMENTVSWR Alarm

ENABLEDTASKIF VSWR fault THEN Activate digital output 2
ENABLEDTASKIF NOT VSWR fault THEN Deactivate digital output 2

ENABLED COMMENTLow Power Alarm

ENABLEDTASKIF Forward power low THEN Activate digital output 1
ENABLEDTASKIF NOT Forward power low THEN Deactivate digital output 1

ENABLED COMMENTPMU/Feeder Alarm

ENABLEDTASKIF NOT PMU alarm on THEN Activate digital output 6
ENABLEDCOMMENTDIG_OUT_3 on XA2610-01 circuit
ENABLEDTASKIF PMU alarm on THEN Deactivate digital output 6
ENABLEDCOMMENTDIG_OUT_3 on XA2610-01 circuit

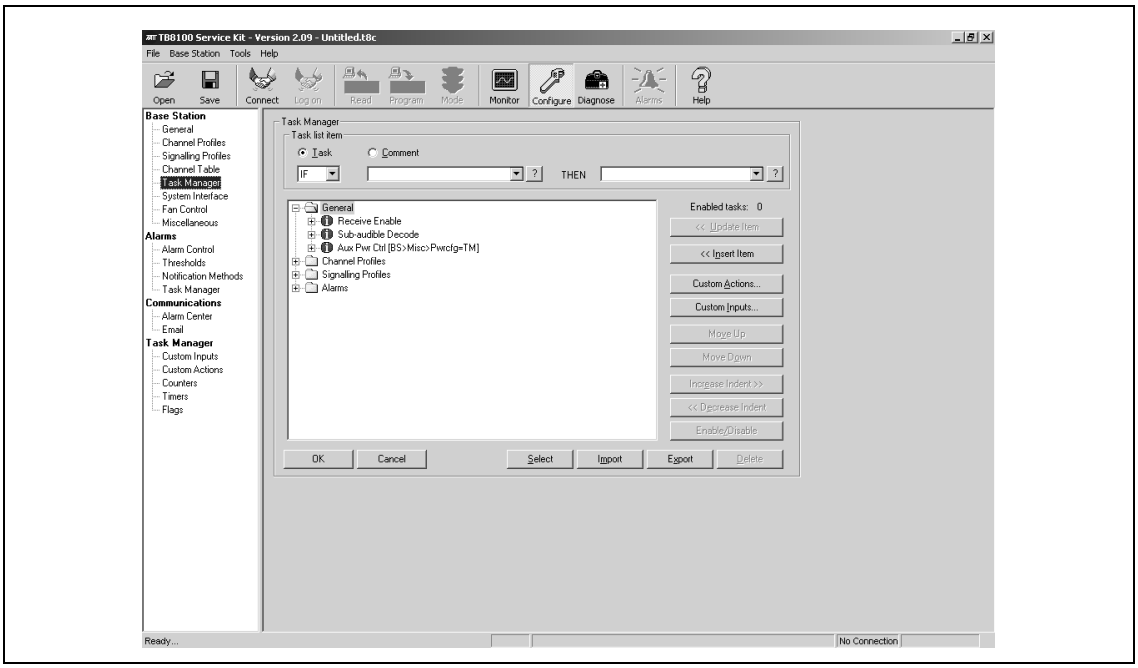
ENABLED COMMENTChannel Change

ENABLEDTASKIF Digital input 01 active THEN Go to channel Test VHF
ENABLEDTASKIF Digital input 02 active THEN Go to channel Test UHF
ENABLEDTASKIF Digital input 03 active THEN Go to channel Test 800M
ENABLEDTASKIF Digital input 04 active THEN Go to channel Test 900M

Loading the Task Manager script

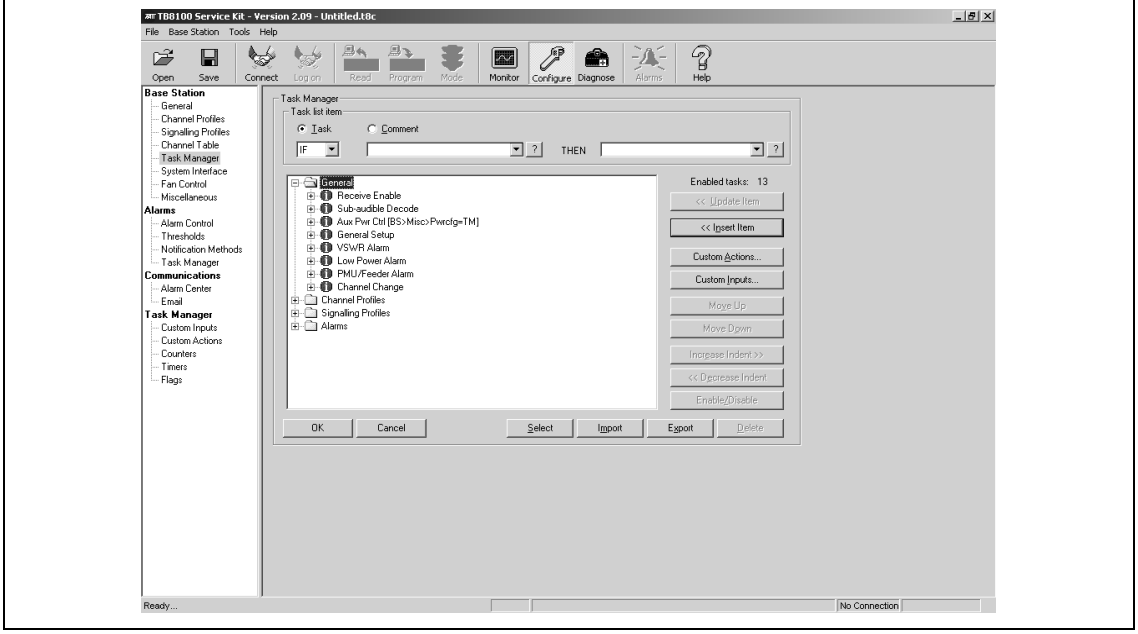
1. Open the Task Manager in the Service Kit.
2. The default Task Manager script should look like Figure 5.1.

Figure 5.1 default Task Manager



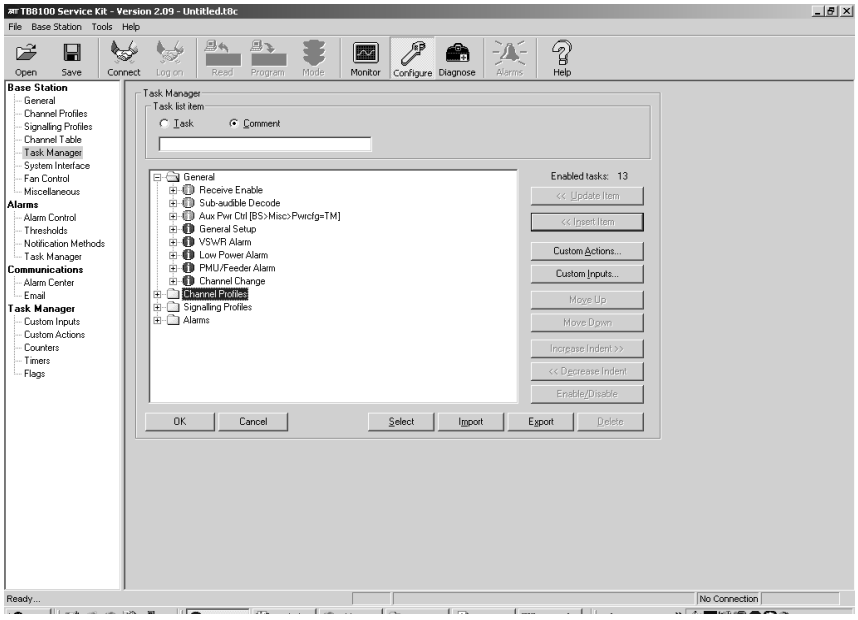
3. Read the configuration out of the base station and check that it has a similar looking Task Manager script.
4. Import the "QA2610A81X.t8I" file by clicking the Import tab and pointing to where the file is stored on the computer.
5. The Task Manager script should now look like Figure 5.2.

Figure 5.2 modified Task Manager script



Note Importing this script will add to any script previously used in the Service Kit.T8C file. If there has never been any Task Manager scripts enabled in the Service Kit (as in default factory configurations), then no changes need to be made. If so, then disable all active (green) tasks in Task Manager that are not part of the new script. An example can be seen below in Figure 5.3.

Figure 5.3 disabled scripts



Starting with a new script

1. The top three scripts are shown grey and not green, this means they are disabled.

2. Once the script looks like this, it can be programmed into the base station.

3. Refer to the TB8100 Service Kit Users Manual (MBA-00010-03, September 2004) Part C, Basic Tasks, page 45 to program the base station.

Note For Task Manager script to run, the base station needs to be in run mode.

4. Program the script into the base station by putting the base station in standby mode and performing a normal program.

5. This will program the new Task Manager script, it will NOT alter any other information in the base station e.g. Channel configuration/ Profiles etc.

Note The channel change script will look for the channel numbers 001, 002, 003 & 004 in the channel profile, and they directly relate to the digital inputs 1-4, i.e. if DIG_1_IN is activated then base station will change to channel 001, regardless of what name it is.

VSWR Alarm: If base station has VSWR fault, relay 2 will activate[1] Pin 12 (Rel_3NO) on customer interface.

The base station will be in this state until the base station has a hard reset (i.e Turn base station off then back on again).

To change the alarm thresholds (e.g. VSWR 1:5 or Low power = 10watts), In TB8100 Service kit, go to Configure->Alarms->Thresholds.

TX_Power Alarm: If Output power is lower than the required threshold, relay 1 will activate[1] Pin 8(Rel_1NO). The base station will be in this state until the base station has a hard rest set (i.e Turn base station off then back on again)

Feeder/PMU Alarm: If there is a fault with the PMU relay3 will activate[1] Pin 14 (Rel_4NC) on the customer interface.

The base station will be in this state until the base station has a hard rest set (i.e Turn base station off then back on again).

Digital inputs: If DIG_1_IN is activated[1] the base station will change to channel number 001, where it will stay until another digital input is activated.

If DIG_2_IN is activated[1] the base station will change to channel number 002, where it will stay until another digital input is activated.

If DIG_3_IN is activated[1] the base station will change to channel number 003, where it will stay until another digital input is activated.

If DIG_4_IN is activated[1] the base station will change to channel number 004, where it will stay until another digital input is activated.

1. Activate in this case means to ground the input or when input is grounded

6 Specifications

The performance figures given in these specifications are applicable only to equipment operating as an integral part of a XA2610-01 base station. These performance figures are minimum figures, unless otherwise indicated, for equipment operating at standard room temperature (+22°C to +28°C [+71.6°F to +82.4°F]) and standard test voltages.

General

Operating Temperature Range	–30°C to +60°C (–22°F to +140°F) ambient temperature* *ambient temperature is defined as the temperature of the air at the intake to the cooling fan
Dimensions	
Height	28mm (1.1in)
Width	50mm (1.97in)
Length	74.3mm (2.93in)

Full 4 Wire plus E&M interface

Balanced Line Output (via System Interface PCB)	
Output Level Range	–20dBm to +10dBm
Output Impedance	600Ω
Distortion*	
De-emphasised	≤2%
Flat	≤4% (NB) ≤2% (WB)

*at –70dBm signal level

E lead	solid state relay internal to the System Interface Card (SIF) of the TB8100 Relay – is connected to GND Relay + is connected to the customers interface connector. (pin 10)
Relay specification	Manufacturer: Clare (USA). Model number: TS117L NAIS; model number: TQ2SA-12V-Z Note: this part also contains the opto-coupler used for Tx-Key
M-lead	optocoupler internal to the System Interface Card (SIF) of the TB8100 Opto+ connects to +13.8V via 1k5 Opto- connects to the Tx-Key input on the customers interface connector (pin 17)
Opto Coupler Specification	Manufacturer AN35

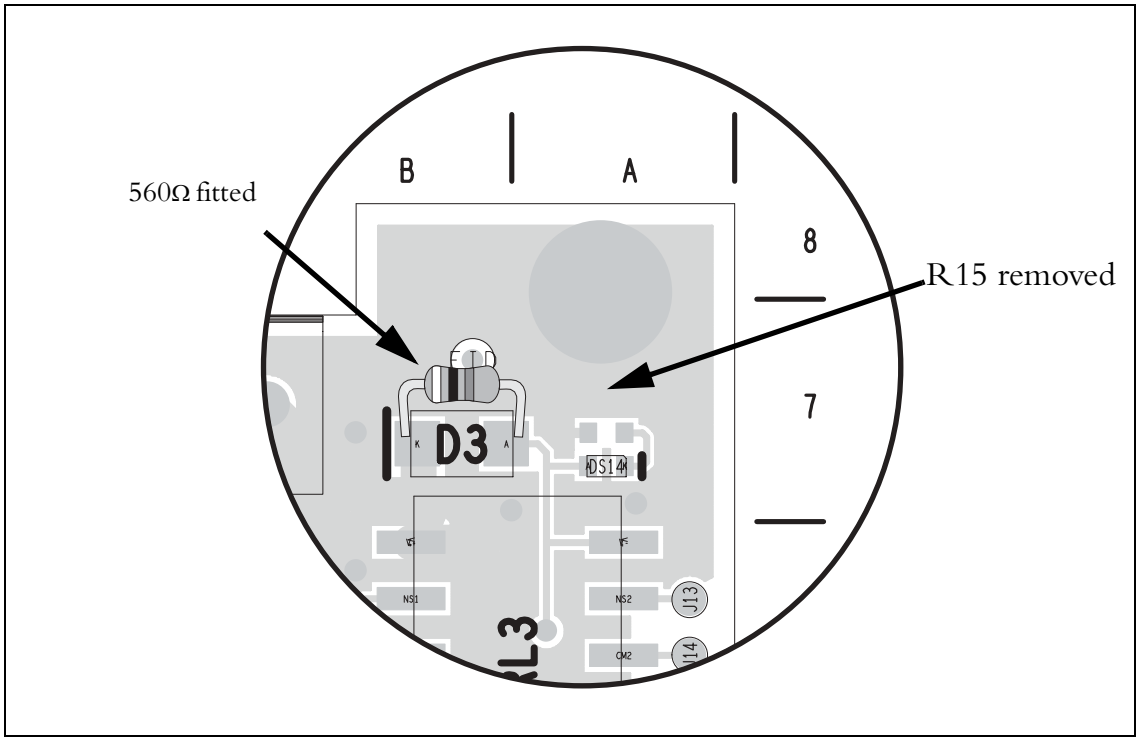
Appendix 1

To enable the first release of the XA2610-01 Alarm Interface to work with a variation in the manufacture of the relays a 560Ω resistor has been added and R15 removed.

First Release Modification

See "Circuit Diagram (page 1 of 1)" on page 27. references E5 and F6 for the new resistor and the removed resistor.

Figure 7.1 layout modification



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