

## Fire Alarm Control and Indicating Equipment

### **SURVEYOR MARK IV**

**Series 3000: 2-10 zone,  
integral charger and battery space.**

**Series 4000: 2-10 zone,  
remote charger and batteries.**



#### **SURVEYOR 3000 SERIES. MULTIZONE WITH INTEGRAL CHARGER, FOR BS 5839 INSTALLATIONS AND TO BS 3116 Pt 4:1974**

The 3000 Series of Multizone Control Panels have been designed for ease of installation and include many features that will be welcomed by both installer & specifier.

The cabinet measures only 3" deep with a two tone brown and ivory finish. A smoked glass window covers all indicator lamps and access to the control panel switches is via the lockable door. Flush fitting kits are available in stove enamelled ivory/brown, brushed stainless steel or polished and laquered brass plate, giving a prestigious finish to a technically advanced control panel.

The battery charger and batteries are contained within the cabinet, but should excessive alarm or standby loads be required, then a control panel from the 4000 Series should be used.

The standard cabinet can accommodate from 2-10 zones together with all associated control equipment to meet the requirements of BS 3116 - Part 4, and BS 5839 installations. Up to 26 zones are contained within a slightly larger cabinet, and more complex systems can be designed into custom built or rack mounting cabinets.

The electronics are all based upon a system of 'mother card' with plug in modules, enabling the equipment to be removed within a few seconds. This is invaluable when an early 'first fix' of the cabinet is required, with commissioning taking place at a later date.

The control panels are suitable for the Nitran range of detectors but can be supplied suitable for many other detectors upon request.

The standard Surveyor 3000 and 4000 forms the basis of a very flexible control panel specification which can be extended in excess of 100 zones with many variable switching functions including, zonal and priority bell ringing etc.

Provision is made for the addition, upon request, of repeater outputs, 'double knock' outputs, precinct facilities, door retainer outputs etc.

A 'Test Point' is provided and by the use of an additional 'Engineers Test Facility' unit, the testing of a large fire alarm system can be undertaken single handed, thus making considerable savings in maintenance time and costs. The test facility will stop the alarm sounders after a variable delay, and then reset the panel again after a second variable delay. This facility automatically controls the fire alarm panel while the engineer checks all the sounders and detection points, without having to return to the unit to reset after each alarm.

#### **SURVEYOR 4000 SERIES. MULTIZONE WITH REMOTE CHARGER FOR BS 5839 INSTALLATIONS AND BS3116 Pt 4:1974**

The 4000 Series has all the features of the 3000 Series, but is used where a remote charger/battery unit is desirable. The cabinet is smaller, measuring 15" x 11" with a depth of only 3 inches and will accommodate up to 10 zones. Panels requiring 11 or more zones can readily be supplied, details of which are found on additional data sheets.

Charger/battery units are available in 3, 5 and 10 amps as standard with larger sizes to special order.

# TECHNICAL SPECIFICATION

## Construction

Two tone, beaver brown back box with ivory front panel. 18 swg mild steel.

All electronics are mounted on PCB's in a 'mother/daughter' board arrangement with plug in connections. All switches and indicators are soldered directly on to PCB's for greater reliability.

Switches are concealed behind a lockable door & lamps viewed through a smoked glass panel.

## Mounting

Surface mounting, direct on to wall via four fixing holes. Recess mounting with flush kit or semiflush with a simplified bezel.

## Wiring

Provision for top and bottom entry cables 20mm knockouts. Terminal blocks for up to 4mm<sup>2</sup>.

## Dimensions

Series 3000  
17.3/8" W x 15 H x 3" D  
(440 x 385 x 76mm)

Series 4000  
15.3/8" W x 11.3/8" H x 3" D  
(390 x 289 x 76mm)

## Application

On systems requiring BS9116 Part 4 or BS 5839 installations. Chassis size:

Series 3000 2-10 zone

Series 4000 11-28 zone

27-42 zone

43-58 zone

etc. In multiples of 16 zones.

## Extendability

Zones can be extended simply by addition of extra zone PCB up to chassis limit.

## Detection Circuit

Two wire open circuit monitored. Short, or low resistance across zone input i.e. call point or fire detectors will initiate alarm.

## Fire Indication

Twin red lamps indicate zone of alarm, internal buzzer sounds and all sounders operate.

## Detector Indication

Alarm lamps on smoke detector or heat detector will illuminate on operation. Remote indication is available upon request.

## Flashing/Steady Fire Lamps

An alarm will cause the relevant red fire zone lamps to flash. Depressing the 'stop alarms' switch will steady the lamps. Any new zone will flash. Zones already accepted will remain steady.

## Detector Type

Current Nittan range of heat or smoke detectors. Most other current models subject to HAES SYSTEMS approval.

## Scope

Any number of call points & up to 100 per zone Nittan Fire Scan or similar smoke or heat detectors. (This is well in excess of any normal requirement).

## Resistance

'Return loop' resistance to be below 100 ohms on long detector circuits.

## Line Monitoring

End of line resistors supplied in the zone output terminals to be fitted in the last detector or call point.

## Zone Polarity

End of line resistor & Nittan Fire Scan range are bi-polar, therefore not polarity conscious.

## Zone Fault Indication

System fault lamps & LED illuminates. Depressing 'Locate Fault' indicates faulty zone. Typical fault, open circuit or high resistance in the zone wiring.

## Alarm Sounder Circuits

Output:- Series 3000: 24 volts DC, 2.5 amp load shared between two outputs.

Series 4000: Panel uses remote charger 24 volt DC, two outputs. BCU4-24-30, 3 amp charger, 2.5 amp alarm load.

BCU4-24-50, 5 amp charger, 4.5 amp alarm load.

BCU4-24-100, 10 amp charger, 9.5 amp alarm load.

Sounder circuits & fuses are open & closed circuit monitored. End of line resistors are supplied in control panel & should be refitted in the last sounder. All sounders, relay coils, etc. should be polarised.

## Stop Alarms

To silence sounders depress stop alarms switch. Each subsequent zone alarming will cause the sounders to operate.

## Sound Alarms Switch

Depressing the switch will cause the sounders to operate. To silence alarms move switch upwards.

## System Reset

Panel will reset only if all detectors are 'clear', if not alarms will resound.

## Test Lamps Switch

Illuminates all lamps. 'Supply On' normally lit.

## Silence Tone

To silence supervisory buzzer, depress switch. Buzzer will resound should further faults occur. No silence tone with 'FIRE' condition.

## Fault Indication

'System Fault' lamps & buzzer. 'Locate Fault' switch identifies faults:-

Sounder circuit 1 & 2 open or short circuit  
Voltage high or low, 'Supply Fault' indicates loss of mains, charger voltage or fuse failure. 'Battery Circuit Fault' indicates break or high resistance in battery circuit. Individual zone fault indicates break or high resistance. Fault buzzer pulsed (constant with 'FIRE' condition).

## Auxiliary Equipment

Upon Request: 2 off changeover relay, isolate switches & lamps. Fused @ 1amp 24 v DC.

Upon Request: Precinct relays for signal out & back. Repeater output signals for zonal fire & common fault. Double knock output for extinguishing system.

## Adaptability

In excess of 100 zones, many variable switching functions, zonal and priority bell zones etc.

## Power Supply

Series 3000: Constant voltage type  
Inputs: 240v  $\pm$ 5% 50/60 HZ.  
Charging voltage: 27.5v DC  
Operating range: 24.0-28.5v DC  
Green 'Supply Healthy' lamps.  
Fused 2amp (200mm quick blow) Sealed lead acid batteries only.

Series 4000: Remote charger 3.5, 10 amps or larger. See data sheet.

## Batteries

Sealed lead acid maintenance free  
Series 3000: Cabinet space for 24 volt 6Ah (2 x 12v 6Ah) giving 24 hour standby and 1 hour alarm load. Longer standbys with larger remote battery packs.

Series 4000: 24v mounted in remote charger. Capacity dependant upon load requirements.

## Fuses

All essential fuses monitored.

## Engineers Test Facility

To facilitate the testing of multi zone panels singlehanded, plug control box ETF1 into panel access point. With panel under test sounders cancel after adjustable period, after a further adjustable period the panel resets.

## PROVISIONAL INSTALLATION

### INSTRUCTIONS - SURVEYOR

#### SERIES 3000 & 4000 MK IV

Suitable for the Nittan Firescan range including many other types. These instructions are to be read in conjunction with our drawing No. 300A.

Before removing or replacing any printed circuit boards at any time, it should be checked that both the mains and battery supplies are dis-connected. To help mounting the cabinet and pyro's the P.C.B. 's should be removed by releasing the barbed locking pillars after first dis-connecting the transformer wires and the clip connector from the remote power transistor.

Care should be taken in the correct removal of this connector. It is simply removed by inserting a small screwdriver in the barbed tab and twisting while pulling upwards on the connector.

Do not 'Megger' cables while any equipment is installed.

#### ZONE WIRING

Only approved detection equipment may be connected on the zone. Up to 100 Nittan Firescan detectors may be fitted per zone, but practical limits are normally around 20-25 units.

When using the Nittan Firescan range (e.g. 2KC, NID 58 etc) it is not necessary (although Adviseable) to maintain correct polarity of all detectors as the terminations are bi-polar. Most other detectors including other models in the Nittan range require correct polarity to their terminals. The end of line resistor can be connected either way around.

The detection equipment should be wired in one continuous pair (see diagram) with no spurs or tees.

Any short circuit or low resistance across Zone + or - will cause the zone to alarm. With detectors that are polarity conscious (i.e. other than Nittan Firescan) non-observance of their polarity will cause an alarm condition on the zone.

Any open circuit or high resistance in the zone loop will cause a zone fault to show (the zone can be identified by pressing 'LOCATE FAULT' switch).

#### REPEATER OUTPUT

For connection of repeater panels, zonal lamps, relays and other approved equipment.

#### AUXILIARY 1 & 2 (Fitted upon request only)

Auxiliary 1 24 volt DC changeover output rated at 1 amp. Generally for use with low power devices, such as relay coils.

NB: The connection of any device to these terminals will modify the power consumption of the system and may revise its compliance with BS 5839. (Aux 1. can be supplied voltage free upon request).

Auxiliary 2 voltage free changeover 1 amp 24 volt DC

Both auxiliary relays are fitted with isolate switch and warning lamps. It is not recommended that any voltage in excess of 50 volt be passed through the relays.

#### BELL CIRCUITS 1 & 2

All sounders must be polarised as both circuits are monitored against open or short circuit faults. Maximum load for the combined outputs of both circuits where compliance with BS 5839 is required, is 1.5amp for Series 3000 panels. Series 4000 loads depend upon the external charger used.

## Installation instructions cont/d

### Bell Circuits 1 & 2 cont/d

All sounders must be wired in one continuous pair with no spurs or tees. Additional bell circuits can be supplied upon request to assist in reducing cable runs. A short circuit fault could be produced by a non-polarised or faulty sounder, or any form of wiring fault.

An open circuit fault indicates a break in the wiring, or the end of line resistor (sleeved yellow) missing.

NB: The open circuit monitor checks wiring to the sounders only but not the existence of that sounder.

### BATTERY TERMINALS

For sealed lead acid batteries. Output regulated at 27.0 - 27.6 volts for connection of 24 volt batteries. A 'Battery' fault indicates a break in the battery leads or an open circuit cell. A 'Voltage' fault indicates either high or low panel voltage which can be verified by checking with an ACCURATE meter.

### MAINS INPUT

240 volts AC 50 hz into white connector block on back box. Should the mains supply fail then the batteries will continue to run the panel and show 'CHARGER' fault.

### FUSES - ALL 20mm QUICK BLOW

Alarm 1 & 2	2 AMP
AUXILARY 1 & 2	1 AMP
BATTERY	5 AMP
SUPPLY	3 AMP

### PANEL BUZZER

This is pulsed for all fault conditions and can be muted. A fire condition cannot be muted and is a constant tone.

### SUPPLY FAULT

NB: This is a general fault warning and will pulse if the mains supply is disconnected thus causing the panel to run off its batteries.

### ENGINEERS TEST FACILITY

By connecting in the test facility control box ETF1 the bell ringing time can be adjusted to a minimum if required. The panel automatic reset can be set to a minimum if only call points are in circuit or to about 20-30 seconds if smoke or heat detectors are used. Should the detector not be clear of smoke or heat then the sequence will re-cycle until the reset occurs.

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## Operating Instructions for Surveyor Mark 4 Range Series 3000 and 4000

### Lamp Indications:-

#### FIRE LAMPS (RED)

The red fire zone lamps will flash & sounders operate when a fire signal is received from a break glass call point, smoke or heat detector.

The flashing fire zone lamp will steady when the alarms are silenced. Any new fire zone in alarm is identified by a flashing indication and the sounders re-operating.

#### ALARM SILENCED (WHITE)

This indicates that the alarm sounders have been silenced as a result of an alarm condition. These lamps will extinguish automatically when the panel is reset.

#### SYSTEM FAULT (YELLOW)

A common fault signal is shown by a steady yellow lamp with individual faults being indicated by the LED's within the cabinet door.

When the panel is operating solely from the standby batteries then any fault signal is indicated by the lamp pulsing.

#### TONE MUTED (WHITE)

If a panel fault exists, then in addition to the "System Fault" lamps, a buzzer will pulse. The buzzer can be muted and white "Tone Muted" lamps illuminate.

It is not possible to mute the constant tone buzzer when any red Fire Zone is illuminated.

#### SUPPLY HEALTHY (GREEN)

These should be illuminated at all times and indicate that the supply into the panel is correct and that the charger is working.

#### SPARE LAMPS (WHITE)

These can be engraved to suit individual requirements and indicate the state of the auxillary relays when fitted.

### SWITCHES

#### SILENCE ALARMS

To silence the alarms depress the switch, the constant tone buzzer (unmutable) will continue to sound. White "Alarms Silenced" lamps illuminate.

## SYSTEM RESET

After an alarm condition has been cleared depress the "Reset" switch. If the panel does not reset, i.e. the alarms sound and Fire Zone lamps illuminate, then a break glass call point is broken alternatively smoke or heat are present in a detector.

## SOUND ALARMS

To sound all alarms, depress the switch. To silence alarms, return the switch upwards.

## LOCATE FAULT

The "System Fault" lamps indicate a malfunction with either the panel, detectors or associated wiring.

Depressing the "Locate Fault" switch will illuminate the individual fault on the LED's situated above the control switches.

The "Zone Fault" LED will light immediately a zone fault occurs and by depressing the "Locate Fault" the particular zone will be indicated by illumination of its red fire lamps.

## TEST LAMPS

Depress to test all lamps. This does not activate the alarms.

## SILENCE TONE

To silence fault buzzer, depress switch, "TONE FAULT" lamps will illuminate. It is NOT possible to silence the constant buzzer when a fire alarm condition exists.

If a further fault occurs the buzzer resounds. If the fault(s) are cleared then the buzzer mute will automatically cancel.

## ISOLATE 1 & 2

Should an alarm condition occur then these switches will prevent the operation of the auxillary relays (where fitted).

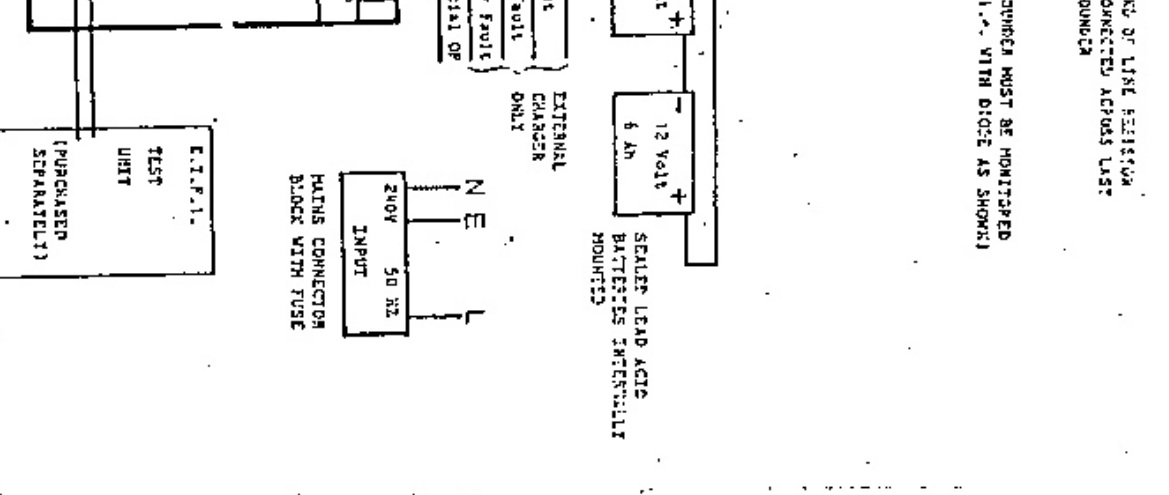
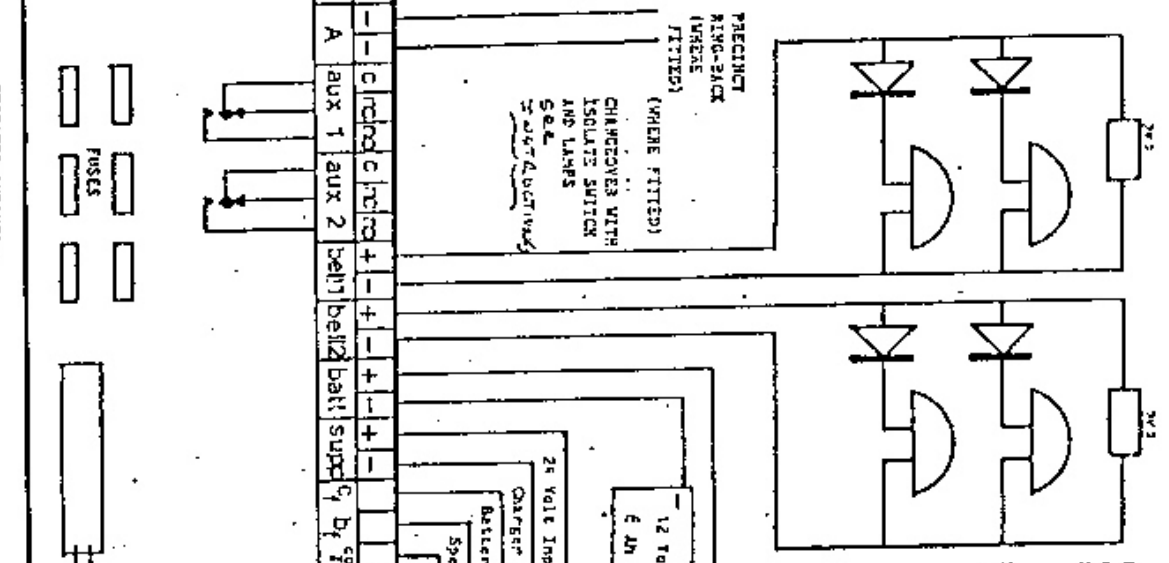
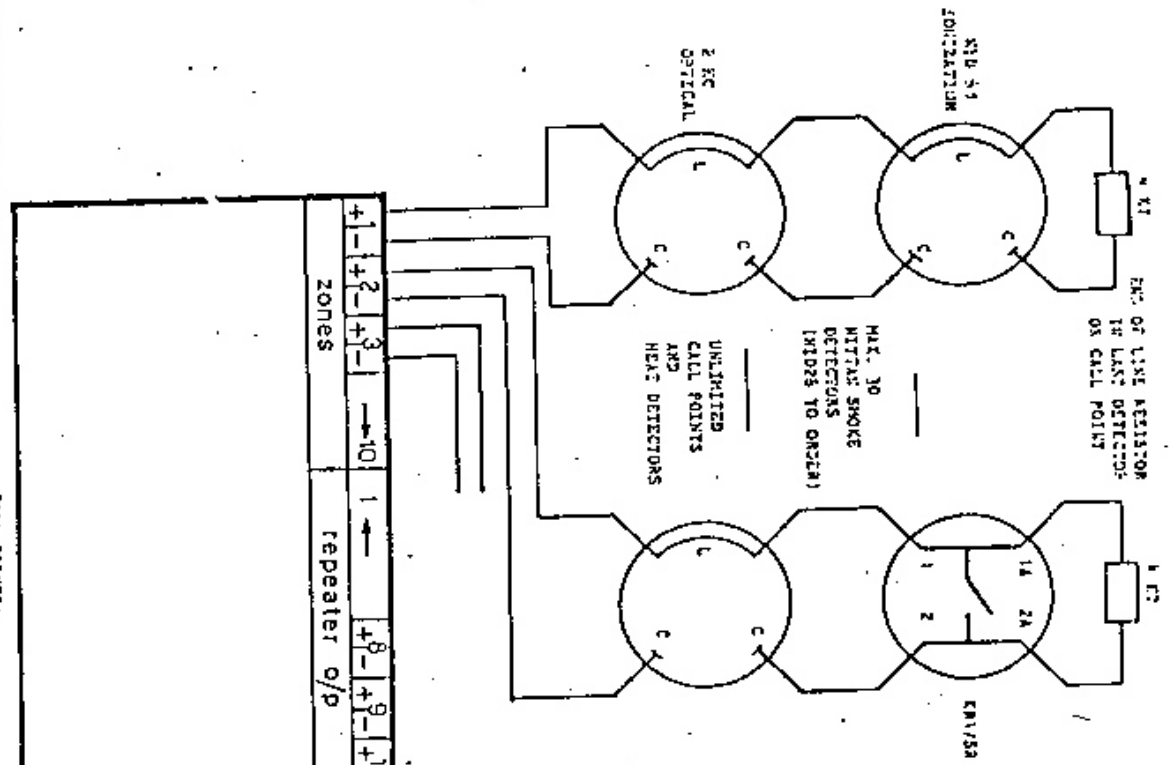
## FUSES

All essential fuses are monitored and values are given alongside each fuse. They are Battery, Supply, Alarm Circuit 1 & Alarm Circuit 2. Failure of these will cause an audible and visual fault warning. Fuses for Aux relay 1 & 2 are not monitored.

## TEST POINT

For use with a test unit ETF 1. This enables an engineer to test the fire alarm system single handed.

Automatic sounder cancel and panel reset times can be adjusted to suit individual systems.



3-WAY ON HEAT DETECTORS:-  
 WITH A PRESHAM LAMP OR  
 SIGNAL

CALL POINTS:-  
 PAGES - NM/5A  
 OR SIGNAL

REPEATER OUTPUTS:-  
 THESE ARE A DIRECT  
 CONNECTION TO REPEATER  
 PANELS & SHOULD NOT BE  
 USED FOR OTHER PURPOSES  
 EXCEPT WHERE SPECIFIED.

3000 SERIES MULTIZONE PCB's

<u>NO.</u>	<u>FUNCTION.</u>	<u>TRANSISTOR PART NO.</u>
PC4001 (CHARGER CARD)		
TR1	Standby pulse inhibit	2N3703/BC212L
TR2	Darlington medium power	TIP31A
TR3	charger pre amp	2N3703/BC212L
TR4	Charger fault pre amp	2N3704/BC182L
TR5	Battery fault oscillator	BC109
TR6	Battery fault pre amp	2N3703/BC212L
TR7	Battery fault driver	2N3704/BC182L
TR8	Voltage fault high	2N3704/BC182L
TR9	Voltage fault low	2N3704/BC182L
TR10	Voltage fault darlington	2N3704/BC182L
TR11	Voltage fault darlington driver	2N3704/BC182L

PC4002 (COMMON CARD)		
TR1	Stop alarms blip	2N3703/BC212L
TR2	Stop alarms latch	2N3703/BC212L
TR3	Fire pulse multivib	2N3704/BC182L
TR4	Fire pulse multivib	2N3704/BC182L
TR5	Stop alarms test lamps	2N3703/BC212L
TR6	Fault blip	2N3703/BC212L
TR7	Fault latch	2N3703/BC212L
TR8	Common fault pre amp	2N3703/BC212L
TR9	Common fault driver	TIP3/A
TR10	Fault pulse multivib	2N3704/BC182L
TR11	Fault pulse multivib	2N3704/BC182L
TR12	Short cct bell 1	2N3704/BC182L
TR13	Short cct bell 2	2N3704/BC182L
TR14	Open cct bell 1	2N3704/BC182L
TR15	Open cct bell 1	2N3704/BC182L
TR16	Short cct bell 2	2N3704/BC182L
TR17	Open cct bell 2	2N3704/BC182L

PC4003 (ZONE CARD)		
TR1	Fire zone 1	2N3704/BC182L
TR2	Locate fault zone 1	2N3704/BC182L
TR3	Fault LED zone 1	2N3704/BC182L
TR4	Fault zone 1	2N3704/BC182L
TR5	Fire zone 2	2N3704/BC182L
TR6	Locate fault zone 2	2N3704/BC182L
TR7	Fault LED zone 2	2N3704/BC182L
TR8	Fault zone 2	2N3704/BC182L

DIO LATCHING FOR ZONE 1

There is only one transistor (TR1 2N3704/BC182L) on the mother card which is for the card monitor (on removal of a PCB the buzzer will sound constantly).