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SKYFIX MINIDOME
OPERATORS MANUAL

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Issue No: 5

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AMENDMENT RECORD SHEET

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1. INTRODUCTION

The SkyFix Mini Dome is a customised Active Stabilized Antenna Platform for use with Inmarsat or OPTUS satellite signals in the L - band frequency range 1525 to 1559MHz. The standard base plate assembly is modified to incorporate an L - band down converter, a cavity filter, a DC - DC converter and a signal interface unit which allows the heading reference to be selected from either the internal fluxgate in the Digital Gyro Compass module or from an external below decks fluxgate or gyro if available.

Operator control of the Mini Dome is provided via the SkyFix 'M' Controller type 90928. This 1U high, 19 in. rack mounting unit contains a Gyro Interface board type 90927 to interface with synchro or stepper type gyros, a Data Decoder board type 90909/3/40 to interface with serial gyros and communicate with the Dome, a power supply for the modified Active Stabilized Antenna Platform, a 2 - line by 16 character backlit LCD and a keypad.

An RG213 coaxial cable from the SkyFix 'M' Controller is used to provide a nominal 28V DC power for the Dome. This cable also carries the IF output from the L - band down converter and should not exceed 100m in length. A separate multicore cable with screened twisted pairs is used for transmission of control and status information between the SkyFix 'M' Controller and the Dome.

1.1 Operational Features

* Digital control of down converter local oscillator selection for use with either Inmarsat or OPTUS satellite signals.

* No cable unwrap requirements, continuous target signal tracking through full 360 degrees.

* Versatile remote heading reference interface allows use of synchro, stepper or serial gyros.

* Rate stabilized pitch, roll and yaw for ship motion compensation.

* Optional Step Track control for maintaining maximum signal strength in azimuth and elevation.

* Compact and light weight(max 24kg).

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2. TECHNICAL SPECIFICATIONS

Dome

Weight:	19 Kg
Dimensions:	57 cm dia. x 69 cm high
Material:	UV stabilised gel-coated fibreglass dome. Aluminium base plate.
Antenna size:	46cm dia. x 16mm thick flat plate
Antenna gain:	16.4 dB receiver frequency: 1525 - 1559 MHz

Stabilisation

Degrees of freedom:	Pitch/roll +/- 45 deg. continuous yaw	
Stabilisation method:	Roll/pitch by integrated inclinometer and 2 axis rate sensor	
	Yaw/azimuth by integrated flux gate compass and 2 axis rate sensor	
	Optional external gyro or fluxgate compass output	
Platform dynamics:	Roll rate:	+/- 25 deg in 8 sec. 0.5g acceleration
	Pitch rate:	+/- 15 deg. in 5 sec, 0.5g acceleration
	Turning:	12 deg/sec, 1 deg/sec/sec
Azimuth range:	360 deg. continuous in either direction. No cable unwrap	
Elevation range:	+/- 110 deg. from vertical	

Environmental

Vibration:	4 to 33 Hz 1.0g	
Temperature:	Operating:	-25 deg C to + 60 deg C (dome internal)

Controller

Weight:	4 Kg	
Dimensions:	19 inch rack mount + 1.75 inch high x 12.5 inch depth	
Power requirements:	85 - 264 VAC, 47 - 440 Hz or 24 -28 VDC. 60 W	
Temperature:	Operating:	0 to +50 deg. C
External gyro types:	Synchro:	ref voltage 115, 110, 60, 50, 26
(optional)	ref freq.	400Hz, 60Hz, 50Hz
	ratios	360:1. 90:1, 36:1, 1:1
	Stepper:	voltages: 70, 50, 35, 24, 20
	Serial:	Robertson 8 bit, SGB1000S -ASCII, NMEA
(HDT,		HDG, VHW)

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3. EQUIPMENT LIST

1 x 90929 SkyFix Mini Dome fitted with down converter (check type of converter).

1 x SkyFix Mini Dome Pedestal (must be Aluminium)

3 x Bolts for Dome - Stainless Steel 2½ x $^{3}/_{8}$UNC.

1 x Pedestal base plate (+ locknuts).

1 x SkyFix Mini Dome lifting strop

1 x 50m RG213 signal cable male to male N type. (Can be extended using second cable and in-line connector)

1 x 90929/3/26 2 metre control flying lead (M controller to 50m down cable).

1 x 90928 SkyFix M Controller.

1 x 90909/2403 SkyFix Decoder/Option 1 Demodulator (60-80 MHz)

2 x IEC mains cables.

1 x 90909/3/50 25-way to 9-way data output cable.

1 x 90929/3/31 Analogue Signal Strength cable (9-way to 9-way).

1 x BNC to BNC cable (0.5 metre plug to plug).

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4. INSTALLATION

WARNING! BEFORE APPLYING POWER TO THE MINIDOME SYSTEM, ESPECIALLY AFTER SHIPPING OR LONG STORAGE, THE DOME COVER SHOULD BE REMOVED AND THE TWO ANTENNA MOTORS SHOULD BE MOVED BY HAND TO ENSURE FREE MOVEMENT. FAILURE TO DO SO COULD RESULT IN A FATAL DOME FAULT.

4.1 Siting the Dome

If degredation of the received satellite signal is to be minimized, the Mini Dome should be installed in a location clear of all sources of mechanical obstruction or electrical interference. As this is not always feasible, a compromise must be accepted in order to reduce the number of possible 'blind spots'. The following is intended as a guide to finding the correct site for the Dome.

1. The pedestal should be mounted along the centre line of the vessel and as near to midships as possible in order to minimize acceleration due to pitch and roll and minimum of 1 metre from any metal.

2. If the Internal fluxgate is to be used as the heading reference for the Dome, the pedestal must be of aluminium and care should be taken to keep the equipment away from moving iron parts and cables with high dc currents. Using an external gyro compass to provide the heading data is strongly recommended as this eliminates the need for the above restrictions.

3. The antenna should have a clear line of sight to the satellite for all values of heading adopted by the vessel. Geographical regions where the elevation of the satellite will be low represent the greatest problem as onboard obstructions are more difficult to avoid without raising the height of the pedestal.

4. The Dome should be located away from electrical interference sources, or in such a position that it is outside the beamwidth of the source (e.g. 10 cm radar antenna).

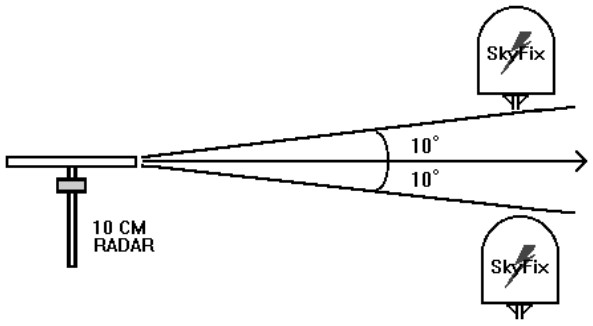


Figure 1

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5. The Dome should be located as far as possible from high power HF and VHF antennas in order to avoid mutual interference.

6. The distance from the Dome to the below decks equipment should not exceed 100m.

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Station Visibility diagram to be completed and submitted with Daily Logs sheets on completion of project.

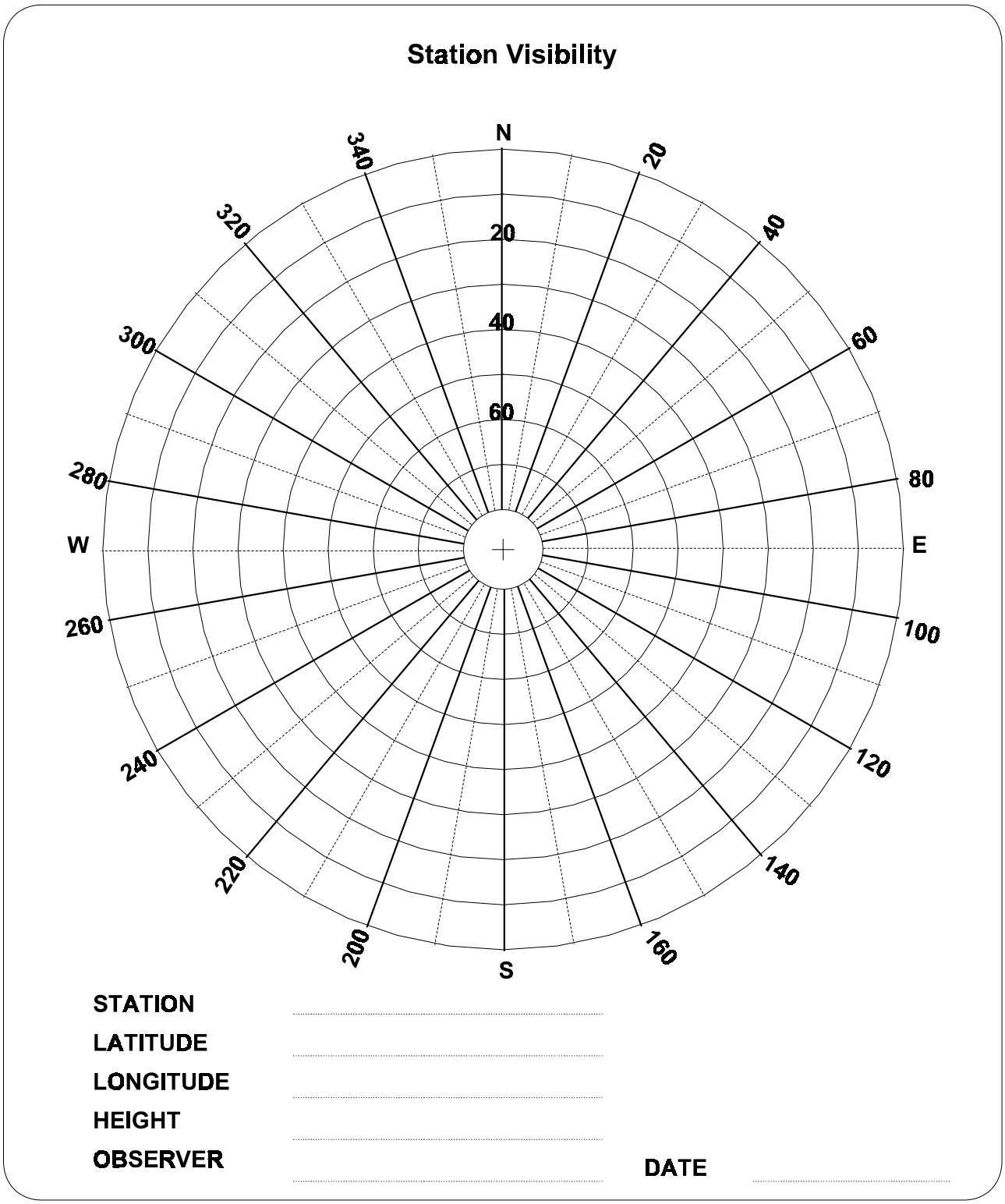


Figure 2

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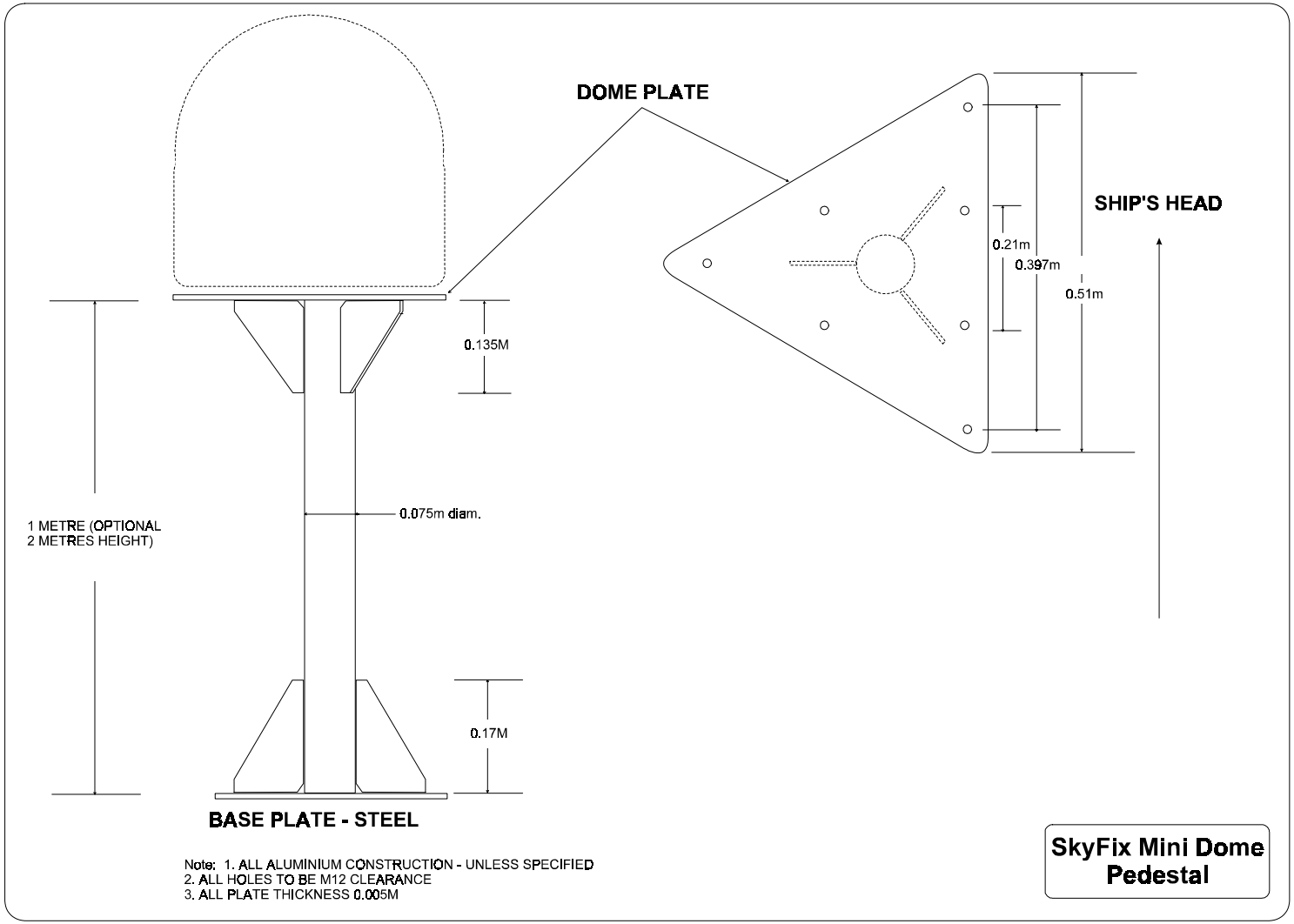


Figure 3

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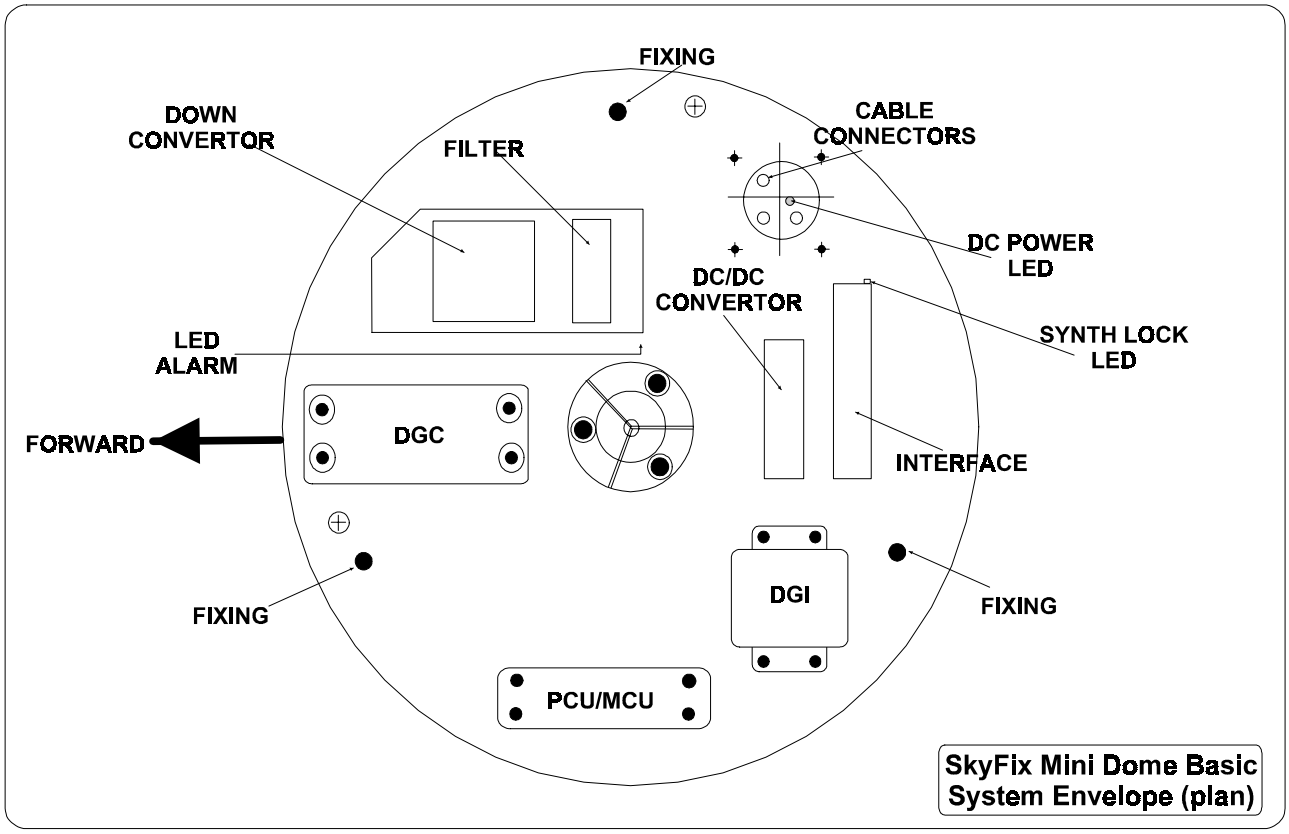


Figure 4

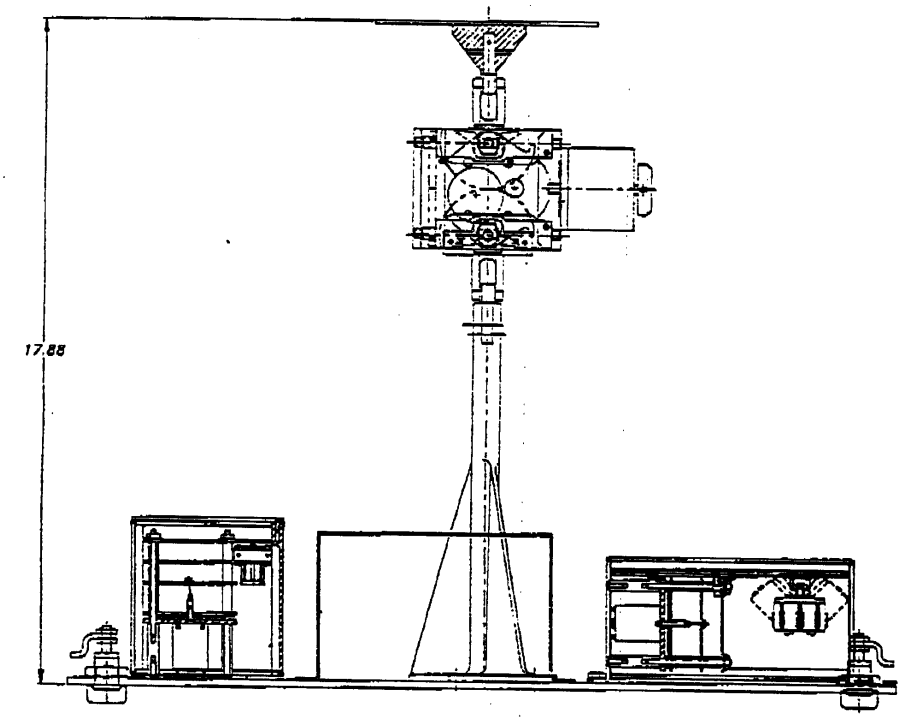


Figure 5 - SkyFix Mini Dome Basic System Layout (elevation)

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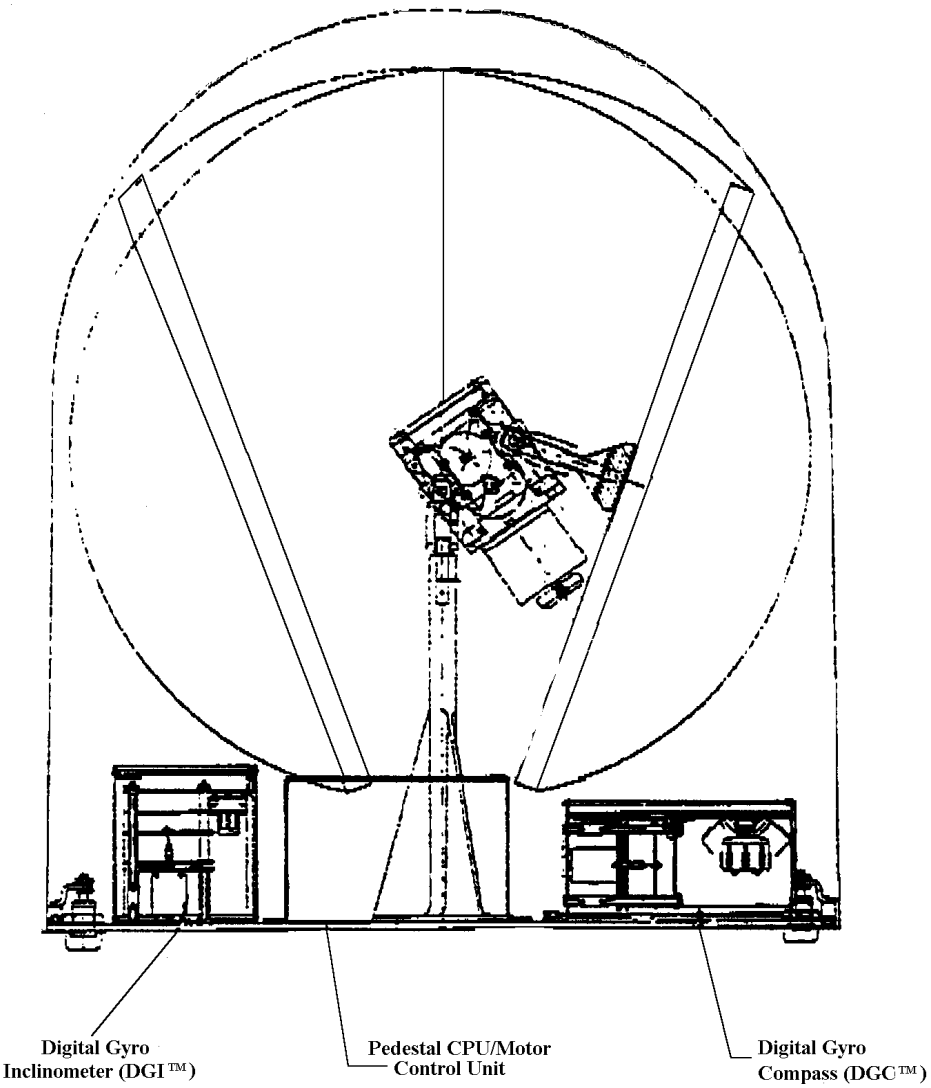


Figure 6 - SkyFix Mini Dome Parked Position

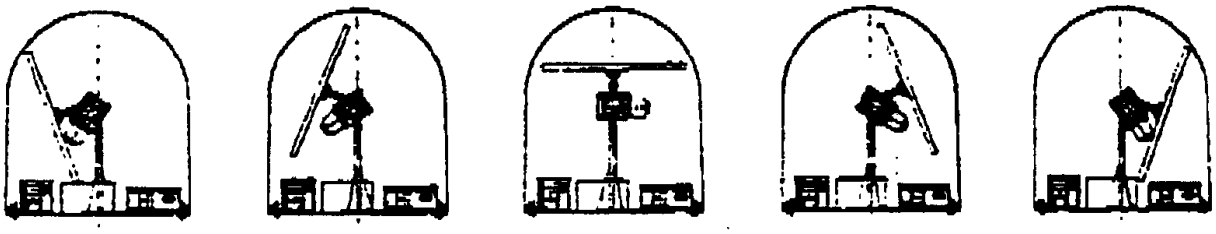


Figure 7 - SkyFix Mini Dome Initialisation Sequence

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4.2 Interconnection Cabling.

NOTE: SKYFIX DECODER CONNECTOR IDENT SHOULD BE "IF IN" NOT "IF ON"

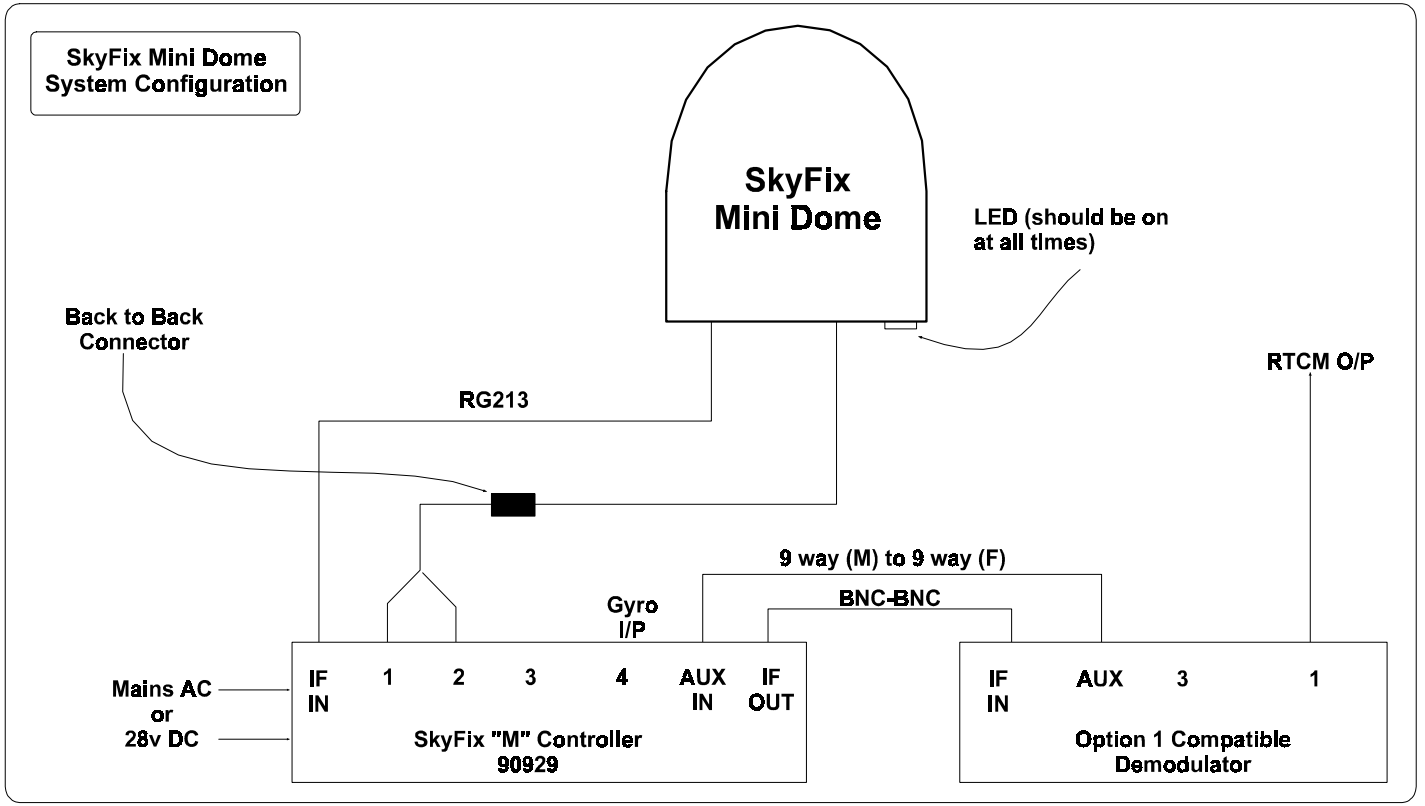
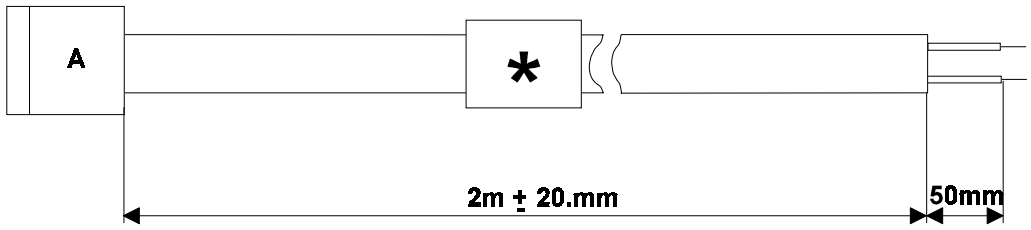
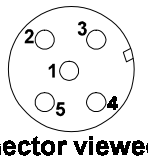


Figure 8

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FISCHER
SE104Z053





Connector viewed from solder spill face

END 'A'	WIRE COLOUR	FUNCTION	END 'B'
1	GREEN/YELLOW	EARTH	Wire not req'd must be cut back
2	BLUE	-NEG	2
3	BROWN	+POS	3
4			4
5			5

NOTES:

1. Cable length is from Face to connectors as indicated
2. Prepare cable ends in accordance with 90000/1/3/023
3. All leads to be secured with flux cored solder
4. Inspection marks to be shown where indicated thus: *
5. Hellashrink sleeves to be fitted over soldered terminations after inspection
6. Secur

Cable - Power DC

Figure 9

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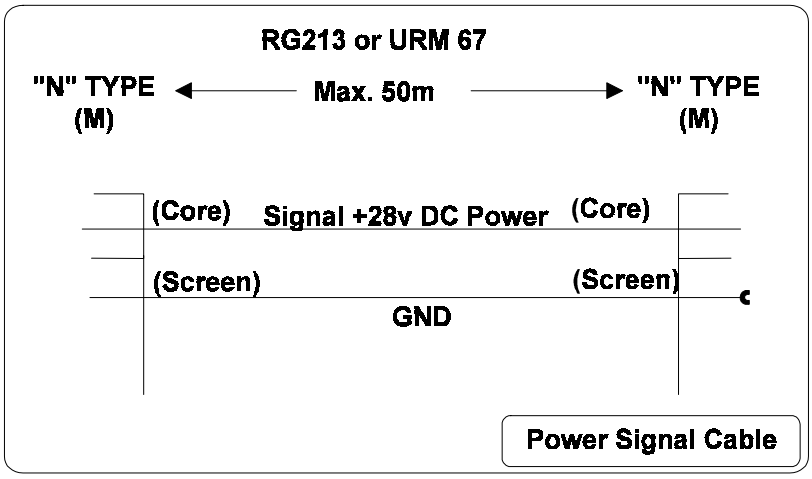


Figure 10

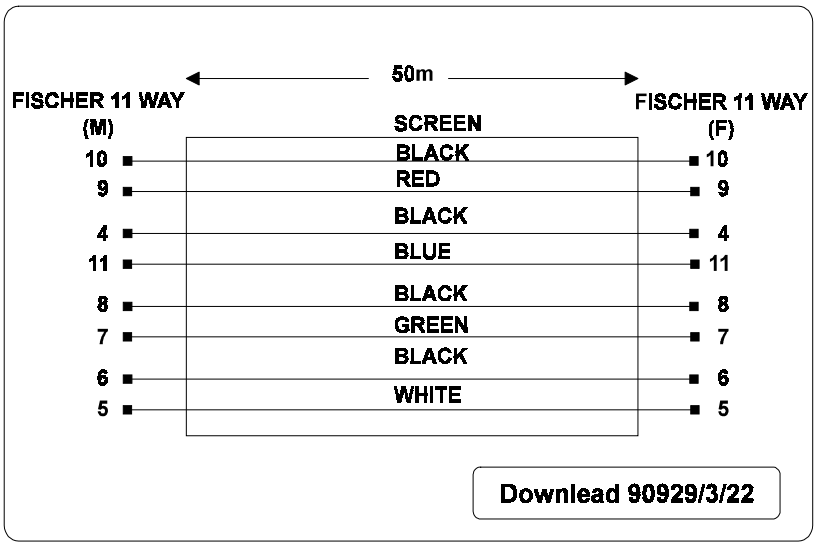


Figure 11

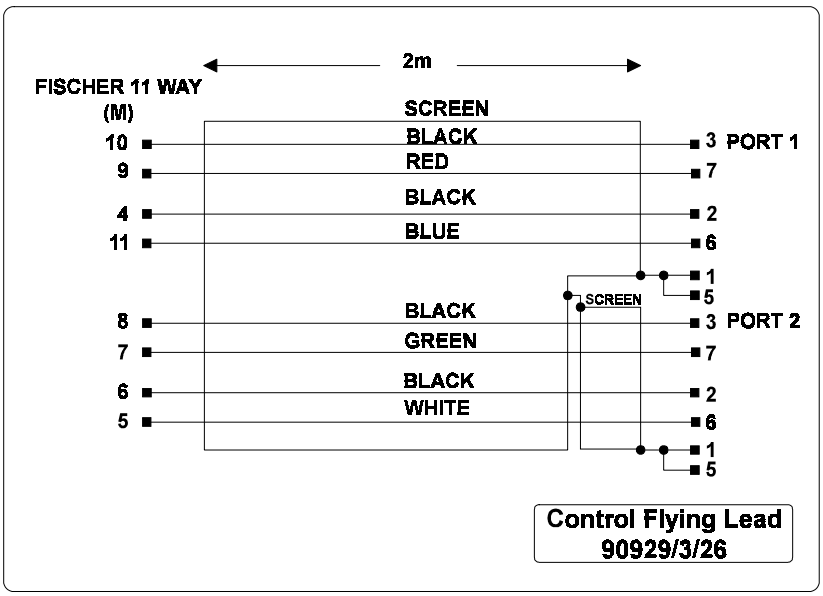


Figure 12

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4.3 Setting Up the SkyFix 'M' Controller.

When the Mini Dome system has been installed and configured as shown in Figure 8, switch the Controller ON and check that the front panel 'DC Supply' LED is lit. Look at the connector plate on the underside of the Mini Dome and check that the red LED is also lit. This indicates that the +28V DC supply is present.

4.3.1 Front Panel Controls and Indicators.

Key Functions

Page - advances the display through each menu option on an associative menu level. After the last menu option the display moves up to the next menu level

Toggle - displays the range of options available for user entry.

Enter - accepts the data option indicated by the cursor and advances the display to the next data entry if one exists on the current display page.

Status LEDs

'Tracking' - indicates Dome in 2pos or 3pos Step Track when lit (see Section 4.5 - Tracking Ctrl.). The LED will flash if the signal strength voltage derived from the Demodulator falls below 0.2V.

'Status' - indicates Dome status healthy when lit and fault(s) detected when flashing.

'Gyro' - indicates external gyro data selected for input to Dome when lit. The LED will flash if there are errors associated with the input data or timeout(s) have occured.

'DC Supply' - indicates the presence of the +5V logic supply when lit.

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Front Panel Meter

Used to indicate the strength of the received satellite signal. This is a useful aid in locating the satellite once the antenna elevation has been set.

4.3.2 Recommended Settings.

4.3.2.1 Controller Menu

At power up, the SkyFix 'M' Controller display will be

DISPLAY MENU **1. Controller**

Press 'ENTER' to move to the Controller Menu pages and scroll through each page in turn to set the system up as follows:

Dome Status

The initialisation sequence for the Dome should take approximately 45 seconds after which the display should change to 'System Healthy'. If the Dome fails to initialise or a fault occurs during operation, the initialisation sequence may be repeated by using the 'ENTER' key to send the RESET command (see Figure 7).

Fluxgate Cal.

If the internal Fluxgate compass is to be used, then a calibration will need to be carried out. Calibration should be switched on, and a note made of the current score e.g. 981. The vessel will then need to perform a 360 degree turn, taking approx. one minute to one minute 30 sec (a good turn is about 400m in dia). If the calibration is successfully completed, the Dome will update the score, and switch calibration off automatically. If the calibration has failed, then the calibration status will remain on. Should this occur, it will be necessary to perform further turns until the calibration is successful. If the calibration fails repeatedly, then the turns may need to be slower, in the other direction, or the dome may need relocating to a better position, away from sources of magnetic interference.
Note: When the Fluxgate cal. Status is toggled and entered, the status will momentarily toggle back to it’s original state, then change after approx 2 seconds. This is perfectly normal, and is due to a delay in communications to the Fluxgate compass in the dome.

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Once the calibration is complete, the program will display a **Score** and a **Magnetic Environment Count.** The noise score (first digit) is an indication of the quality of the calibration procedure. The noise score will be a number in the range 0 to 9, 0 being the worst and 9 the best. If the noise score is 7 or below, re-calibration is recommended for optimum accuracy. The magnetic environment count (second digit) gives an indication of the quality of the magnetic environment, with 9 being the best and 0 the worst. If the value is less than 5, you should consider relocating and re-calibrating the compass in a better environment (i.e. away from magnetic fields and material). The count (third digit) indicates the number of times the internal fluxgate has been calibrated, and will be a number between 0 and 9.

NOTE. If an external gyro or/fluxgate is to be used as the heading reference, ensure that calibration is switched off before selecting the reference on the Compass Select page.

Compass Heading

Displays heading derived from Internal DGC, External Gyro or External Fluxgate.

Ship Motion

Displays stabilised Pitch and Roll from the inclinometer in the Dome.

Target Position

Enter Azimuth and Elevation to satellite. (Use left/right and up/down symbols to peak signal when Azimuth and Elevation values entered).

Tracking Control

The following values are the recommended settings for standard use:

Step Track	-	**3pos** Use this setting in low dynamic environments eg. Rigs, Seismic vessels on long, slow line changes. If this setting does not maintain lock, try changing to 2 Pos.
		2pos. Use this setting in high dynamic environments eg. Site surveys with short, quick line changes, and any situation where the vessel will be required to make rapid changes in heading.
AZ Stepsize	-	**2°**
EL Stepsize	-	**0.0° ELEVATION TRACKING IS NOT REQUIRED. THIS MUST ALWAYS BE SET TO 0!**
Averaging	-	**2s**

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Prediction	-	**on**
Park Window	-	**1.0° THIS MUST ALWAYS BE LESS THAN AZ STEPSIZE FOR DOME TO TRACK CORRECTLY**

Should any tracking problems be encountered, try using the above recommended default settings before further investigation.

L/O Select

1460 MHz (SkyFix Inmarsat data) or 1480 MHz (OPTUS satellite data). In both cases, check that Synth Lock indicates 'yes'.

Compass Select

If no external gyro or fluxgate heading reference is available, this should be set to Internal DGC.

Port Setup

Serial gyro data compatible with one of the formats accepted by the Controller can be input on either Port 3 or Port 4 by selecting 'GYRO I/P'. The baud rate should be set to match the gyro data. If the ports are not required, they should be set to 'OFF'.

4.3.2.2 Gyro I/F Menu

Gyro Options

If a Synchro gyro is to be used as the heading reference, the Synchro ratio will need to be selected from one of the available options once the gyro type has been entered.

Note: If no external gyro is to be used, select 'Serial' as the default gyro option.

Initial Heading

If a Stepper gyro or non 1:1 ratio Synchro is selected, a value of initial heading will be required by the Gyro I/F board. This is set up and entered using the 'Toggle' and 'Enter' keys.

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4.4 Gyro Interface Board Setup

The 90927 Gyro interface board can accept the following inputs.

SYNCHRO

115V reference voltage
110V reference voltage
60V reference voltage
50V reference voltage
26V reference voltage
60Hz reference frequency
400Hz reference frequency
1:1 ratio
36:1 ratio
90:1 ratio
360:1 ratio

STEPPER

The board will accept stepper voltages from 20 to 70 volts,

The rear of the board contains five connectors. These are for:

1) I.F. input and D.C output to dome.
2) I.F feedthrough to demodulator
3) Analogue signal strength input from demodulator.
4) Synchro input (Rl,R2,Sl,S2,S3 left to right)
5) Stepper input (common, A, B, C left to right)

To accommodate the various gyro types, there are two headers which need to be changed. A 16 pin header situated on the daughter board and on 8 pin header situated at the rear of the mother board. The 8 pin header is used to select which reference frequency is needed and can be either 400Hz or 60Hz header (this header also serves for 50Hz). The 16 pin header is used to select which reference voltage is needed and can be either 110V or 26V.

All headers needed for the above synchro parameters will be contained on the board, spare/unused headers are stored in the "network parking skts".

The daughter board becomes active when a 360:1 ratio synchro gyro has been selected and needs the set of three links to be set in Position A. For all other ratios of synch and stepper gyro the links should be set to B.

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4.5 The Display Pages Explained

4.5.1 Menu Hierarchy

Menu Level 1	Menu Level 2	Menu Level 3
	:--- Dome Status	
	:	
	:--- Fluxgate Cal.	
	:	
	:--- Compass Heading	
	:	
	:--- Ship Motion	
	:	
1. Controller ----------	:--- Target Position	:--- Step Track
	:	:--- AZ Stepsize
	:--- Tracking Ctrl. ----------	:--- EL Stepsize
	:	:--- Averaging
	:--- L/O Select	:--- Prediction
	:	:--- Park Window
	:--- Compass Select	
	:	
	:--- Port Setup ----------	:--- Setup for Port N
	:	:--- Gyro Msg Format
	:--- S/W Version	
		:--- Synchro 1:1, 36:1, 90:1, 360:1
	:--- Gyro Type ----------	:--- Stepper
	:	:--- Serial
2. Gyro I/F ----------	:--- Initial Heading	
	:	
	:--- S/W Version	
3. Alarms ----------		
	:--- LCD Test	
	:	
4. System Checks ----------	:--- LED/Alarm Test	
	:	
	:--- O/P Port Test	

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4.5.1.1 **Dome Status**

Display shows:

```
Initializing...xx
RESET?
```

Toggle options: none.

Notes: The top line of the display indicates the status of the Dome as returned in response to a status request from the Controller. Other possible status messages displayed are:

```
'Gyro.Comp    fail'
'Gyro/Incl    fail'
'Motor count  fail'
'Comms        fail'
```

While the Dome is initializing, a count is incremented every second and displayed at the end of the first line. If this exceeds 60 seconds, the message ' PCU init. > 1 min' will be displayed.

If the Dome has completed initialization and there are no faults detected, the following status message will be displayed:

```
'System Healthy'
```

If the 'enter' key is pressed, the message 'enter?' will be displayed on the second line of the display.The user may then press the 'enter' key again to send the SOFT RESET command to the Dome. This command terminates the current system tracking, resets all system parameters to their default values and restarts the system. Pressing 'toggle' when the 'enter?' message is displayed will clear the message and return the cursor to the beginning of the second line.

4.5.1.2 **Fluxgate Calibration**

Display shows:

```
FLUX. CAL. on
Cal. score  xxx
```

Toggle options: Fluxgate calibration may be toggled ON or OFF and the command sent to the Dome using the 'enter' key.

Notes: If Fluxgate calibration is ON, the Controller will request the calibration score from the Dome every 5 seconds. If calibration is OFF, the score recorded when the Fluxgate performed the previous calibration will be displayed. If Fluxgate calibration has not previously been performed, the display will show '. . .' To switch the fluxgate calibration function on, the user selects 'on' using the toggle and enter keys. This will send the On command to the dome and wait for confirmation that it has been accepted. This wait for confirmation may take 3-5 seconds during which time the display will show the fluxgate calibration to be off.

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When the calibration sequence has finished it must be switched off as this will interfere with the tracking of the satellite.

If Compass Select is not set to Internal DGC, the Fluxgate calibration option is disabled and the Cal. score field will display the most recent calibration result.

4.5.1.3 **Compass Heading**

Display shows:

```
HDG  GYRO  EXFG
hhh  hhh   hhh
```

Toggle options: None.

Notes: This page displays the integer heading data from the Dome DGC, an external gyro input via the Gyro I/F or the serial ports, and an external fluxgate.The data displayed under HDG is derived from the compass type selected via Compass Select. If no external gyro or fluxgate is available, Compass Select should be set to Internal DGC and the HDG heading displayed will be derived from the fluxgate compass in the dome. The heading displayed under GYRO or EXFG allows the user to compare the values from various heading sensors before directing the data from one up to the DGC in the Dome.

4.5.1.4 **Ship Motion.**

Display shows:

```
Pitch     Roll
+xx.x°  +xx.x°
```

Toggle options: None.

Notes: This page displays the stabilized pitch and roll values generated by the inclinometers in the Dome.The valid range of data is ±60.0 degrees and the convention for polarity is BOWS UP - positive in pitch, PORT UP - positive in roll.

4.5.1.5 **Target Position.**

Display shows:

```
AZ: xxx.x°  □ □
EL: +xx.x°  □ □
```

Toggle options: On selection of the Target Position page the flashing block cursor is placed over the AZ data field. Successive presses of the Toggle key will move the cursor to the EL data field and then to each of the four single step movement symbols before returning to the AZ field. If Target Azimuth or Elevation is to be set by the user, pressing Enter will move the cursor to the first digit of the corresponding data field, and clear the associated single step symbols on the same line.The required value may be set by using a combination of the Toggle and Enter keys.When the final digit has been entered, the message `enter?' will be displayed in

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order that the user can check the value before sending it to the Dome. If the Enter key is pressed while the cursor is on one of the four single step symbols, the antenna will move in the corresponding direction by an amount dictated by the Steptrack Stepsize value entered on the Tracking Control page.

NOTE. If the Elevation Steptrack Stepsize is set to 0.0°, the Elevation single step value will be 1.0°.

4.5.1.6 **Tracking Ctrl.**

Display shows:

```
CONTROL OPTIONS
Step Track    off
```

Toggle options: When the flashing block cursor is on the first character of the second line, the Toggle key allows the user to view the Step Track control options available. To change the state or value of the corresponding option, press Enter to move the cursor to the position immediately in front of the option value and then use the Toggle and Enter keys to select the new value.

Notes. There are currently two types of Step track available. The method incorporated into the dome software has been defined as 3pos, and requires signal strength values to be sent up the Dome from the controller on a regular basis. The second method, defined as 2pos, has been developed as a tracking algorithm by Racal Survey, and sends only single step positional adjustment commands to the Dome. AZ Stepsize sets the value of azimuth movement for each Step track increment and may be toggled from 0.3° up to 30°. The recommended setting for this is 2°. EL Stepsize sets the value of elevation movement for each Step track increment and may be toggled from 0.0° up to 8°. **THIS FEATURE IS NOT REQUIRED AND MUST BE SET TO 0° AT ALL TIMES.** ELEVATION TRACKING IS CARRIED OUT INTERNALLY BY THE INCLINOMETER IN THE DOME, AND REQUIRES NO USER INPUT.

Averaging time is directly proportional to the number of signal strength samples used by the Dome before single stepping the antenna. The MIN setting forces the Dome to make Step Track adjustments for every signal strength value received. Averaging may be toggled from MIN up to 9 seconds. The recommended setting is 2s.

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Prediction may be used in 3pos Step Track to improve system pointing accuracy while dynamically tracking a target. The value of this correction will depend upon the amount of pitch, roll and yaw to which the Dome is subjected.

Park Window has been incorporated into the ASAP software to reduce unnecessary antenna movement and subsequently reduce the wear on the drive motors. By setting a Park Window size between 1.0° and 6.0°, any resultant angular movement calculated by the 3pos Step Track routine will be compared with the Window size before issuing a command to move the antenna. If the required movement is less than the Park Window in either azimuth or elevation, the antenna position will not be adjusted. Park Mode may be disabled by setting the Park Window to 0.0°. The recommended setting is 1.0°. THIS VALUE MUST ALWAYS BE LESS THAN AZ. STEPSIZE FOR THE DOME TO TRACK CORRECTLY.

4.5.1.7 **L/O Select.**

Display shows:

```
FREQ:        1460MHz
SYNTH LOCK    yes
```

Toggle options: The carrier frequency used in the Downconverter in the Dome may be set to either 1460MHz for SkyFix signals or 1480MHz for OPTUS satellite data.

Notes. If the Downconverter has successfully locked its phase lock loop to the selected reference frequency, the Synth Lock status will display 'yes'. If the phase lock loop is unstable or the reference oscillator is not present, Synth Lock will display 'no'.

See Note 4.6.1.

4.5.1.8 **Compass Select.**

Display shows:

```
COMPASS TYPE:
  Internal DGC
<
```

Toggle options: Use the Toggle key to display the types of heading reference available for providing compass heading data for the DGC in the Dome. The options are:

Internal DGC
Gyro
Ext. Fluxgate
C100 RS422
C100 RS232

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Press Enter to select the type of heading reference required. A left arrow will appear at the extreme right hand end of the second line to indicate the type of heading reference currently selected for use by the Dome.

Notes: Internal DGC refers to the fluxgate fitted as part of the Dome assembly. The C100 options are yet to be implemented.

4.5.1.9 **Port Setup.**

Display shows:

```
View Setup for
Port 1
```

Toggle options: Use the Toggle key to change the Port number and Enter to display the current settings for this Port. The display pages for each of the four Ports are as follows:

Port 1.

```
PORT 1 DOME I/O
 4800     8, n, 1
```

Notes: Port 1 is dedicated to communication with the Dome. The baud rate is fixed at 4800, and the format is 8 data bits, no parity, 1 stop bit.

Port 2.

```
PORT 2    DGC I/O
 9600     8, n, 1
```

Notes: Port 2 is dedicated to communication with the DGC when remote Gyro or Fluxgate data is to be used in place of the Internal Fluxgate. The baud rate is fixed at 9600, and the format is 8 data bits, no parity, 1 stop bit.

Ports 3 and 4

```
PORT 3  GYRO
I/P
 1200     8, n, 1
```

Notes: Ports 3 and 4 may be configured for a number of mutually exclusive I/O options. i.e. if GYRO I/P is selected on Port 3, it will not be available in the Port 4 options as there should not be a requirement for identical port configurations.

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Ports 3 and 4.

Toggle options: I/O = 'EXT F/G' - External Fluxgate heading input (serial RS232).
'SIG STR' - Signal strength input from 90909/2403 Decoder.
'GYRO I/P' - External Gyro heading input (serial RS232).
'HDG O/P' - Dome Gyro Compass NMEA 0183 heading output.
'P&R O/P' - Stabilized Pitch and Roll output from Dome.
'OFF'

Baud = 110, 300, 600, 1200, 2400, 4800, 9600 or 19200.
Char = 8,n,1 8,n,2 8,e,1 8,e,2 8,o,1 or 8,o,2

Notes: (i) If GYRO I/P is selected, the next display page will allow the user to select the format of the input heading message from the following list:

Robertsons
Robertsons rev.
SGB1000S-ASCII
NMEA - HEHDT, HEHDM, HEVHW, GPVHW

(ii) If HDG O/P is selected, the Gyro Compass heading received from the Dome and displayed on the Compass Heading page will be output as an NMEA 0183 message with the HEHDM header twice a second. The output message is in the following form:

$ H E H D M , X X X . X , M * C C [C R] [L F]

where XXX.X is the Gyro Compass heading, and CC is the message checksum.

(iii) If P&R O/P is selected, the stabilized pitch and roll values received from the Dome and displayed on the Ship Motion page will be output twice a second in the following format:

P ± X X X X R ± X X X X [C R] [L F]

where XXXX is the pitch and roll value with an implied decimal place between the second and third digits.

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4.5.1.10 **S/W Version**

Display shows:

```
RSL:   v*.*  v*.*
DOME:  v*.*
```

Toggle options: none.

Notes. (i) The versions displayed on the first line are for EEPROMS IC18 and IC5 respectively on the Data Decoder board. The version on the second line is for the
software in the PCU\MCU module in the Dome.

4.5.2 Gyro I/F Menu

4.5.2.1 **Gyro Options**

Display shows:

```
GYRO TYPE:
 Synchro    1:1
```

Toggle options: The Gyro options available are Synchro, Stepper and Serial. If Synchro is selected, the cursor will move to the colon on the synchro ratio and the user must also enter the required synchro ratio as 1:1, 36:1, 90:1 or 360:1.

Notes. (i) If no external Gyro is to be used, the Gyro Type should be set to Serial.

4.5.2.2 **Initial Heading**

Display shows:

```
INITIAL HEADING:
000.0
```

Toggle options: Use the Toggle key to increment the digit marked by the cursor. As each digit is entered the cursor will move to the next digit on the right until the heading is completed. When all four digits have been entered, the display will show 'enter ?' to accept the heading and send it to the Gyro I/F.

Notes. (i) Initial Heading must be entered for Stepper type gyros and non 1:1 ratio Synchros.

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4.5.2.3 **S/W Version**

Display shows:

GYRO I/F: v*.*

Toggle options: none.

4.6 Setting Up the 90909/2403 Decoder (Option 1 Demodulator)

4.6.1 Frequency (Demodulator Menu)

A physical check should be made of the fitted downconverter prior to selecting frequency.

This must be entered as the current SkyFix IF frequency +10.000MHz. i.e. if AOR(E) satellite data is required, the frequency entered will be 71.050MHz + 10.000MHz = 81.050MHz. Therefore the frequencies for the 4 Inmarsat satellites should be entered as follows:

IOR	82.285 MHz
POR	82.475 MHz
AOE	81.050 MHz
AOW	80.775 MHz

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APPENDIX A - Rear Panel Interface

Power Supply Input

A filtered IEC mains inlet connector with integrated on/off switch and fuse is fitted to the rear panel of the unit.

Fuse type:	1.6A, 20 x 5mm Anti Surge
AC Input:	85-264V AC 47-440Hg
DC Input:	24-28V DC
Power:	60W

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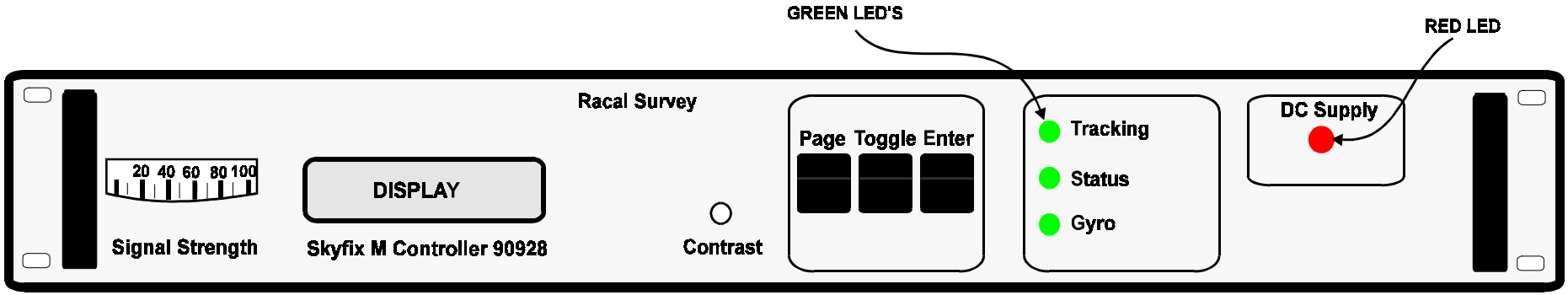


Figure 13 - 90928 Front Panel

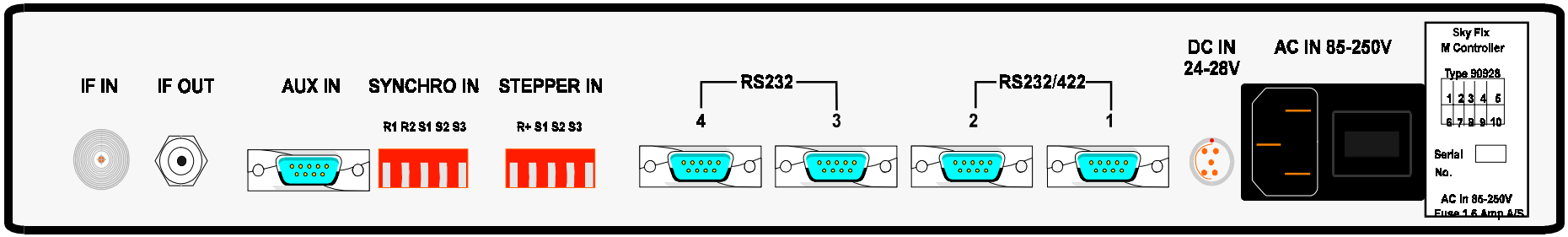


Figure 14- 90928 Back Panel

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APPENDIX B - Data Decoder Board Link Settings

There are four 9-way D type connectors available for interfacing to remote equipment on the rear panel of the Data Decoder board. Ports 3 and 4 are RS232 level only. Ports 1 and 2 are internally link selectable for either RS232 or RS422 levels and should be set for operation at RS422 levels as detailed below:

	LK6	LK7	LK10	LK11	LK12
Port 1 RS422		1-2	1-2,5-6		In
Port 2 RS422	1-2,5-6	5-6		In	

Ports 1 and 2:

Connector:	9 way D type socket
pin 1:	screen (0v)
pin 2:	Tx- (RS232 Tx)
pin 3:	Rx- (RS232 Rx)
pin 5:	0v
pin 6:	Tx+
pin 7:	Rx+
pin 4,8,9:	no connection

Ports 3 and 4:

Connector:	9 way D type socket
pin 1:	screen (0v)
pin 2:	Tx (RS232)
pin 3:	Rx (RS232)
pin 5:	0v
pin 4,6,7,8,9:	no connection

The remaining header links should be set as follows:

LK1:	1 - 2, 3 - 4, 5 - 6	LK8:	1 - 3, 5 - 6
LK2:	2 - 3	LK9:	In
LK3:	Out	LK13:	Out
LK4:	1 - 2, 3 - 4, 5 - 6	LK14:	1 - 2, 3 - 4
LK5:	1 - 3, 5 - 6		

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APPENDIX C

SKYFIX REFERENCE STATION AREAS ID CODES, UPLINK AND RTCM MESSAGE TYPE

Updated	**15/04/97**		**SkyFix Stations Online**			**64**		
AREA	**AREA CODE**	**ID**	**Status**	**RTCM**	**IOR**	**POR**	**AOE**	**AOW**
ASIA	**100-199**							
	.							
Singapore		100	Online	2	ON	ON	OFF	OFF
Terengganu		101	Online	2	ON	OFF	OFF	OFF
Miri		102	Online	2	ON	OFF	OFF	OFF
Minila		110	Online	2	ON	ON	OFF	OFF
Hong Kong		120	Online	2	ON	ON	OFF	OFF
Sapporo		140	Online	2	OFF	ON	OFF	OFF
Kota Kinabalu		105	Online	2	ON	OFF	OFF	OFF
Ho Chi Minh City		115	Online	2	ON	OFF	OFF	OFF
Ujung Pandang		150	Online	2	OFF	ON	OFF	OFF
Wenzhou		135	Online	2	ON	ON	OFF	OFF
Seoul		130	Online	2	ON	ON	OFF	OFF
Jakarta		160	Online	2	OFF	ON	OFF	OFF
Guam		170	Online	2	OFF	ON	OFF	OFF
Bangkok		180	Online	2	ON	OFF	OFF	OFF
	.							
Australia/New Zealand	**200-299**							
	.							
Cairns		201	Online	2	OFF	ON	OFF	OFF
Darwin		202	Online	2	OFF	ON	OFF	OFF
Dampier		203	Online	2	OFF	ON	OFF	OFF
Perth		204	Online	2	OFF	ON	OFF	OFF
Adelaide		205	Online	2	OFF	ON	OFF	OFF
Sydney		206	Online	2	OFF	ON	OFF	OFF
Broome		207	Online	2	OFF	ON	OFF	OFF
Melbourne		208	Online	2	OFF	ON	OFF	OFF
Auckland		250	Online	2	OFF	ON	OFF	OFF
	.							
RUSSIA (CIS)	**300-399**							
	.							
	.							
Middle East	**400-499**							
	.							
Abu Dhabi		400	Online	2	ON	OFF	ON	OFF
Bombay		450	Online	2	ON	OFF	OFF	OFF
Baku		410	Online	2	ON	OFF	ON	OFF
Bahrain		420	Online	2	ON	OFF	ON	OFF
Calcutta		480	Online	2	ON	OFF	OFF	OFF

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AREA	AREA CODE	ID	STATUS	RTCM	IOR	POR	AOE	AOW
North America	**500-599**							
	.							
Houston		500	Online	2	OFF	OFF	ON	ON
Tampa		520	Online	2	OFF	OFF	ON	ON
Halifax		530	Online	2	OFF	OFF	ON	ON
New Orleans		540	Online	2	OFF	OFF	ON	ON
Carmen(Mexico)		550	Online	2	OFF	OFF	OFF	ON
San Diego		535	Online	2	OFF	ON	OFF	ON
Vancouver		505	Online	2	OFF	ON	OFF	OFF
St. Johns		545	Online	2	OFF	OFF	OFF	ON
Hawaii		560	Online	2	OFF	ON	OFF	OFF
	.							
South America	**600-699**							
	.							
Falklands		600	Online	2	OFF	OFF	OFF	ON
Panama		610	Online	2	OFF	OFF	OFF	ON
Macae(Brazil)		620	Online	2	OFF	OFF	OFF	ON
Trinidad		640	Online	2	OFF	OFF	OFF	ON
Fortaleza(Brazil)		650	Online	2	OFF	OFF	OFF	ON
Caracas		660	Online	2	OFF	OFF	OFF	ON
	.							
North/Norwegian Sea	**700-799**							
	.							
Aberdeen		700	Online	2	OFF	OFF	ON	ON
Sumburgh		710	Online	2	OFF	OFF	ON	OFF
Hammerfest		720	Online	2	ON	OFF	ON	OFF
Den Helder		740	Online	2	OFF	OFF	ON	ON
Flamborough		750	Online	2	OFF	OFF	ON	OFF
Scillies		760	Online	2	OFF	OFF	ON	OFF
Bronnoysund		770	Online	2	OFF	OFF	ON	OFF
Bergen		780	Online	2	OFF	OFF	ON	ON
Kristiansund		790	Online	2	OFF	OFF	ON	OFF
Mediterranean	**800-899**							
	.							
Rome		800	Online	2	OFF	OFF	ON	OFF
Cadiz		810	Online	2	OFF	OFF	ON	OFF
Ankara		830	Online	2	ON	OFF	ON	OFF
	.							
Africa	**900-999**							
	.							
Gabon		900	Online	2	OFF	OFF	ON	ON
Nigeria 1		910	Online	2	OFF	OFF	ON	ON
Nigeria 2		911	Online	2	OFF	OFF	ON	OFF
Namibia		920	Online	2	OFF	OFF	ON	OFF
South Africa		930	Online	2	OFF	OFF	ON	OFF
Pointe Noire(Congo)		940	Online	2	OFF	OFF	ON	OFF
Cairo(Egypt)		960	Online	2	ON	OFF	ON	OFF
Port Nolloth(SA)		950	Online	2	OFF	OFF	ON	OFF
Durban		970	Online	2	OFF	OFF	ON	OFF

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