MVS Series Antennas
Operating Instructions
Dec 2005
Version 3.3

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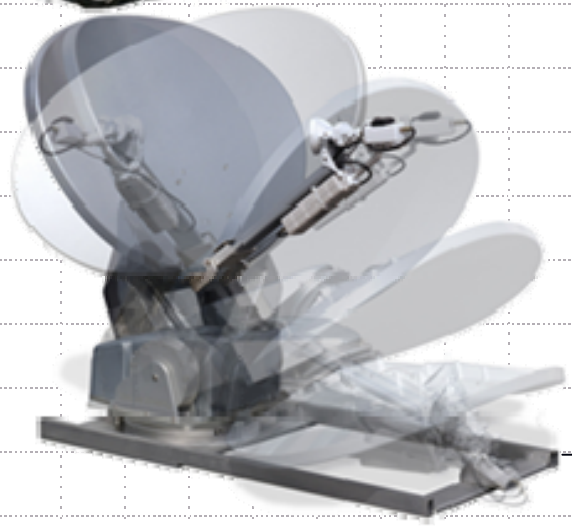
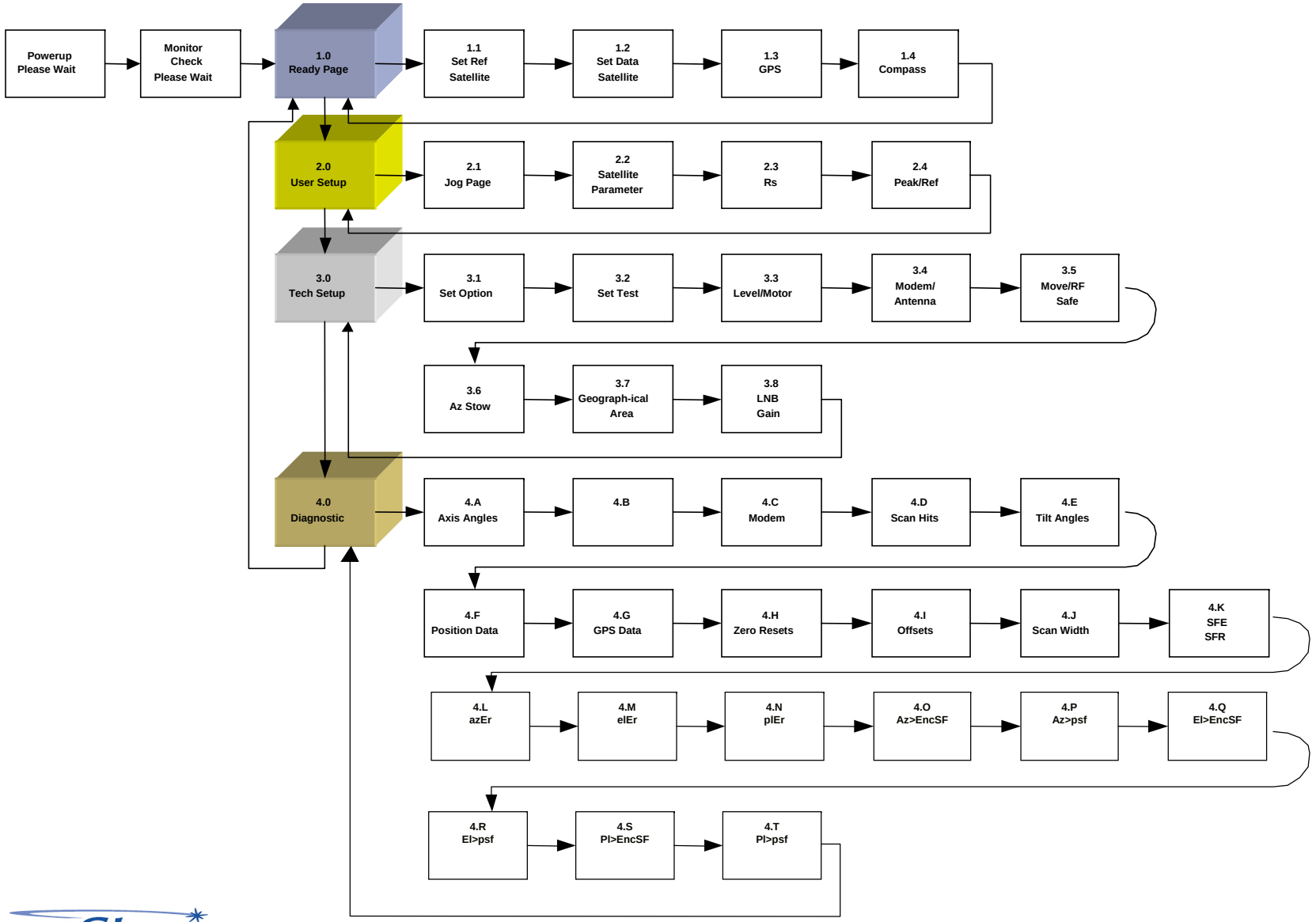
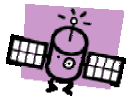


TracStar SYSTEMS

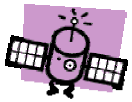
TracStar Controller Menu Grid



Contents



Using the Manual



ARROW 1X
MAIN 2X

PgUP / PgDn

- Click on HOME / HOUSE symbol to return to INDEX page
- Means it is something Trac*Star* feels is important to you.
- Number of times operator must touch respective keypad position to accomplish the direction(s) being given.
- PgUP / PgDn navigates the MVS Manual by decreasing or increasing the page number respectively.

Summary Slide

Summary Slide (cont.)

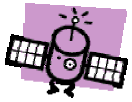
Antenna Description

- Three axis, polarization over elevation over azimuth
- Configurable for operation on most satellites
- Designed for operator simplicity, performs precise antenna to satellite alignment with the push of a button or a switch
- Pedestal Description:
  - High precision motors with optical encoders
  - Very low backlash drive system
- Each antenna is fully integrated with
  - GPS
  - Compass
  - DVB Receiver
  - Base level sensor
  - Antenna Control System with User Interface

- Satellite Acquisition Description
- Upon power up and deployment, the following acquisition sequence takes place:
  - Compass aligns the antenna with south (if in the northern hemisphere, to the north if in the southern hemisphere)
  - Antenna acquires GPS for high precision geographic location information
  - Antenna precisely sets elevation angle and sweeps through a selected reference satellite, monitoring signal characteristics of the reference satellite
  - Antenna peaks on reference satellite until the center of the antenna beam is located as a calibration
  - Antenna then peaks on the satellite of interest and performs a high precision alignment to the satellite
  - Antenna sends GPS to satellite modem (if applicable)
  - Satellite modem initiates contact with network operations

Antenna Description

- DirectPoint™ technology closely couples with the satellite modem thus enhancing the satellite acquisition accuracy and reducing the startup time. The antenna goes directly to the data satellite and using enhanced communications capability with intelligent modems is able to acquire, lock and peak on the specific satellite without the traditional pre-alignment (reference satellite) stage.

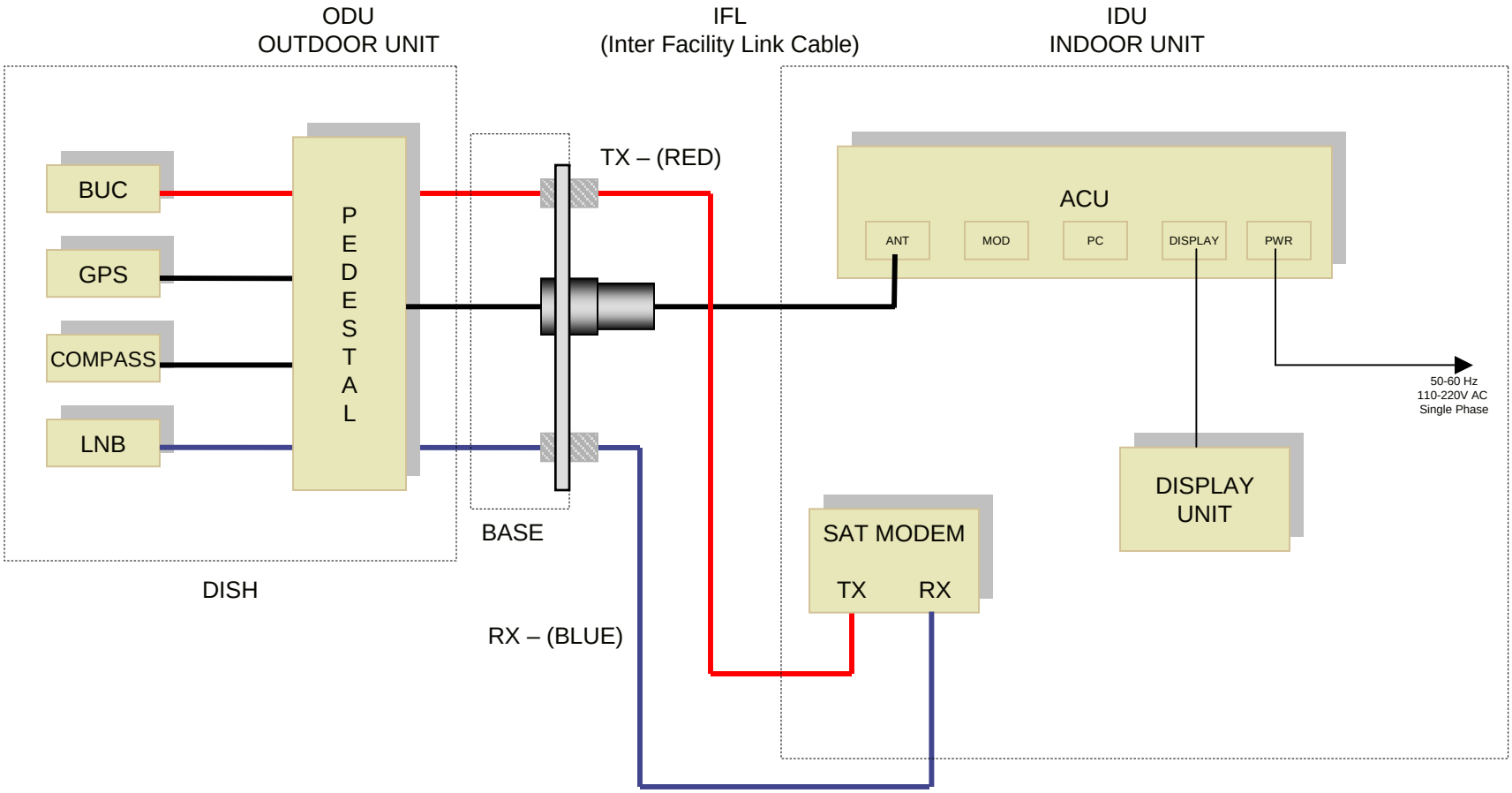


The DirectPoint mode is invoked by setting "10000" as the Lock Method Word in the User Setup Page 2.4 and "iDirect" as the Modem in Tech Setup Page 3.4.

Satellite Acquisition Description

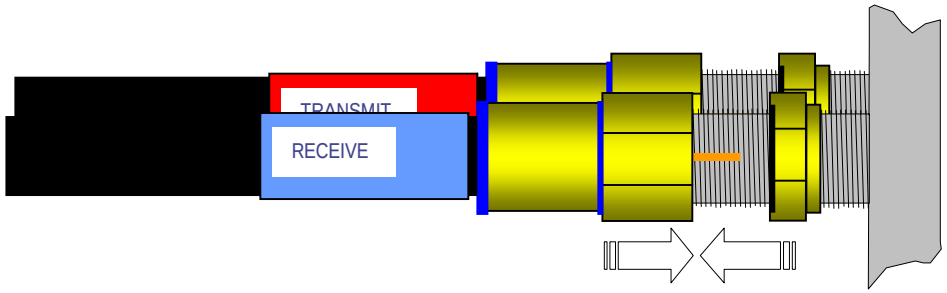
- Upon power up and deployment, the following acquisition sequence takes place:
  - Compass aligns the antenna with south (if in the northern hemisphere, to the north if in the southern hemisphere)
  - Antenna acquires GPS data for high precision geographic location information
  - Using DirectPoint™ and bypassing the selected reference satellite, the antenna pointing algorithm precisely scans to the selected data satellite
  - Monitoring signal characteristics specific to this data satellite, the antenna peaks on the center of the satellite beam and performs a high precision alignment to this satellite
  - After completion of the peaking sequence data is sent to the modem to enable transmit
  - The modem can then automatically initiate contact with the network operations center and be commissioned into the network

System/Cabling Block Diagram



IFL CABLE CONNECTIONS

There are two different types of coaxial connectors on the IFL cables. The cable connecting to the antenna is shown below. The two-piece connection allows for the O-ring seal in the smaller nut to be placed on the F Type connector first. Once the cable is connected, the smaller nut is tightened against the cable end allowing the O-ring to provide a moisture proof seal.



Antenna Setup Options

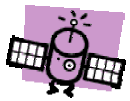
1. Quick Setup
    1. This setup is performed for an antenna system to be used in a geographical region for the first time.
    2. The user has known Reference Satellite information.
    3. The user does not have Reference Satellite frequencies.

2. Quick Setup Reference from Script
    1. This setup is performed for an antenna system to be used in a geographical region for the first time.
    2. The user has a script, i.e., orbital positions and frequencies exist for the Reference Satellites and therefore can be entered into the antenna controller.

3. Quick Setup Reference Using SkyScan
    1. This setup is performed for an antenna system to be used in a geographical region for the first time.
    2. There is no information for Reference Satellites.

4. After the Reference Satellites are input, the following criteria should be considered in selecting them.
    1. There can be up to 12 Reference Satellites in the library. A general rule is to select 3-4.
    2. The antenna “rated” the satellites during the ScanSky. Reference satellite positions ending with the letter “A” are the most desirable, then “B”, then “C”. “Z” indicates that carrier power was not found.
    3. Try to select satellites that are off to the side (east or west) of the users longitude position, i.e., lower on the horizon is better.

1. Quick Setup Reference – Known Reference Satellites



NOTE:

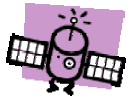
Locate the antenna so that it has a view of the orbital arc.

Orient the antenna so that it comes up generally to the south (if located north of equator), north (if located south of equator).

Step	Function	Action	Display Page
1.	Power up antenna	Turn on power at ACU	READY
2.	Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP,[Code 0] Tech Setup [CODE 13] READY
3.	Clear existing satellite data. (Page 3.2)	From READY page Main 2x Arrow 2x + or – to Enter + Enter	READY TECH SETUP [Code 13] SET TEST, [NONE] [CLEAR REF DATA] [CANCEL] [RUN NOW] READY
4.	Input reference satellite parameters. (Page 2.3) Go to reference satellites entry page Leave both default frequencies 10799 Set scan type to Freq Repeat, up to 12 Ref satellites	From READY page Main 1x Arrow 3x Enter + or – to Ref Sat Long ENTER - to [10799] ENTER + TO [Freq] ENTER	READY USER SETUP [Rs 1] [XXX.X] [XXX.X] [XXX.X] [10799] [SS] [Freq]
5.	Run Frequency Scan (Page 3.2 – Set Test/Freq Scan)	From READY page Main 2x Arrow 2x + or – to ENTER + Enter	READY TECH SETUP, [Code 13] SET TEST, [NONE] [SCAN FREQ] [cancel] [RUN NOW] READY
6.	(Input Reference Satellites Page 1.1) Select RefX Satellite Select RefY Satellite	From Ready page: Arrow 1x + or – through Ref Sat List ENTER + or – through Ref Sat List Enter Main	READY SetREF, X XXX.X SetREF, Y XXX.X READY
7.	(Input data satellite parameters Page 1.2) Toggle between SatA and SatB Input orbital position for SatA Input orbital position for SatB	From READY page: Arrow 2x + or – + or – Enter	READY SELECT DATA [SatA] or [SatB] XXX.X

TracStar SYSTEMS

2. Setup Quick Reference: From A Script



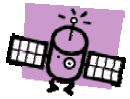
NOTE:

Locate the antenna so that it has a view of the orbital arc.

Orient the antenna so that it comes up generally to the south (if located north of equator), north (if located south of equator).

Step	Function	Action	Display Page
1.	Power up antenna	Turn on power at ACU	READY
2.	Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, ENTER Main 2x	READY TECH SETUP [Code 0] Tech Setup [CODE 13] READY
3.	Clear existing satellite data. (Page 3.2)	From READY page Main 2x Arrow 2x + or – to ENTER + ENTER	READY TECH SETUP [Code 13] SET TEST, [NONE] [CLEAR REF DATA] [cancel] [RUN NOW] READY
4.	Input reference satellite parameters (Page 2.3) Select Reference Satellite 1 Input orbital position for Ref 1 Input primary frequency for Ref1 Input secondary freq. for Ref1 Repeat, up to 12 Ref satellites	From READY page Main 1x Arrow 3x ENTER + or – then ENTER + or – then ENTER + or – then ENTER + or – then ENTER	READY USER SETUP [Rs 1] [XXX.X] [XXXXX] [XXXXX] [Rs2]
5.	(Input reference satellites Page 1.1) Select RefX satellite Select RefY satellite	From READY page: Arrow 1x + or – then ENTER + or – then ENTER	READY Set Ref XXX.X XXX..X
7.	Input data satellite parameters. (Page 1.2) Toggle between SatA and SatB Input orbital position for SatA Input orbital position for SatB	From READY page Arrow 2x + or – then Enter + or – then Enter + or – then Enter	READY SELECT DATA [SatA] or [SatB] XXX.X XXX.X

3. Setup Quick Reference Using SkyScan



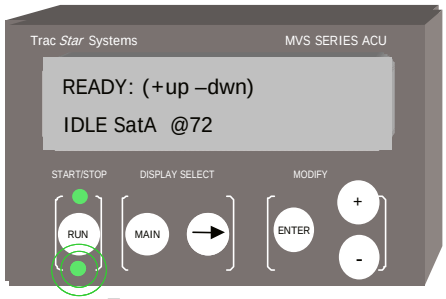
NOTE:

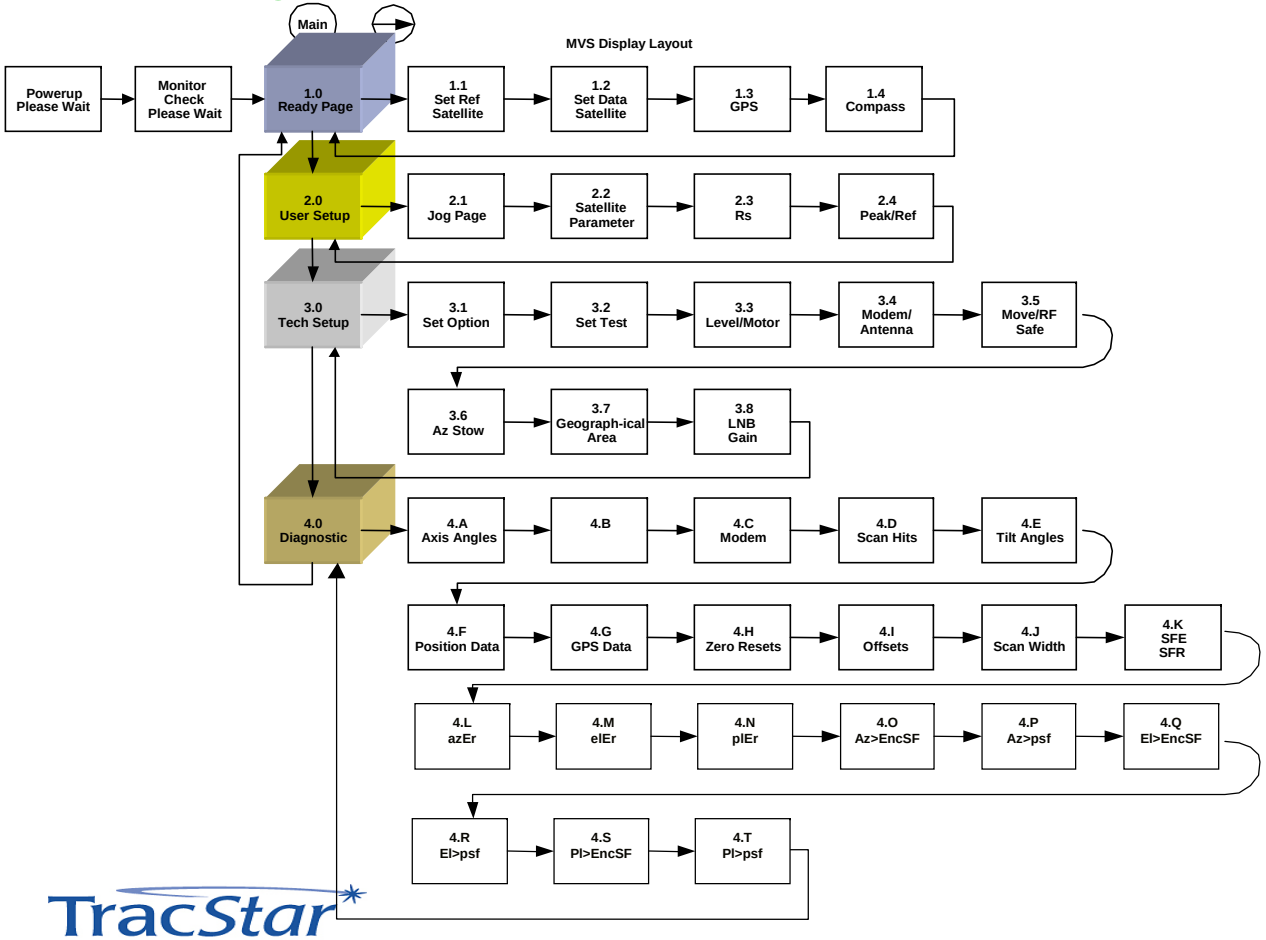
Locate the antenna so that it has a view of the orbital arc.

Orient the antenna so that it comes up generally to the south (if located north of equator), north (if located south of equator).

Step	Function	Action	Display Page
1.	Power up antenna	Turn on power at ACU	READY
2.	Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP, [Code 0] Tech Setup, [CODE 13]
3.	Clear existing satellite data. (Page 3.2)	From READY page Main 2x Arrow 2x + or – to ENTER + ENTER	READY TECH SETUP, [Code 13] SET TEST, [NONE] [CLEAR REF DATA] [cancel] [RUN NOW] READY
4.	Initiate ScanSky function:	From SET TEST page + or – to ENTER + ENTER	SET TEST, [NONE] [SCAN Sky] [cancel] [RUN NOW] Initiates Sky Scan
5.	Input reference satellites (Page 1.1) Select RefX satellite Select RefY satellite	From READY page: Arrow 1x + or – then ENTER + or – then ENTER	READY Set Ref XXX.X XXX.X
6.	Input data satellite parameters. (Page 1.2) Toggle between SatA and SatB Input orbital position for SatA Input orbital position for SatB	From READY page Arrow 2x + or – then ENTER + or - then ENTER + or – then ENTER	READY SELECT DATA [SatA] or [SatB] XXX.X XXX.X

Technical Manual DATA Presentation





IMPORTANT

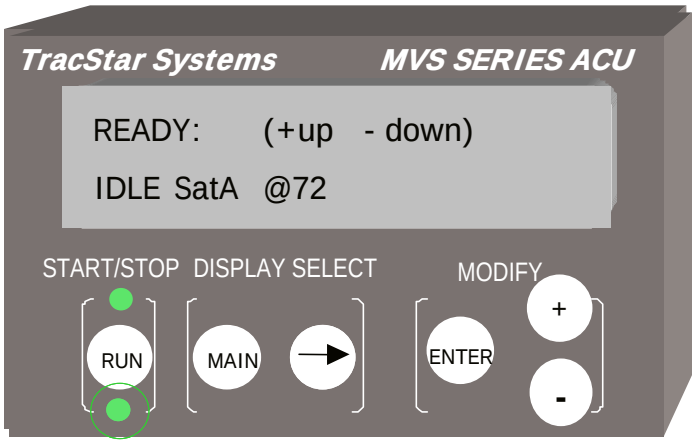
There are four distinct groupings of functions in the operation of the TracStar Auxiliary Control Unit (ACU). This manual will discuss each of these groups (Ready Page, User Setup, Tech Setup and Diagnostics) individually.

During actual ACU operation, the various sections are selected buy pushing the MAIN button the appropriate number of times thus moving "vertically" to select the desired group function. Hereafter, the block diagram will be shown for each individual function without the other groups functions being represented.

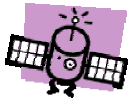
Regardless of what operation is displayed in the ACU display panel, returning to the MAIN or MASTER menu may always be accomplished by continually pressing MAIN until "READY:" appears.

TracStar SYSTEMS

MVS ACU Unit Display and Layout



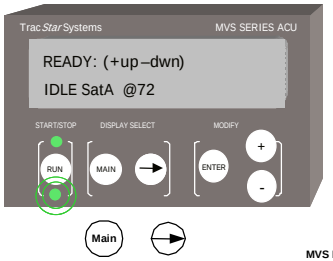
START/ STOP	Places the antenna in **operational mode** (green LED on top) or **standby** (green LED on bottom)
DISPLAY SELECT	MAIN steps through the menu vertically → steps across the menu horizontally
MODIFY	ENTER to select or step through page + or – to modify selection

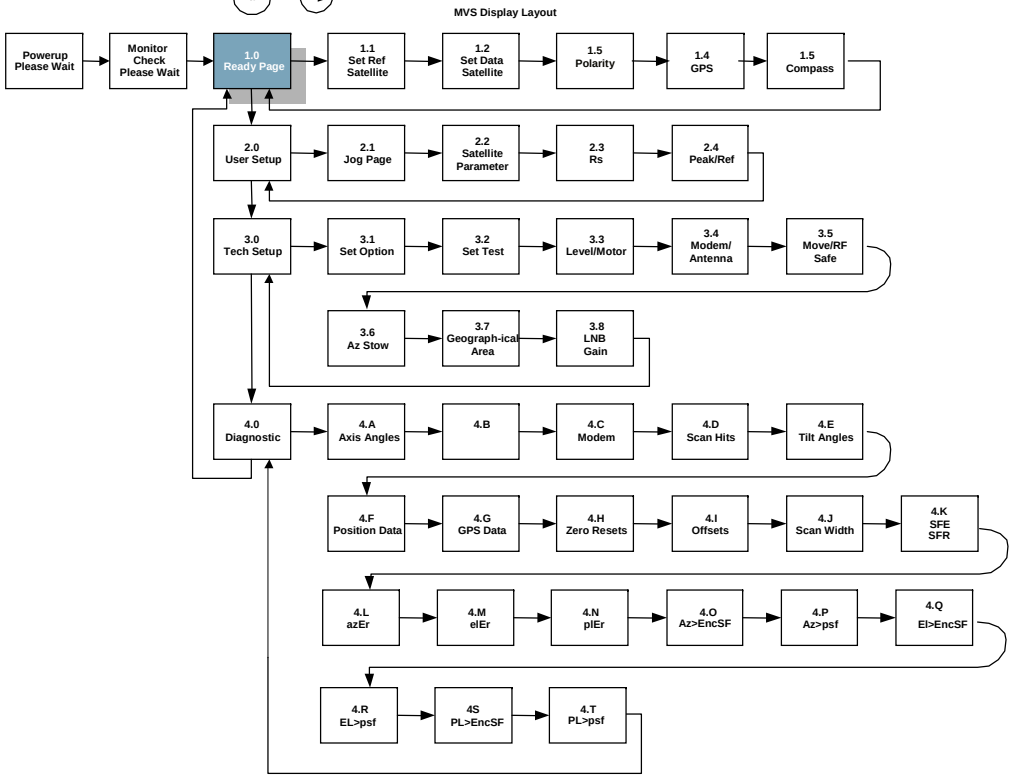


Note: A Flashing Question Mark [---?---] in the display indicates an item has not yet changed in the process. Select the desired item with [+/-] then press enter.

Flashing Blocks indicate something has changed but not been stored. ENTER must still be pressed to move to the next item.

1.0 READY



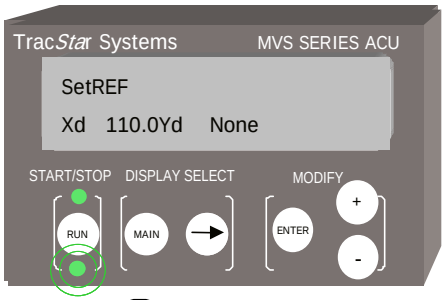


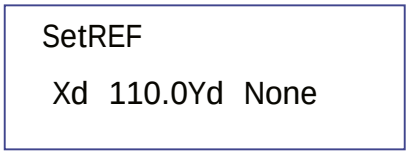
- READY is the main or default page and appears once the system is powered up. The selected satellite and orbital position in degrees longitude is displayed. Positive degrees indicates west longitude, "-" or negative degrees indicates east longitude.
- To activate the system:
- Turn on power to the TracStar Power Supply.
- Press + and hold for 2 seconds to initiate a satellite acquisition. This can be done with the antenna in any position.
- Press – and hold for 2 seconds to stow. This can be done with the antenna in any position. Lower LED should be on.
- From the READY page the user can:
  - Press → move to the Select Satellite page.
  - Press **MAIN** move to User Setup.
- Note that when the system is in READY (standby) mode the bottom green LED is on. When the system is active the top LED is on.

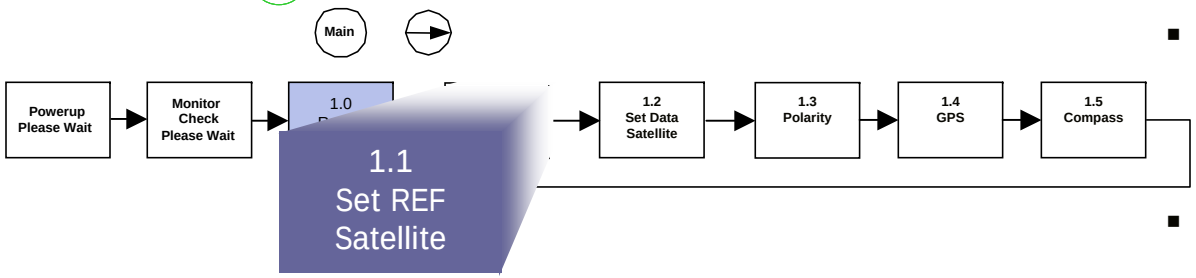
1. Typical Acquisition Sequence

Message Displayed	Description
POWER UP PLEASE WAIT	Power is being applied to the system
MONITOR CHECK PLEASE WAIT	The system is initiating its internal monitor software
LOADING PLEASE WAIT	The system is going through a momentary warm-up stage (3-5 seconds)
READY: (+ up – down)	The system is in standby mode waiting for instructions (green LED is on bottom): (a) Press + to initiate an acquisition (b) Press – to stow the antenna
RUN: (+/- stop) Startup @ XX	The system is active and has started an acquisition (green LED on top). NOTE: any time the system is active press + or – to place the system in standby.
RUN: (+/- stop) Compass XXX	The system is reading the compass and aligning. Shows relative compass sensor reading.
RUN: (+/- stop) Wait GPS 118	The system is acquiring GPS signals Last digit shows number of GPS satellites acquired, +100 if locked
RUN: (+/- stop) SCAN XXX YYYY	The system is scanning a reference satellite XXX is orbital position; YYY shows signal strength
RUN: (+/- stop) PEAK XXX YYY	The system is scanning the selected communications satellite
RUN: (+/- stop) Locked XXX YYY	The antenna is locked on the selected satellite
	To place the system is standby, press + or -, READY page will appear

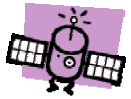
1.1 Set Reference Satellite







- The antenna system uses a reference satellite as part of the acquisition process.
- The Set Reference Satellite page allows the user to select up to two pre-programmed reference satellites from a stored library.
- The RefX is the primary and the RefY is the secondary. The secondary reference satellite will be used in case the primary satellite cannot be found, for example, signal blockage.



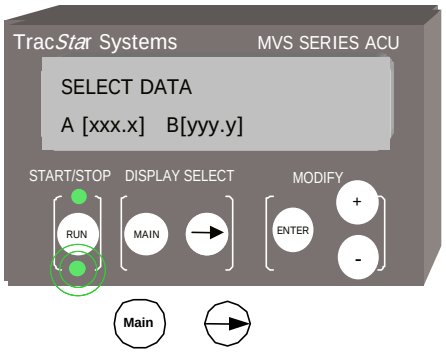
IMPORTANT

- NOTE: *Those satellites located west of 0° longitude are positive and those east of 0° are shown as a negative number.*

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Set Reference Page (Page 1.1)	From Ready Page: Arrow 1x	SetREF X[**XXX.X**] Y XXX.X
Reference X is the primary reference satellite. Select the appropriate reference satellite from the library. **For USAdvb ONLY:** {If reference satellite is unknown, select [auto]}	+ or – then Enter (Press + to select known satellite or "auto", then Enter)	SetREF [**XXX.X**] Y [XXX.X]
Reference Y is the secondary satellite in case the primary satellite is not available, i.e., blockage. In some cases the RefY satellite will be used as a check during the acquisition. *If RefX is set as AUTO, then setting RefY to other than AUTO will cause the RefY location to be tried FIRST, followed by the AUTO list as needed.*	+ or – then Enter (Press + to select known satellite or "auto", then Enter)	SetREF XXX.X Y [**XXX.X**]

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Set Reference Page (Page 1.1)	From Ready Page: Arrow 1x	SetREF X[**XXX.X**] Y XXX.X
Reference X is the primary reference satellite. Select the appropriate reference satellite from the library.	+ or – then Enter	SetREF XXXX.X Y [**XXX.X**]
Reference Y is the secondary satellite in case the primary satellite is not available, i.e., blockage. In some cases the RefY satellite will be used as a check during the acquisition	+ or – then Enter	SetREF XXXX.X Y [**XXX.X**]

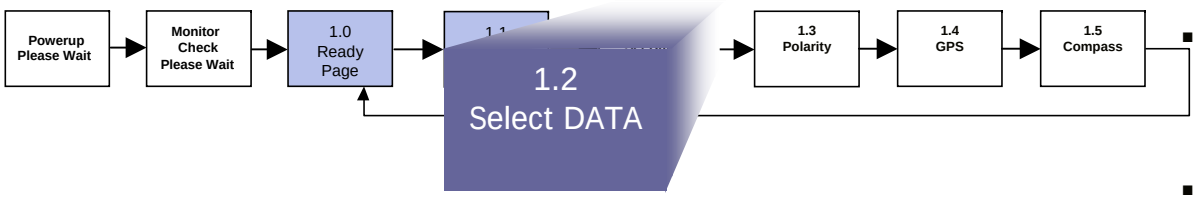
1.2 Select Data Satellite



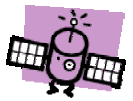
MVS Display Layout

SELECT DATA [SatA]

A XXX.X B XXX.X



- The Set Data Satellite page allows the user to select the communications satellite of interest.
- The user can select up to two pre-programmed data satellites, SatA and SatB.
- The user can program the desired satellite by entering the orbital position in degrees longitude.

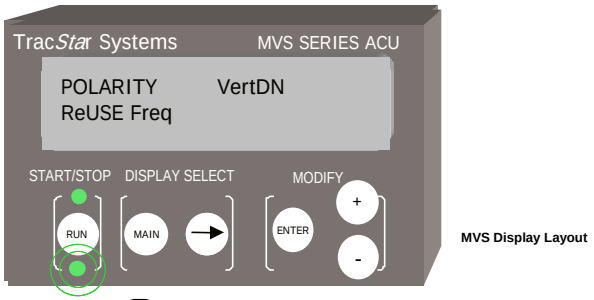


IMPORTANT

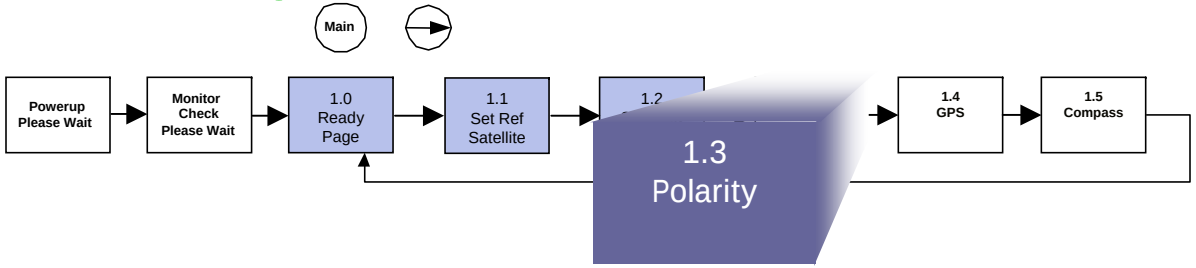
- NOTE: Satellites west of 0° longitude must be entered as positive values, satellites east of 0° longitude must be entered as negative values.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Set Satellite Page (Page 1.2)	From Ready Page: Arrow 2x	SELECT DATA [**SatA**] A XXX.X B XXX.X
When SatA is flashing, the antenna will acquire SatA. The orbital position for SatA is shown on the bottom row as well as on the READY page. Press ENTER to select SatA, or press + to change to SatB , then press ENTER.	+ or – to [SAT A] or [SAT B] ENTER	SELECT DATA [**SatA**] A XXX.X B XXX.X SELECT DATA [SAT A] [A XXX.X] B XXX.X
Now the orbital position for SatA is flashing and the user can input the desired orbital position in degrees longitude. Press + or - until the desired value is reached then ENTER.	+ or – to Data Sat Long ENTER	SELECT DATA [**SatA**] A XXX.X B XXX.X SELECT DATA SAT A A XXX.X [B XXX.X]
Now the orbital position for SatB is flashing and the user can input the desired orbital position in degrees longitude. Press + or - until the desired value is reached then ENTER.	+ or – then Enter Main	SELECT DATA SatA A XXX.X [**B XXX.X**] READY
NOTE: Satellites west of 0° longitude must be entered as positive values, satellites east of 0° longitude must be entered as negative values.		

1.3 Polarity

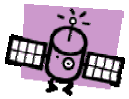


MVS Display Layout



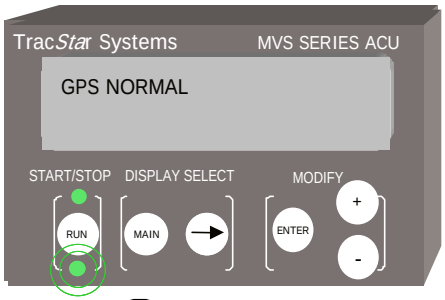
POLARITY VertDN
ReUSE Freq

- **Applies to MVS1200 with motorized feed assembly ONLY**
- The user is allowed to change the polarization of the receive frequency
- Allows the user to ReSCAN the existing selection of Satellite A / Satellite B frequency after changing the receive polarity

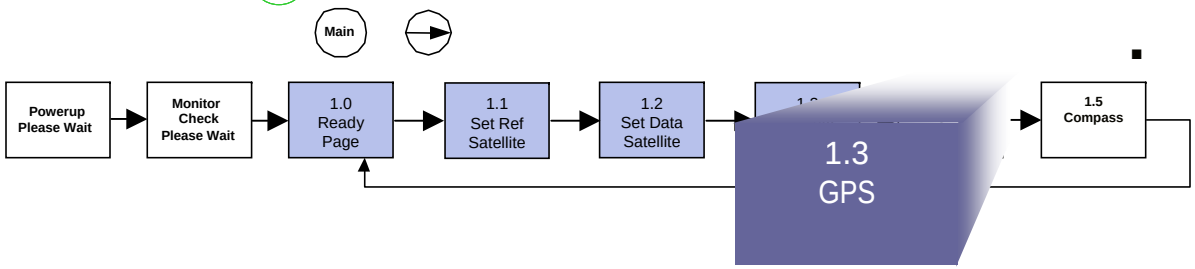
Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Polarity Page (Page 1.3) FOR MVS1200 ANTENNAS ONLY	From Ready Page: Arrow 3x	POLARITY [**VertDN**]
After the code is entered, the word VertDN is flashing. The user can now manually input the desired polarity, VertDN or HorzDN.	+ or – then Enter	POLARITY [**VertDN**]
ReUSE Freq is now flashing. The user can now manually select the ReUSE or ReSCAN options. *NOTE: ReSCAN is not intended to replace the Satellite Parameters / Section 2.2 of the manual. If the proper frequencies are in place for SatA and SatB, a simple ReSCAN can be used after changing polarity. If problems are encountered, refer to Section 2.2, reset the SatA and SatB frequencies to 10799 and the antenna will scan for the best available frequency.*	+ or – then Enter 	[**ReUSE Freq**] [**ReSCAN Freq**]

IMPORTANT

1.4 Manual GPS Input



MVS Display Layout



GPS NORMAL

- The antenna systems has an integrated GPS to aid in satellite acquisition. The Manual GPS page allows the user to select between the built in GPS (default) or manually input GPS coordinates in case the GPS is unavailable.

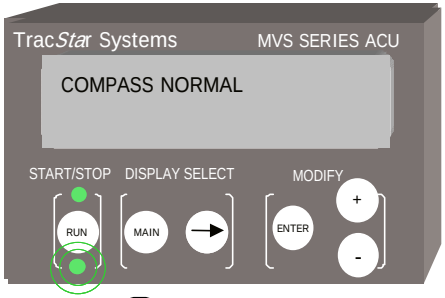
1.4 Manual GPS Input (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
GPS Normal Page (Page 1.4)	From Ready Page: Arrow 4x	GPS [**NORMAL**]
After the code is entered, the word NORMAL is flashing. The user can now manually input the GPS coordinates.	+ or – then Enter	GPS [**NORMAL**]
MAN is now flashing, press ENTER to step to the latitude input.	Enter	Gps[**MAN**] LATXXX.XX LONG XXX.XX
LAT is now flashing, press + or – until the desired coordinate is reached, then press ENTER.	+ or – then Enter	GpsMAN [**LAT 22.86**] LONG XXX.XX
LONG is now flashing, press + or – until the desired coordinate is reached, then press ENTER.	+ or – then Enter	GpsMAN LAT 22.86 LONG [**81.23**]

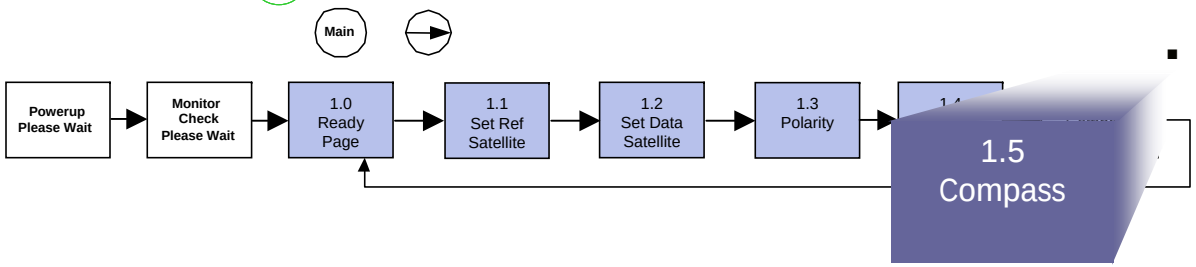
IMPORTANT

NOTES:
1. Coordinates are entered in degrees and decimals of degrees (vs. minutes and seconds)
2. Coordinates west of 0° longitude are positive, east of 0° are negative values.
3. Coordinates north of the equator are positive, south of the equator are negative.

1.5 Manual Compass Input



MVS Display Layout

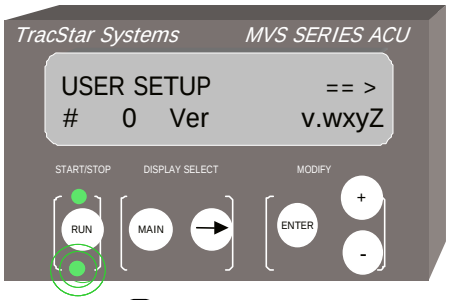


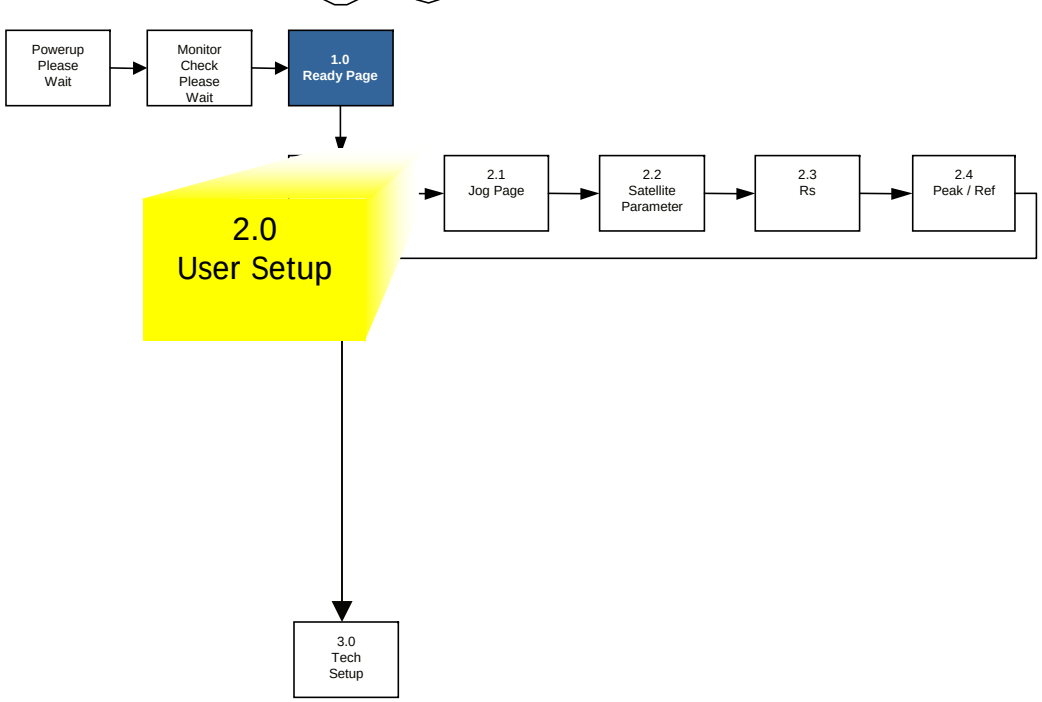
COMPASS NORMAL

- The antenna system has an integrated compass to aid in satellite acquisition. The Manual Compass page allows the user to provide the antenna with a north or south heading in case the compass is unavailable or heavily influenced by external magnetic fields.
- The Menu returns to the READY PAGE.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
COMPASS Page (Page 1.5)	From Ready Page: Arrow 5x	COMPASS [**NORMAL**]
After the code is entered, the word NORMAL is flashing. Press + or – to change to Manual input, then ENTER.	+ or – then Enter	COMPASS [**NORMAL**]
The Display now prompts the user to jog the antenna to face or point south. The Jog function is described in section 2.1.		COMPASS MANUAL JOG South, Start
Once the antenna is pointed south using the Jog function, press START and the system will initiate its scan from the manually input south position.		

2.0 USER SETUP

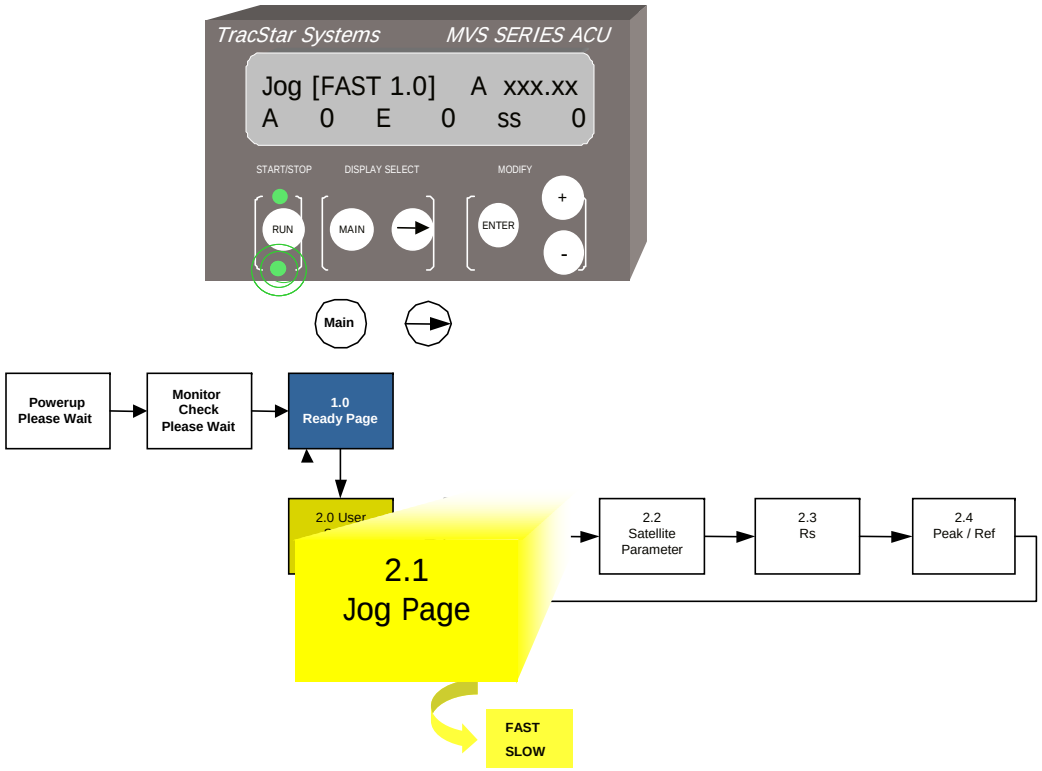




USER SETUP == >
#XXXXX Ver v.wxyZ

- USER SETUP contains several interactive and setup pages including antenna jog control and satellite parameter setup.
- The antenna serial number and the software version is shown on the bottom row.
- Press ⊖ to step to the Jog page or MAIN to step to the TECH SETUP page.

2.1 Jog



Jog [FAST 1.0] → ENT

A 0 E 0 ss 0

- Jog control enables the user to manually position the antenna in the azimuth, elevation and polarization axes. The jog step increment is flashing.
- Press (+) to select FAST (2 Degree steps) or SLOW (1 Degree steps) jog increments.
- Press (ENTER) to select.

- CAUTION:

  DO NOT JOG THE ANTENNA IN AZIMUTH OR POLARIZATION WHILE IN STOW.

  DO NOT DRIVE THE ANTENNA BEYOND ITS TRAVEL LIMITS IN ANY AXIS

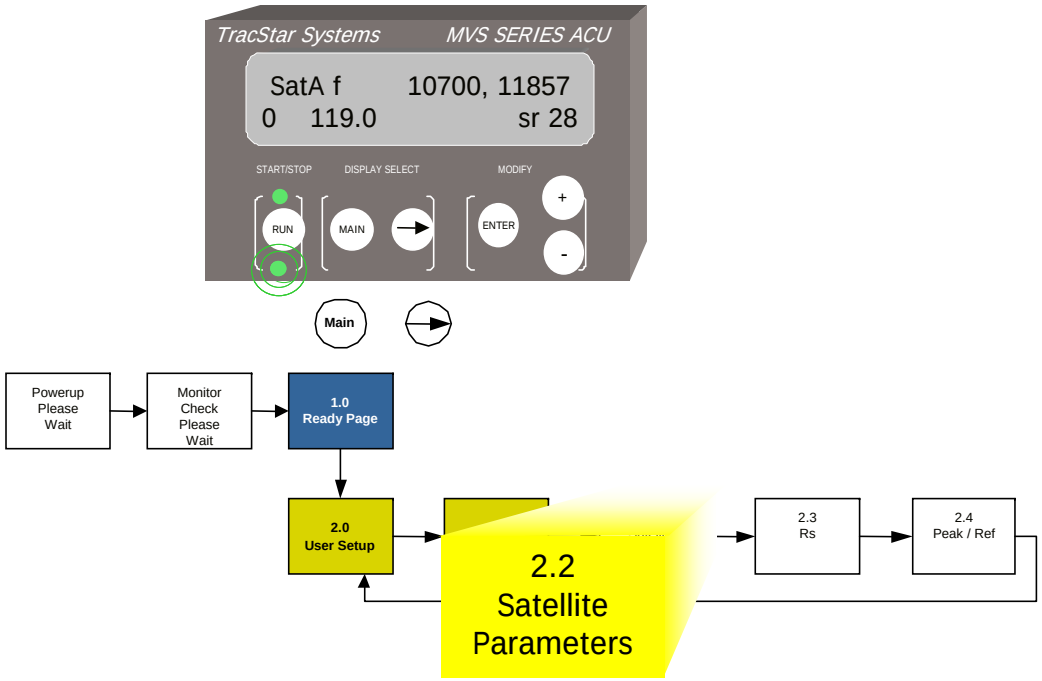
Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Jog Page (Page 2.1)	From Ready Page: Main 1x Arrow 1x	Jog FAST A XXX.XX
Jog Position is now flashing. The user can select FAST or SLOW jog increments.	+ or – then Enter	Jog **FAST** A XXX.XX
The azimuth position is now flashing. The user can jog the antenna by pressing + for clockwise and – for counterclockwise.	+ or – then Enter	Jog FAST 1.0 → ENT [**A 0**] E 0 P 0
Now the elevation position is flashing. The user can jog the antenna by pressing + for up and – for down.	+ or – then Enter	Jog FAST 1.0 → ENT A 0 [**E 0**] P 0
Now the polarization position is flashing. When viewed from the rear of the dish. the user can jog the antenna by pressing + for clockwise and – for counterclockwise.	+ or – then Enter	Jog FAST 1.0 → ENT A 0 E 0 [**P 0**]

IMPORTANT

NOTES:

1. The user must press START/STOP to activate the antenna motors. The top green LED will flash when the motors are enabled.
2. DO NOT JOG THE ANTENNA IN AZIMUTH OR POLARIZATION WHILE IN STOW.
3. DO NOT DRIVE THE ANTENNA BEYOND ITS TRAVEL LIMITS IN ANY AXIS.

2.2 Satellite Parameters



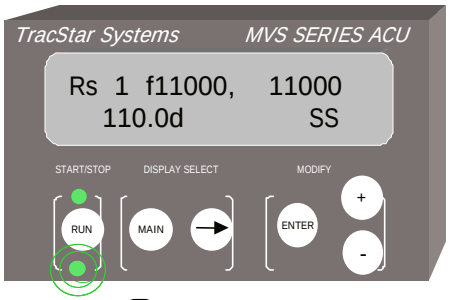
SatAf10700,11857

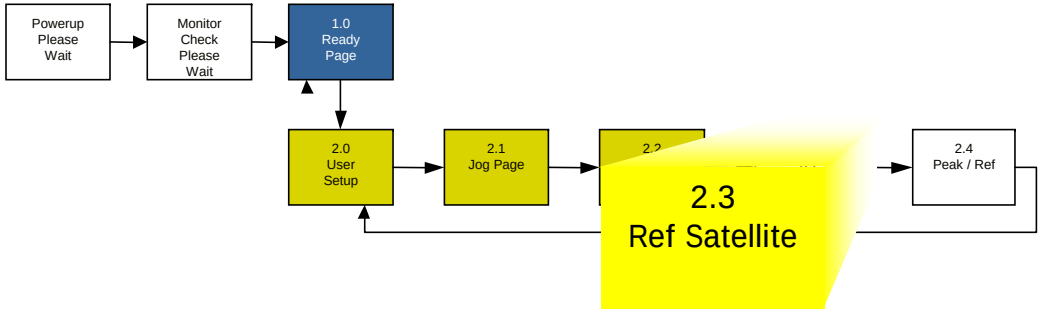
0 119.0 sr28

- The Satellite Parameters page allows the user to view or edit the frequencies used to acquire the communications satellite.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Satellite Parameters Page (Page 2.2)	From Ready Page: Main 1x Arrow 2x	SatAf10799, 10799 [**0**] 119 sr28
The user can toggle between SatA and SatB. To change to SatB, press + to switch to SatB. To change from SatB to SatA, press -. The orbital position of the selected satellite is displayed on the bottom row.	+ or – then Enter	SatAf10799, 10799 [**0**] 119 sr28
To input a new frequency for SatA press Enter then + or – to the desired frequency, then Enter. The default frequency is 10799. When the default is entered, the antenna will scan for the best frequency available.	+ or – then Enter	SatA[**f10799**], 10799 0 119 sr28
This is the secondary frequency and may be used by the antenna to verify lock or as a backup frequency, depending on the Lock Word (paragraph 2.4)	+ or – then Enter	SatAf10799, [**10799**] 0 119 sr28
sr is the symbol rate and should not be adjusted.		

2.3 Reference Satellite





[Rs1] f10799, 10799
110.0 SS

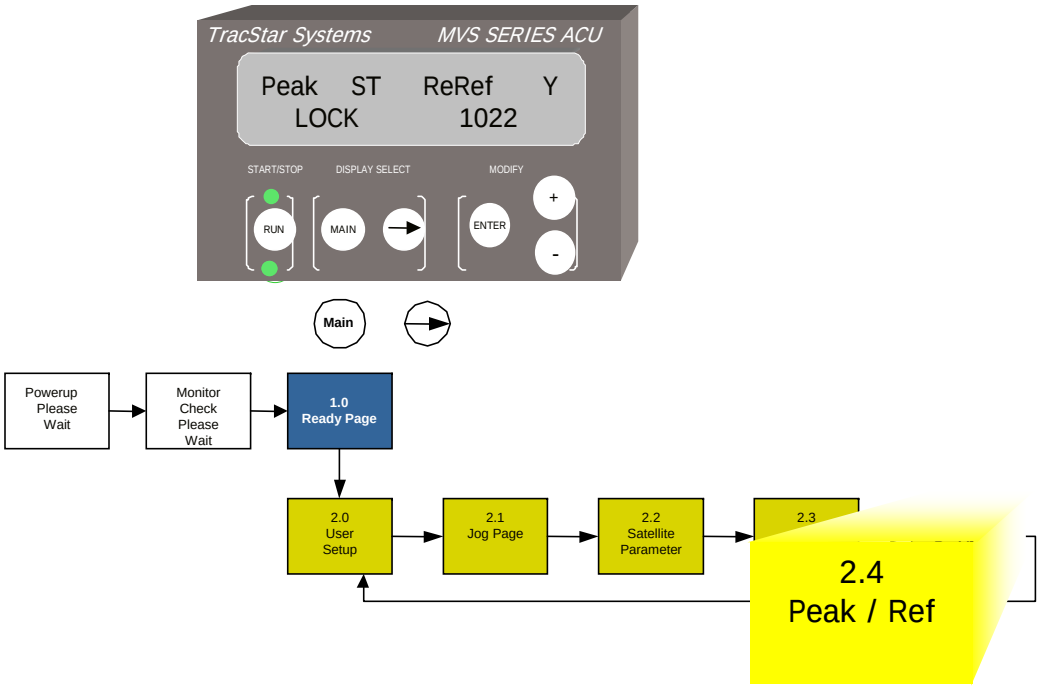
- The Reference Satellite page provides access to the available reference satellites so the user can:
  - Enter Reference Satellites
  - Delete Reference Satellites
  - Edit parameters
- Up to 12 reference satellites can be stored

2.3 Reference Satellite (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Reference Satellite Page (Page 2.3)	From Ready Page: Main 1x Arrow 3x	[**Rs1**] f10799,10799 XXX.X USDvB
The user can enter/edit the reference satellites from this page. When [RSX] is flashing the user can step to the next reference satellite with + or -. There can be up to 12 Reference Satellites stored. Select the desired Ref satellite number then Enter.	+ or – then Enter	[**RsX**] f10799,10799 XXX.X USDvB
The orbital position is now flashing and can be edited. Press + or – to the desired value, then Enter	+ or – then Enter	RsX f10799,10799 [**XXX.X**] USDvB
The primary frequency is now flashing. Use + or – to set the desired frequency or set to 10799 as default, then Enter. The default will be automatically updated when the frequency scan is run (para. 3.2 Set Test)	+ or – then Enter	Rs2 [**f10799**],10799 XXX.X USDvB
Continued on Next Page		

Description	Action	Display
Carry Over From Page 29		
The backup frequency is now flashing. Use + or – to set the desired frequency or set to 10799 as default, then Enter. The default will be automatically updated when the frequency scan is run (para. 3.2 Set Test)	+ or – then Enter	Rs2 f10799,[**10799**] XXX.X USDvB
The user can select a scan method that uses signal strength (SS) or frequency (Freq) or USDvB to acquire the Reference Satellite.	+ or – then Enter	Rs2 f10799, 10799 XXX.X [**USDvB**]
If more Reference Satellites are desired, change to RsX then input the orbital positions and frequencies. *Repeat until all the applicable Reference Satellites are input.*	+ or – then Enter	[**RsX**] f10799, 10799 XXX.X USDvB

2.4 Peak/Re-reference/Lock Methods



Peak ST ReRef Y
Lock 1022

- This page gives the user the ability to:
  - change between SatA and SatB satellites without initiating a new acquisition sequence, i.e., skip the compass and reference satellite scan functions. The antenna will move directly between SatA and SatB
  - Set the Lock Method Word
- Upon Power Up the antenna will default as follows:
  - Peak: ST: As previously set
  - ReRef: Y
  - Lock Word: As previously set

2.4 Peak/Re-reference/Lock Method (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13 Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Peak / Re-reference / Lock Page (Page 2.4)	From Ready Page: Main 1x Arrow 4x	[Peak [**ST**] ReRef Y Lock 1022
The antenna has two types of peaking, step track and criss-cross. Step Track is the default and required mode and should not be changed. Press Enter to step to ReRef{Y].	Enter	Peak [**ST**] ReRef Y Lock 1022
The user can set the antenna to change between SatA and SatB without repeating the compass and reference satellite scans. This should not be changed unless the user has a requirement to lock onto more than one satellite.	Enter	Peak ST [**ReRef Y**] Lock 1022
The Lock Word sets the criteria by which the antenna identifies satellites. The choices are to use a transponder/carrier frequency or by signal strength. By modifying the Lock Word, certain conditions are set and must be met for the antenna to lock.	+ or – then Enter	Peak ST ReRef Y [**Lock 1022**]
Note: The following are valid lock words.	1233, 1133, 1036, 1022, 1032, 1023, 1222, 1233,1232,1223 and 10000 (DirectPoint Mode)	

Peak ST ReRef Y
Lock [1022]

2.4 Peak/Re-reference/Lock Method (con't)

0	1	0	2	2
	Reference Satellite Scan	Reference Satellite Lock Condition	Reference Satellite Frequency Condition	Data Satellite Frequency Condition
	0 = Signal Strength	0 = AGC	**0** = Neither	**0** = Neither
1 = DirectPoint Mode	**1** = Frequency	1 = AGC & SNR	**2** = F1 or F2	**2** = F1 or F2
All Other parameters must be "0"		2 = SNR Only	**3** = F1 and F2	**3** = F1 and F2
				6 = Peak on B; Move to Sat A

Example: 1022 is a decimal word and will set the following condition for acquisition of the Reference and Data Satellite:

1022 = When the antenna is scanning for the Reference satellite, it will use the frequency from the Reference Satellite Page (2.3). Alternatively, if the digit is set to 0, the antenna will scan for the Reference Satellite using signal strength.

1**0**22 = 0 the AGC circuit of the internal receiver is used for a satellite lock indication. If the digit = 1, the lock indication is a combination of AGC and SNR (Signal Noise Ratio) readings. If the digit = 2, the lock indication is from SNR values only.

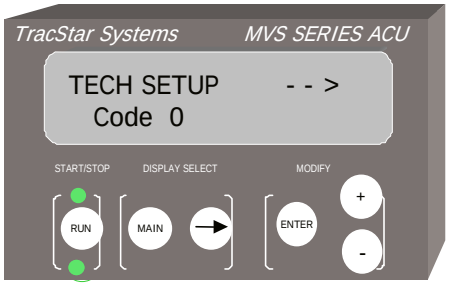
10**2**2 = This digit sets the condition that the antenna must find either the primary or the secondary frequency (F1 or F2) on the reference satellite in order to confirm lock. Alternatively, if the digit is set = 3, F1 AND F2 will be confirmed in order for the antenna to lock.

102**2** = This digit sets the condition that the antenna must find either the primary or the secondary frequency (F1 or F2) on the reference satellite in order to confirm lock. Alternatively, if the digit is set = 3, F1 AND F2 will be confirmed in order for the antenna to lock. *

If the last digit is set to = 6, the antenna will peak on Satellite B, then swing to Satellite A. Use this for extreme cases where there appears to be no transponder on the desired data satellite.

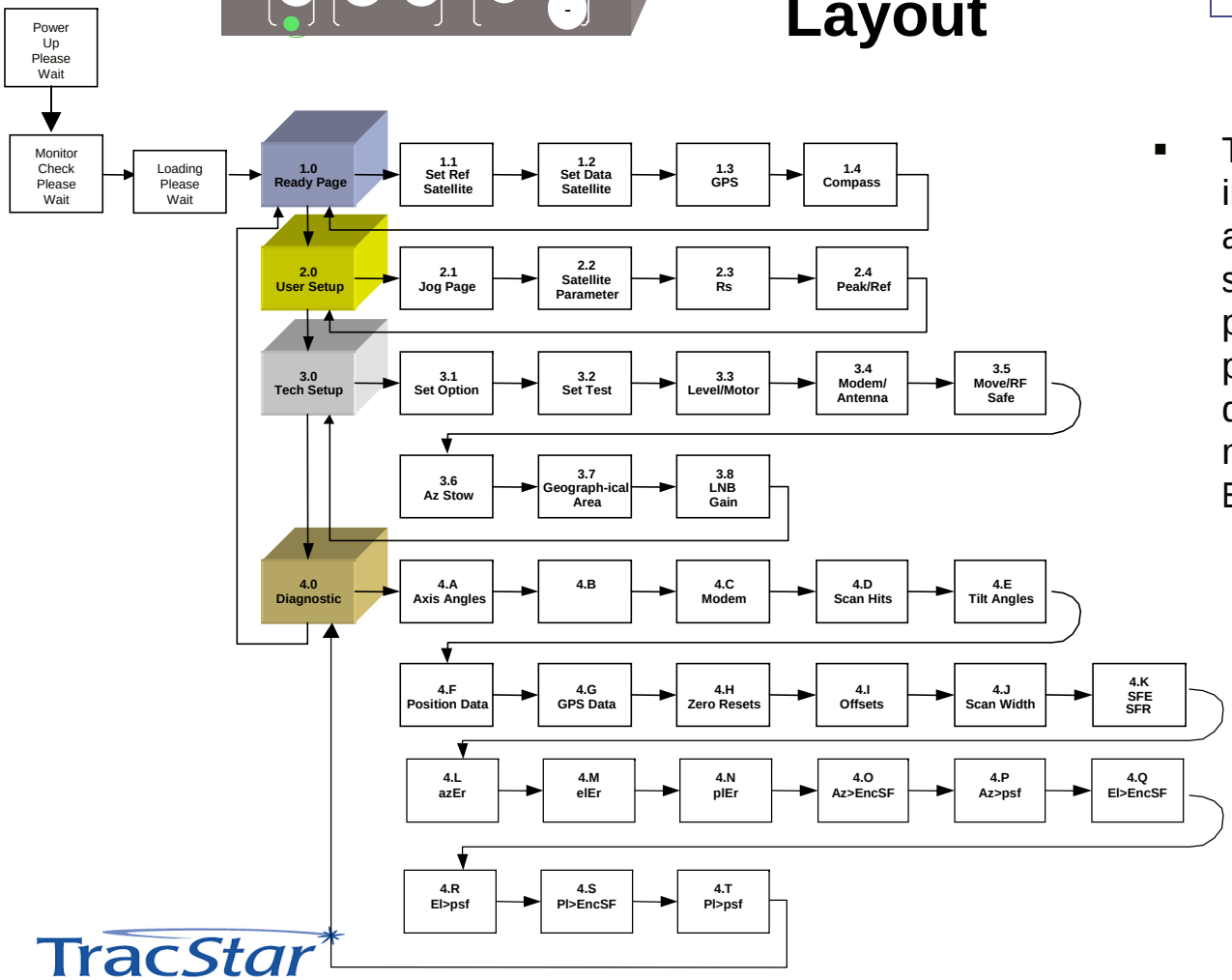
With DirectPoint™ the Lock Method Word can be set to 10000 to enable peaking on the desired satellite (Sat A or Sat B) without using a Reference satellite. In this mode the carrier data from the modem is used solely for acquiring and peaking on the satellite.

The valid lock words are: 1022, 1033, 1023, 1032, 1222, 1233, 1232, 1223 and 1036. Use 10000 for DirectPoint acquisition.*



MVS Display Layout

TECH SETUP – – >
Code 0

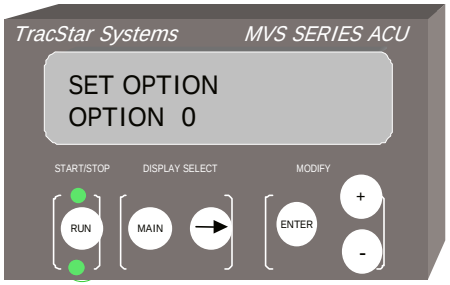


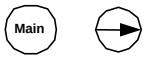
- TECH SETUP contains several interactive setup pages and the ability to enable/disable various sensors and motor drives. This page is password protected to prevent inadvertent or un-desirable changes. The user must press + to Code 13, then ENTER to edit these pages.

3.0 TECH SETUP (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY

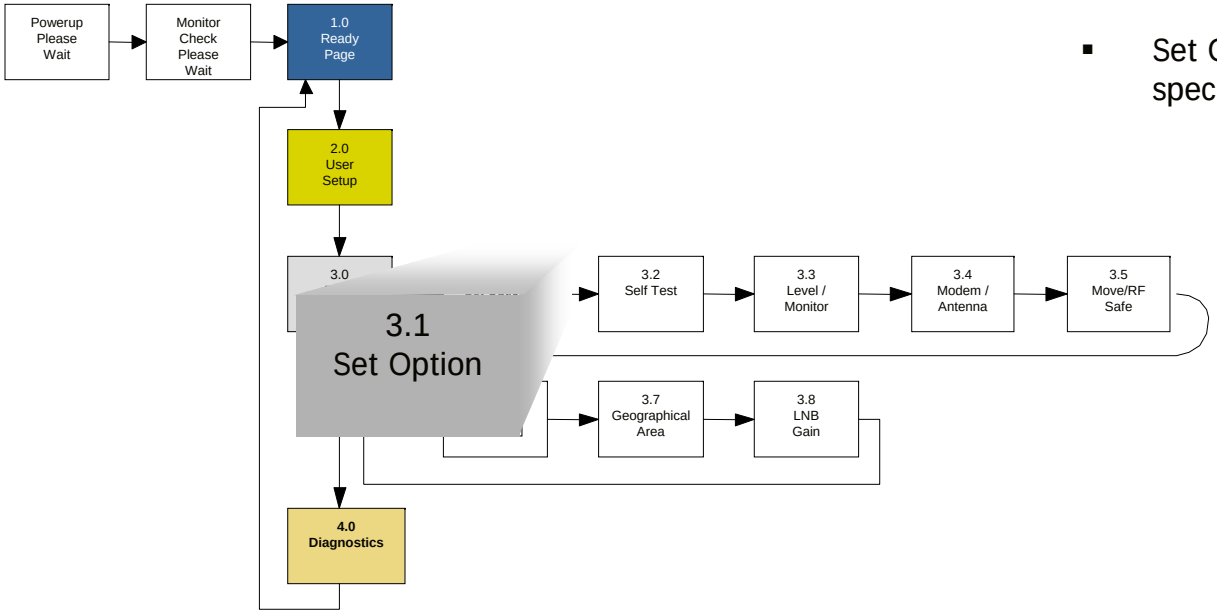
3.1 Set Option





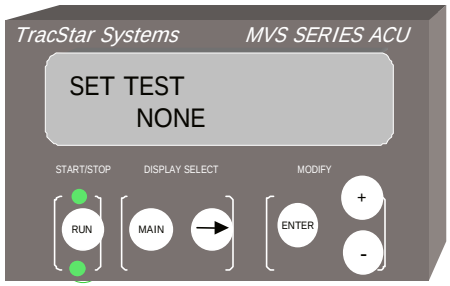
SET OPTION

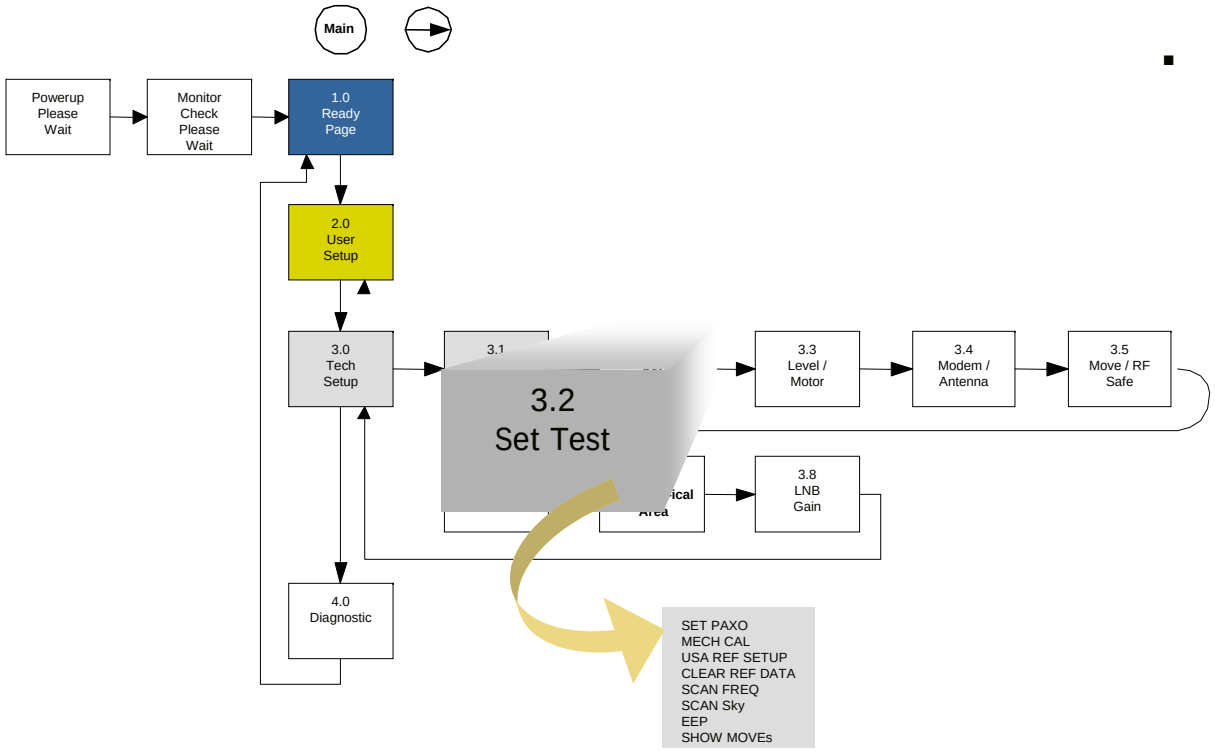
[OPTION 0]



- Set Option is occasionally used for special functions.

3.2 Set Test





SET TEST

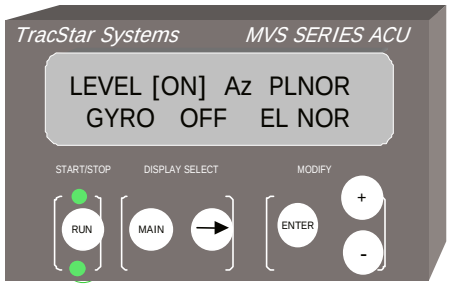
[NONE]

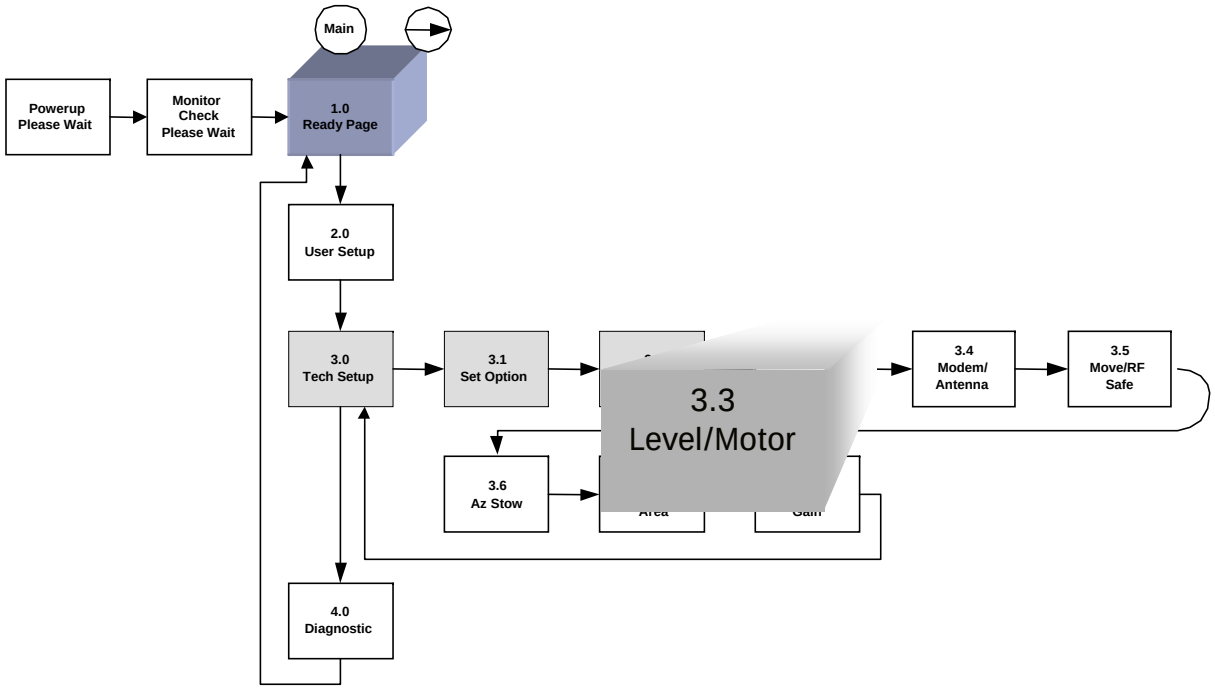
- There are several function available to the user in Set Test. Press the + key to select the desired function. NOTE: The following tests do not have input parameters. They either RUN or NOT RUN a standard factory setup.

  - NONE:
  - SET PAZO: Sets pol axis azimuth offset
  - MECH CAL: Mechanical calibration of antenna
  - USA REF SETUP
  - CLEAR REF DATA
  - SCAN FREQ: Scans selected Reference Satellites for transponder/carrier frequencies that will be used in subsequent acquisitions.
  - SCAN Sky: Scans the orbital arc for Reference Satellite positions, signal strength and frequency.
  - EEP Save: Saves memory to EProm.
  - SHOW MOVEs: Pre-programmed satellite acquisition simulation.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY
Set Test Page (Page 3.2)	From Ready Page: Main 2x Arrow 2x	SET TEST [**NONE**]
Press + or – until the desired function is shown: Set PAZO – Factory Direction Only MECH CAL – Factory Direction Only USA REF SETUP CLEAR REF DATA SCAN FREQ SCAN Sky EEP Save SHOW MOVEs	+ or – then Enter	SET TEST [**NONE**]
	+ or -	SET TEST [**CANCEL**] SCAN FREQ
	Enter	SET TEST [**RUN NOW**] SCAN FREQ

3.3 Level/Motor Control Page





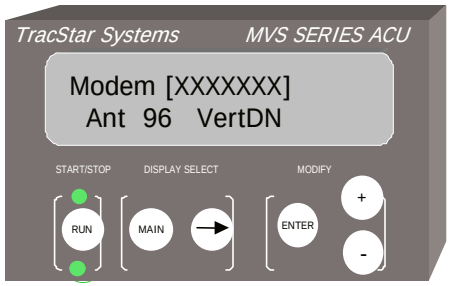
LEVEL [ON] Az PL NOR

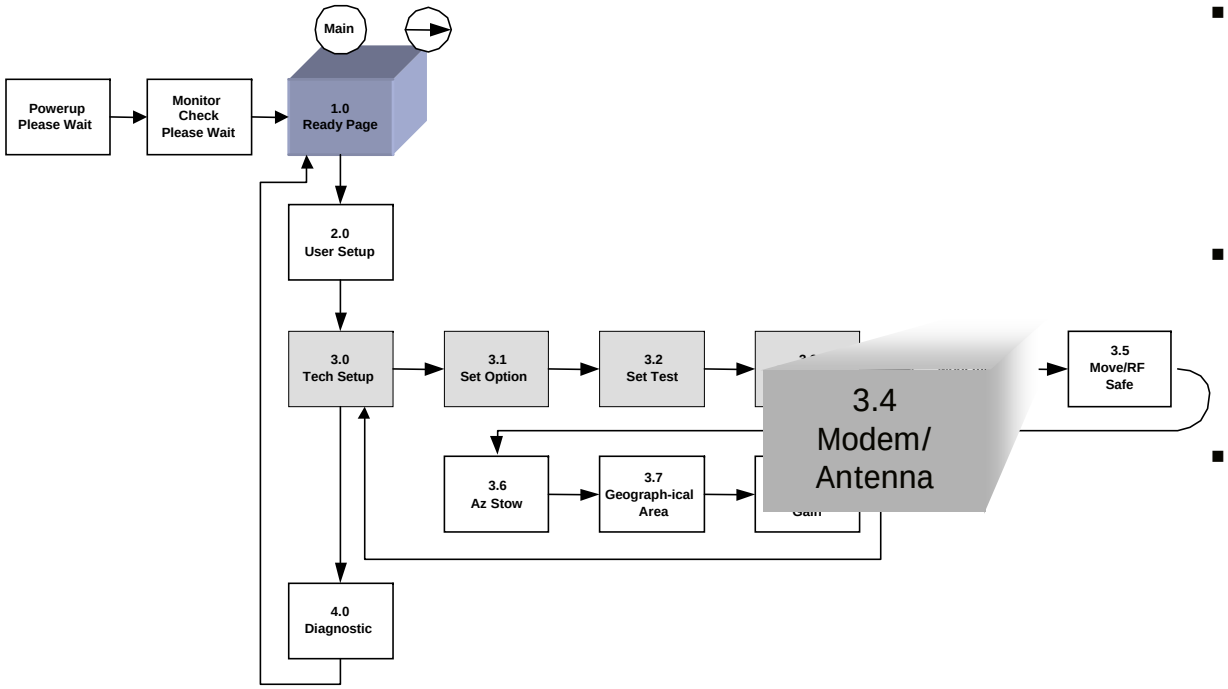
GYRO OFF El NOR

- This page gives the user the ability to turn off the base level sensor and the azimuth, elevation and polarization motors. This would normally only be performed in a troubleshooting application.
- The GYRO option is not applicable to this antenna. Default setting is OFF.

Description	Action	Display **BLUE** indicates default setting
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY
Level / Motor Control Page (Page 3.3)	From Ready Page: Main 2x Arrow 3x	LEVEL [**ON**/OFF] Az PLNOR GYRO OFF EL NOR
The user can turn the base level sensor off, this would only be done during a maintenance or troubleshooting activity.	+ or – then Enter	LEVEL [**ON**/OFF] Az PLNOR GYRO OFF EL NOR
The user can turn the azimuth and polarization motor off, normally only a troubleshooting function.	+ or – then Enter	LEVEL ON Az PL **[NOR/**DIS**]** GYRO OFF EL NOR
The user can turn the elevation motor off, normally only a troubleshooting function.	+ or – then Enter	LEVEL ON Az PL NOR GYRO OFF EL [**NOR /**DIS**]**

3.4 Select Modem/Antenna/Pol





Modem [XXXXXXX]
Ant 96 VertDN

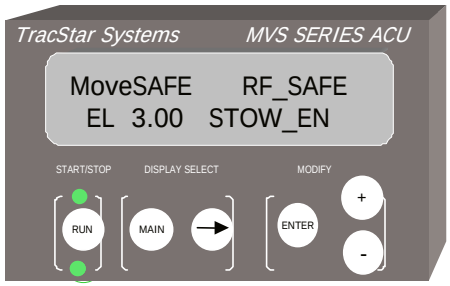
- The antenna has a serial interface for communications to selected modem types. The antenna can provide GPS information over this port.
- Press the + or – key to scroll through the pre-programmed modem models, make a selection and press ENTER.
- On the MVS1200 (1.2 Meter) Antenna with the Motorized Feed Assembly, Receive Polarization can be selected.

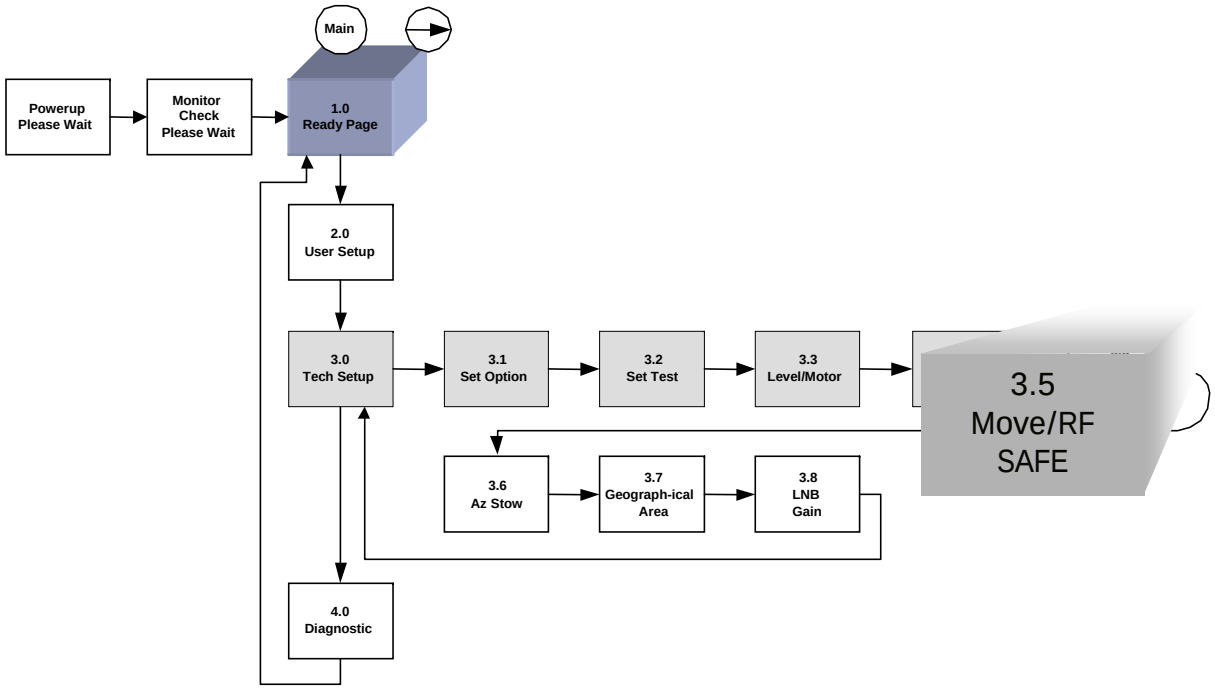
3.4 Select Modem/Antenna/Pol (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY
Select Modem / Antenna Page (Page 3.4)	From Ready Page: Main 2x Arrow 4x	Modem [iDirect] Ant 96 Remove
The user can select from the following modem types for the GPS interface: None iDirect Linkstar Linkway AuxRemote	+ or – then Enter	Modem [iDirect] Ant 96 Remove
The antenna type cannot be changed without factory direction.	Contact Factory	Modem iDirect Ant 96 Remove
MVS 1200 Antenna ONLY		
The user can select the Receive Polarization for the antenna. Choices are: HorzDN VertDN	+ or – then Enter	[HorzDN]

MODEM TYPE	Supported Modems
NONE	
iDirect	Net Modem II Plus
Linkstar	Linkstar, EMS
Linkway	Linkway
Aux Remote	
Com Tech	Com Tech SCPC
Skylane96	Skylane @ 9600 baud
iNfiniti	3000,5000, 7000 iDirect

3.5 Move/RF_SAFE





Move[SAFE] RF_SAFE

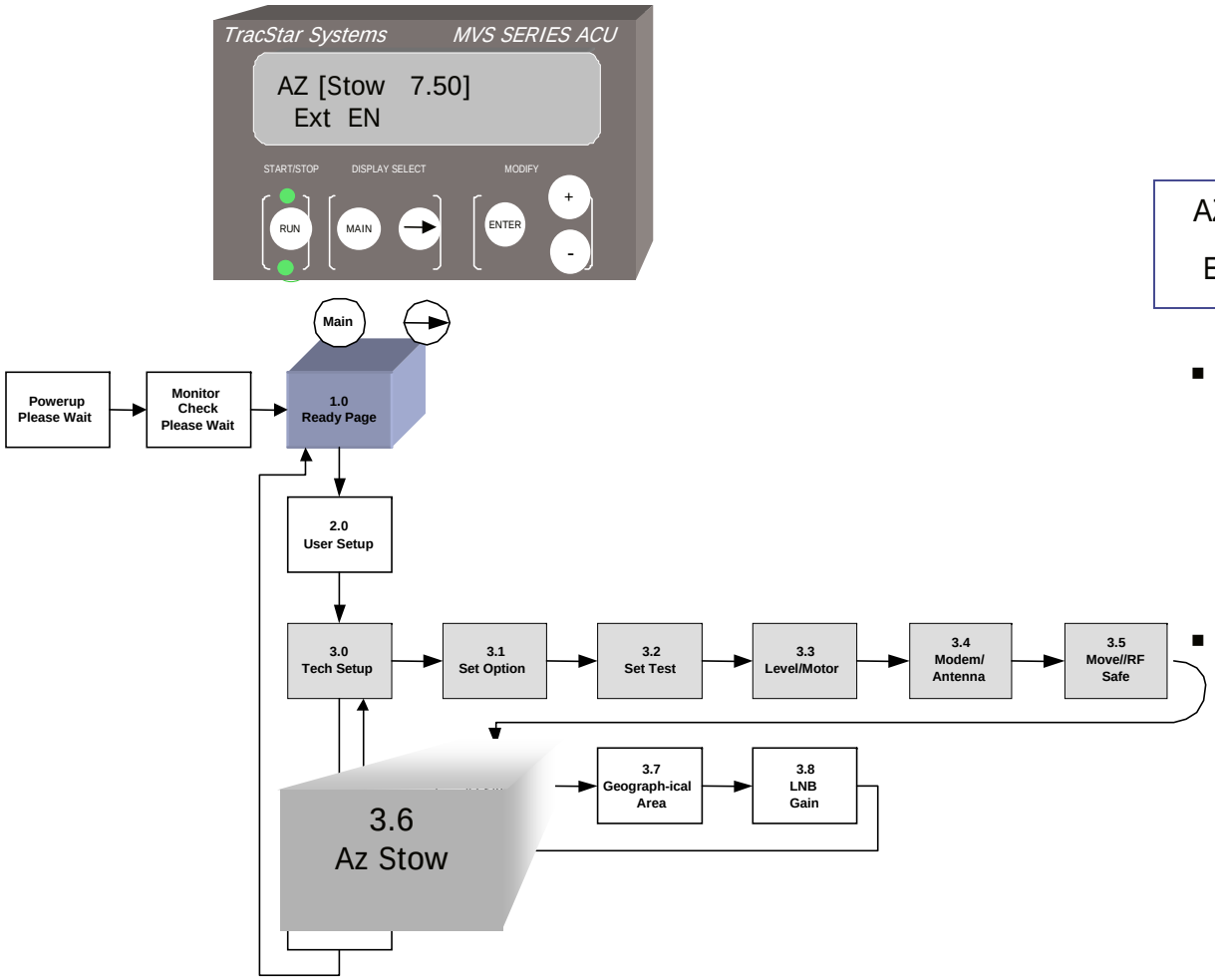
EL 3.00 Stow EN

- There are several safety features built into the antenna:
- MOVE SAFE prevents any azimuth motion including jog commands below a pre-set elevation angle. This is to prevent jogging the antenna at too low of angles and possibility causing a mechanical interference.
- RF SAFE provides a Transmit Inhibit feature. If there is any motion command given to the antenna while it is locked onto a satellite, the transmitter will be inhibited prior to any motion of the antenna. The modem must have a DC block installed in the receive line to be valid.
- STOW SAFE will stow the antenna if any base motion is detected by the on-board sensors. This feature will automatically stow the antenna if the user drives off with the antenna deployed.

3.5 MOVE/RF_SAFE (con't)

Description	Action	Display **BLUE** indicates default setting
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Move/RF/Stow Safe Page (Page 3.5)	From Ready Page: Main 2x Arrow 5x	Move [**SAFE**/ANY!] RF SAFE EL 3.00 Stow EN
Move [SAFE] prevents azimuth axis motion including jog commands below this pre-set limit to prevent accidental mechanical interference. Move [ANY] will disable the SAFE mode.	+ or – then Enter	Move [**SAFE**/ANY!] RF SAFE EL 3.00 Stow EN
RF [SAFE] will inhibit LNB power thereby inhibiting transmit if a motion command is given to the antenna via the controller. RF [ANY] will disable the SAFE mode.	+ or – then Enter	Move SAFE RF [**SAFE**/ANY!] EL 3.00 Stow EN
EL [X.XX] sets the low elevation angle for Move SAFE. Adjust with + or – until the desired value is reached.	+ or – then Enter	Move SAFE RF SAFE [**EL 3.00**/x.xx] Stow EN
Stow [En] is the auto stow feature designed to stow the antenna in the event of excessive base motion. This is a safety feature if the antenna is roof mounted and the vehicle begins to move with the antenna up. Stow [DIS] will disable the safe feature.	+ or – then Enter	Move SAFE RF SAFE EL 3.00 Stow [**EN**/dis]

3.6 Azimuth Stow/External Switch



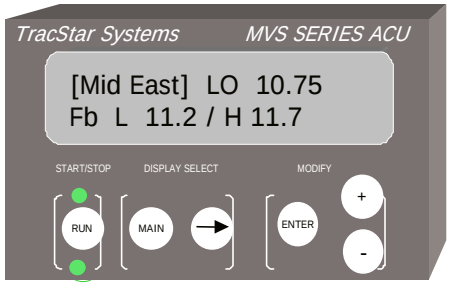
AZ [Stow 7.50]

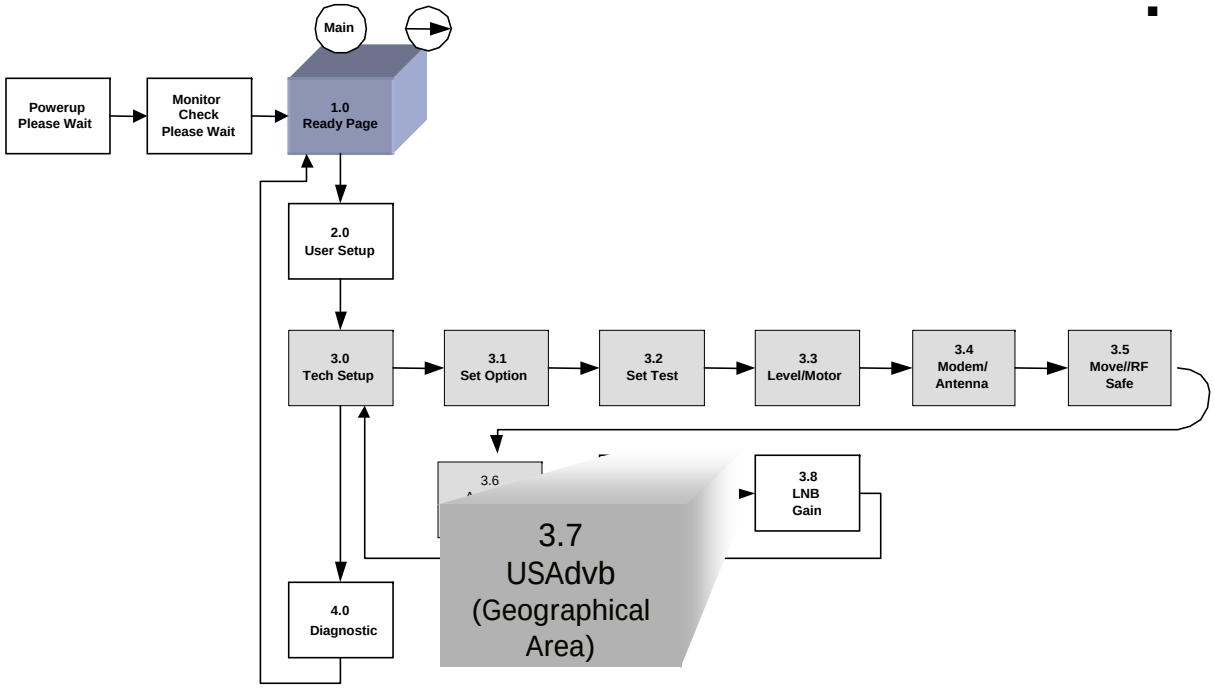
Ext EN

- The AZIMUTH STOW setting provides the offset for the angular distance from the azimuth reference switch to the desired azimuth stow position.
- The Enable/Disable setting enables or disables the optional stow switch that is located on the antenna.

Description	Action	Display **BLUE** indicates default setting
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY
Azimuth Stow / External Switch Page (Page 3.6)	From Ready Page: Main 2x Arrow 6x	AZ [**Stow 7.5**] Ext EN
The azimuth stow setting determines the offset for the angular distance from the azimuth axis reference switch to the desired azimuth stow position. + or – will change the angle. This is set in the factory.	+ or – then Enter	AZ [**Stow 7.5**] Ext EN
Ext EN indicates whether the pedestal start/stow switch is enabled or disabled. Press + or – to change the selection, then Enter.	+ or – then Enter	AZ Stow 7.5 Ext [**EN**/dis]

3.7 USAdvb





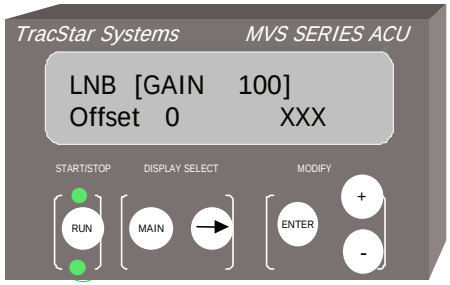
[Mid East] LO 10.75

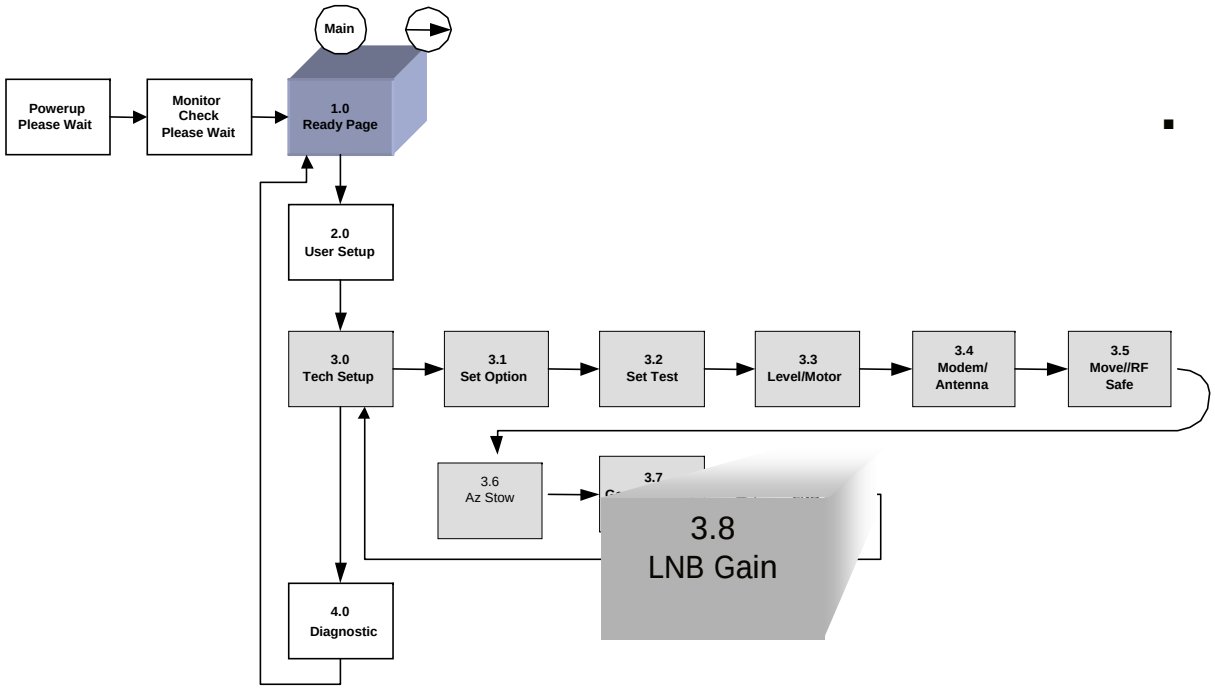
Fb L 11.2/H 11.7

- The LNB Setup page allows the user to:
  - Select the region of the world that the antenna is located in
  - Input the local oscillator frequency of the LNB in use
  - Input the receive frequency band corresponding to the transponder and LNB in use.
  - Note: these are the frequencies that are used during the antenna scan.

Description	Action	Display **BLUE** indicates default setting
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
LNB Setup Page (Page 3.7)	From Ready Page: Main 2x Arrow 7x	[**USAdvb**] LO 10.75 Fb L 11.2/H 11.7
The antenna must be set to USA, USAdvb, Mid East or Europe. Press + to edit then Enter. *USAdvb is the preferred setting in the USA, due to the type of satellite typically used as a reference. Mid EAST and EUROPE have the same internal software functions, either will work in either location.*	+ or - then Enter	[**USAdvb**] LO 10.75 Fb L 11.2/H 11.7  **IMPORTANT**
Set the LNB Local Oscillator frequency using + or -, then Enter	+ or – then Enter	Mid East [**LO 10.75**] Fb L 11.2/H 11.7
Set the low end of the frequency band in use with + or -, then Enter.	+ or – then Enter	Mid East LO 10.75 Fb [**L 11.2**]/H 11.7
Set the high end of the frequency band in use with + or - ,then Enter	+ or – then Enter	Mid East LO 10.75 Fb L 11.2/[**H 11.7**]

3.8 LNB GAIN





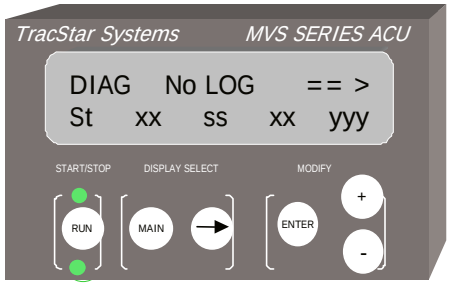
LNB [GAIN 100]

Offset 0 XXX

- The LNB Gain page allows the user to:
  - Adjust the gain of the LNB as seen by the antenna controller's built in signal strength measurement (SS).
  - Enter a LNB noise offset as seen by the antenna controllers built in signal strength measurement (SS).

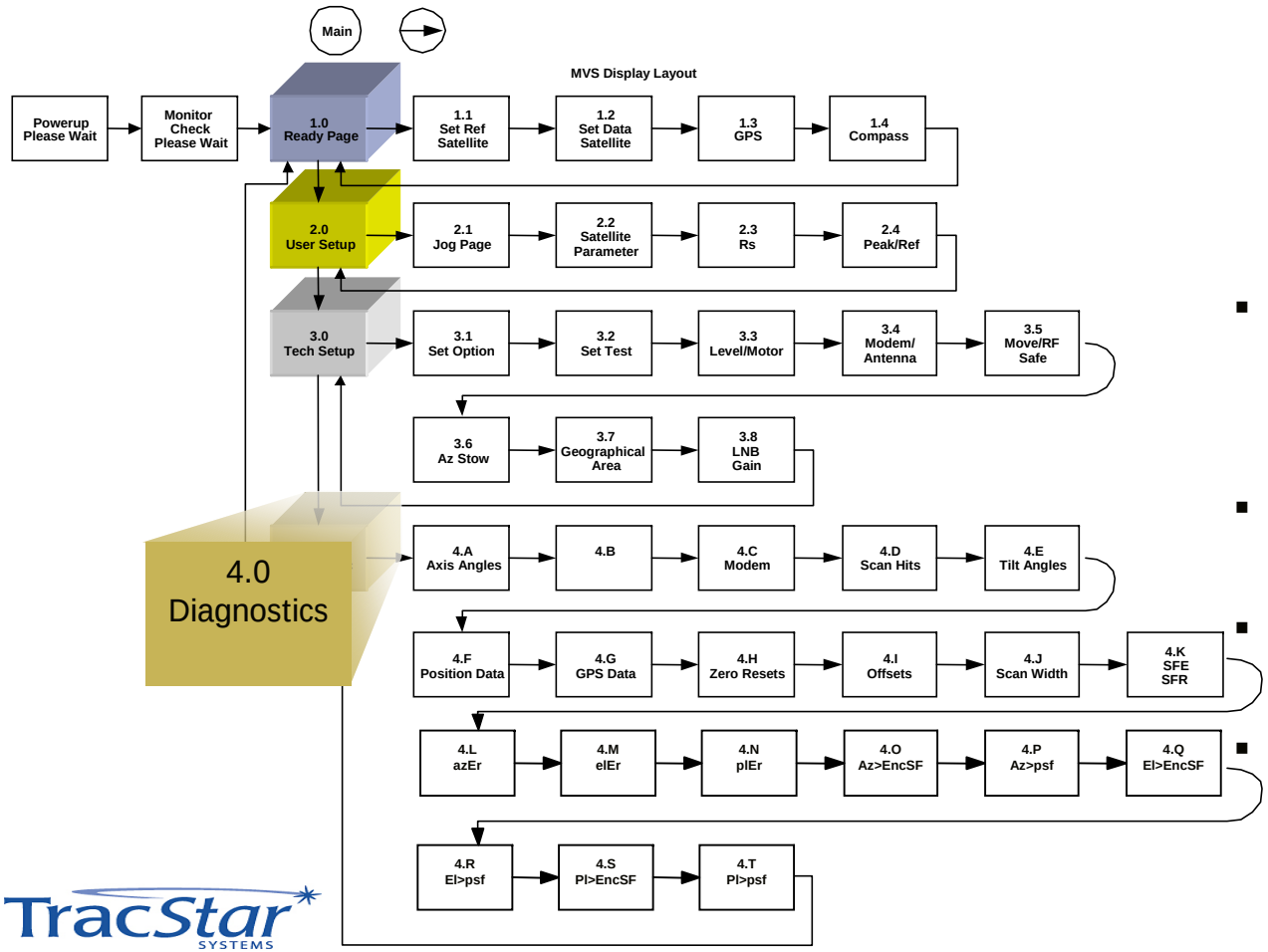
Description	Action	Display **BLUE** indicates default setting
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
LNB GAIN Page (Page 3.8)	From Ready Page: Main 2x Arrow 8x	[**USAdvb**] LO 10.75 Fb L 11.2/H 11.7
The user may wish to adjust the LNB gain as measured by the built in tuner: Gain = 100, nominal setting Gain = 50, ½ of nominal gain Gain = 200, double the nominal gain When adjusting the gain, monitor the signal strength number in the lower right. Increasing the gain will increase the signal level.	+ or – then Enter	LNB [**GAIN 100**] Offset 0 XXX
The user may wish to adjust the LNB offset as measured by the built in tuner. Adjust the offset when the antenna is pointed at a cold sky. Adjusting the offset should minimize the signal strength number when the antenna is looking at cold sky.	+ or – then Enter	LNB GAIN 100 [**Offset 0**] XXX

4.0 DIAGNOSTICS



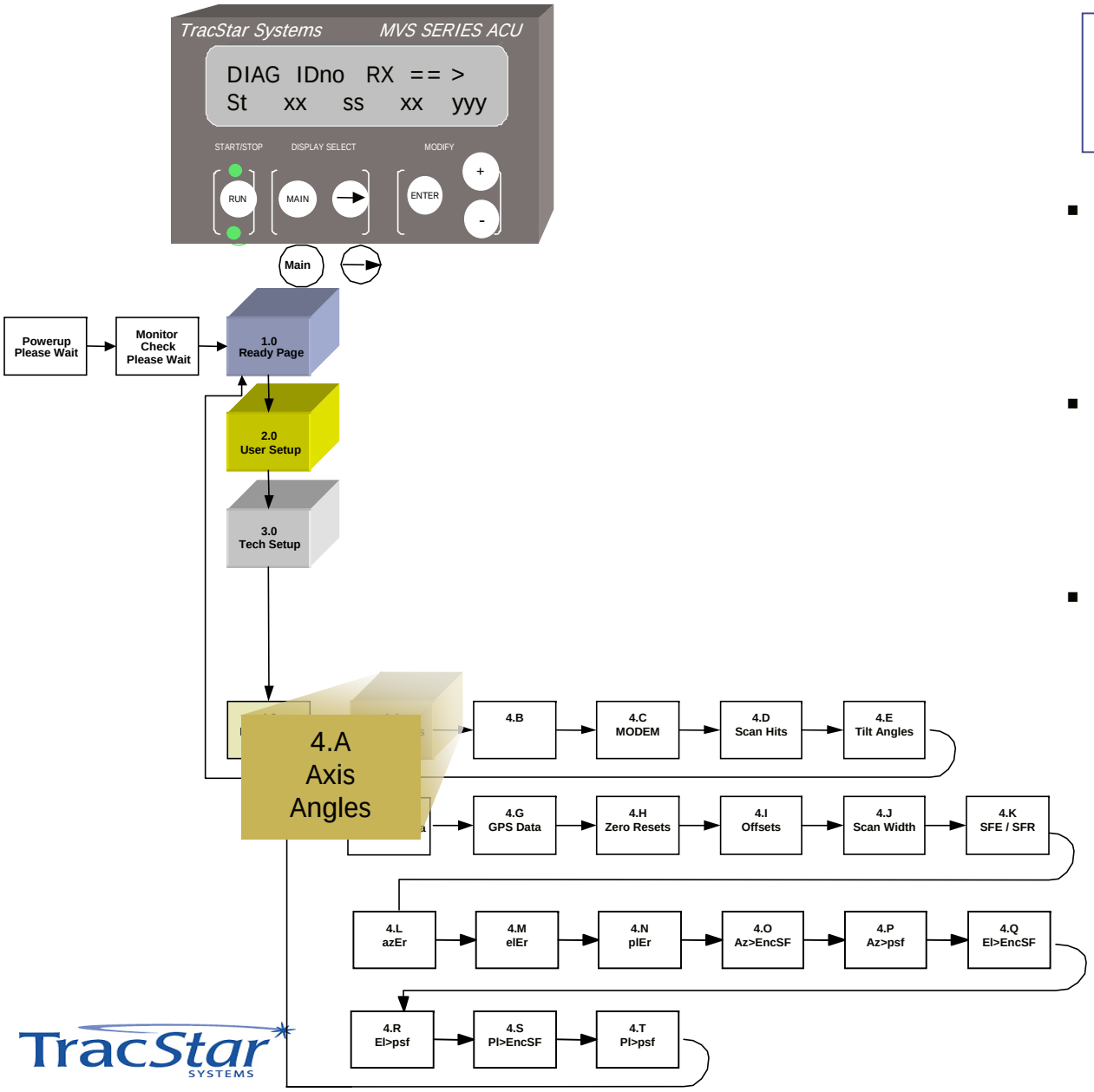
DIAG No LOG ==>

St XX ssXX YYY



- The Diagnostics section includes information on antenna pointing angles, level sensor readings, GPS data and the ability to set correction factors for the three axes.
- "No LOG" and "LOG try" are messages unique to Idirect Modems and a log-in process.
- St XX indicates the tracking state of the antenna.
- ssXX indicates the current signal strength reading.
- YYY is tuner signal to noise (>100 is locked) ratio.

4.A Axis Angles

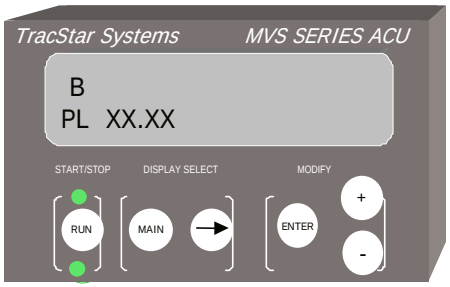


A 246.00 E 28.70

Ap 44.6 Ep 27.77

- The DIAGNOSTICS A page indicates the azimuth and elevation angles of the antenna.
- The top row shows the antenna Az and El angles relative to the earth (azimuth only valid after lock on)
- The second row Ap and Ep indicate the Az and El angle relative to the pedestal coordinates, i.e., the azimuth stow angle is zero degrees. El is only valid above –10 degrees.

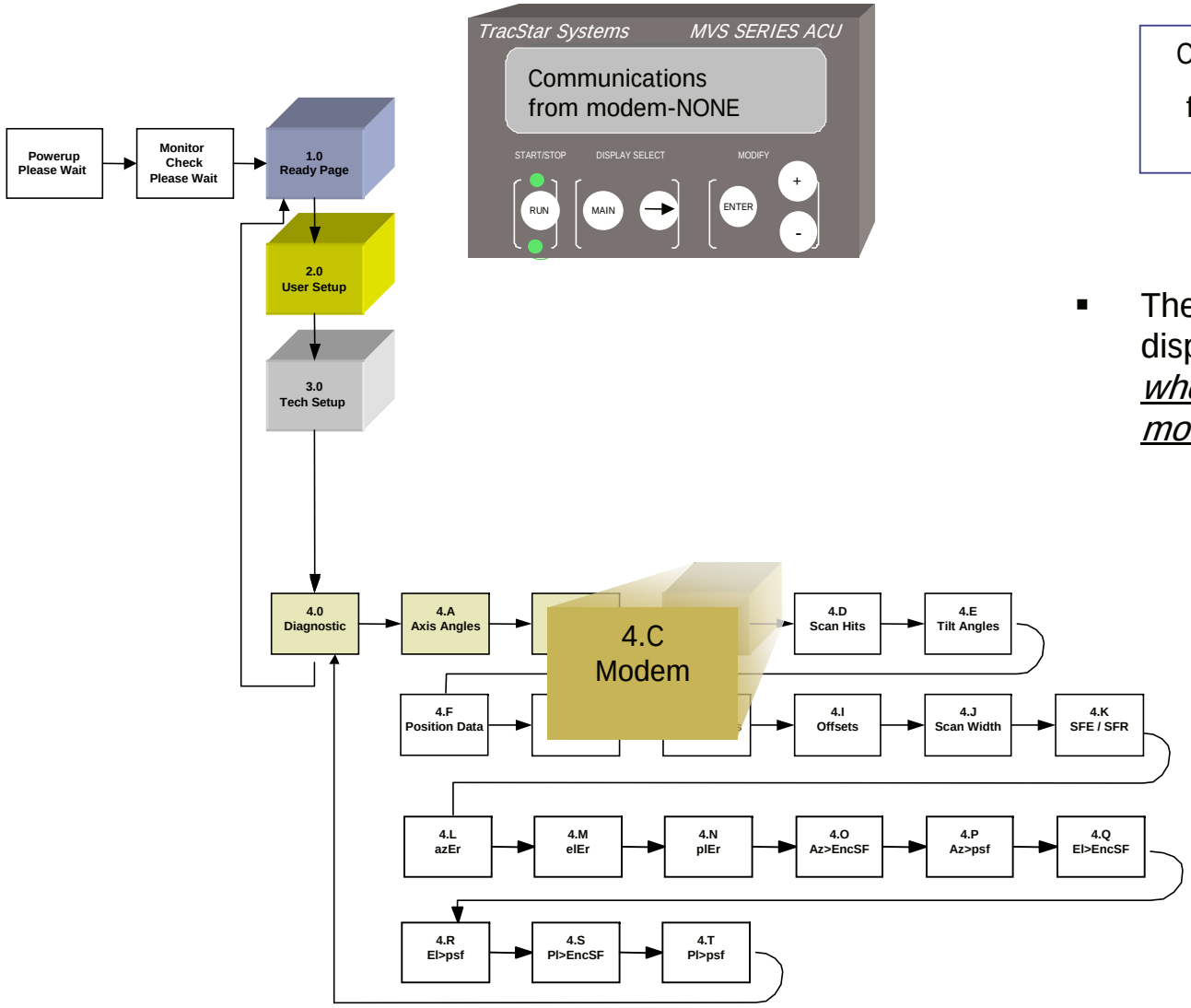
4.B B Page



B

PL XX.XX

- The DIAGNOSTICS B page displays the polarization angle of the antenna.

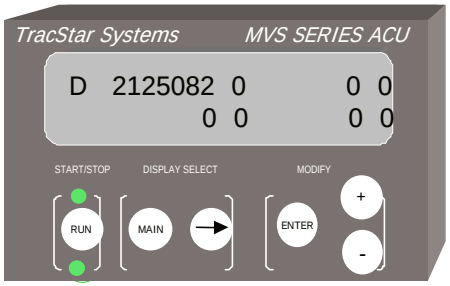


Communications

from modem-NONE

- The DIAGNOSTICS C page displays modem messages *<u>when connected to an iDirect modem only</u>*.

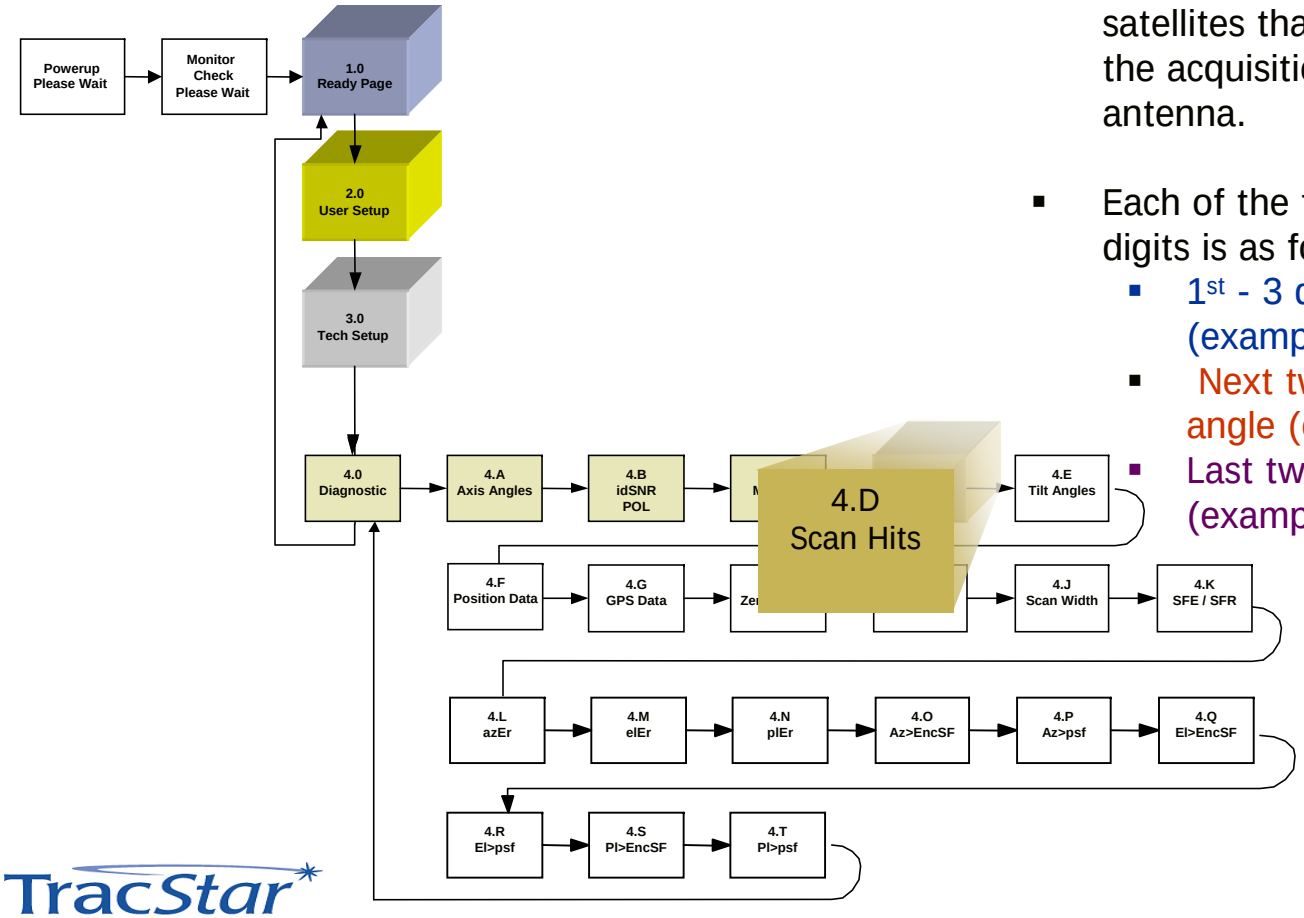
4.D Scan Hits

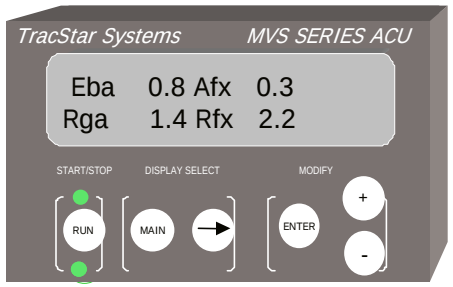


2125082 0000000

0000000 0000000

- The DIAGNOSTICS D page indicates satellites that were “seen” during the acquisition and alignment of the antenna.
- Each of the four groups of seven digits is as follows:
  - 1st - 3 digits - azimuth angle (example 212)
  - Next two digits - elevation angle (example 50)
  - Last two digits signal – strength (example 82)



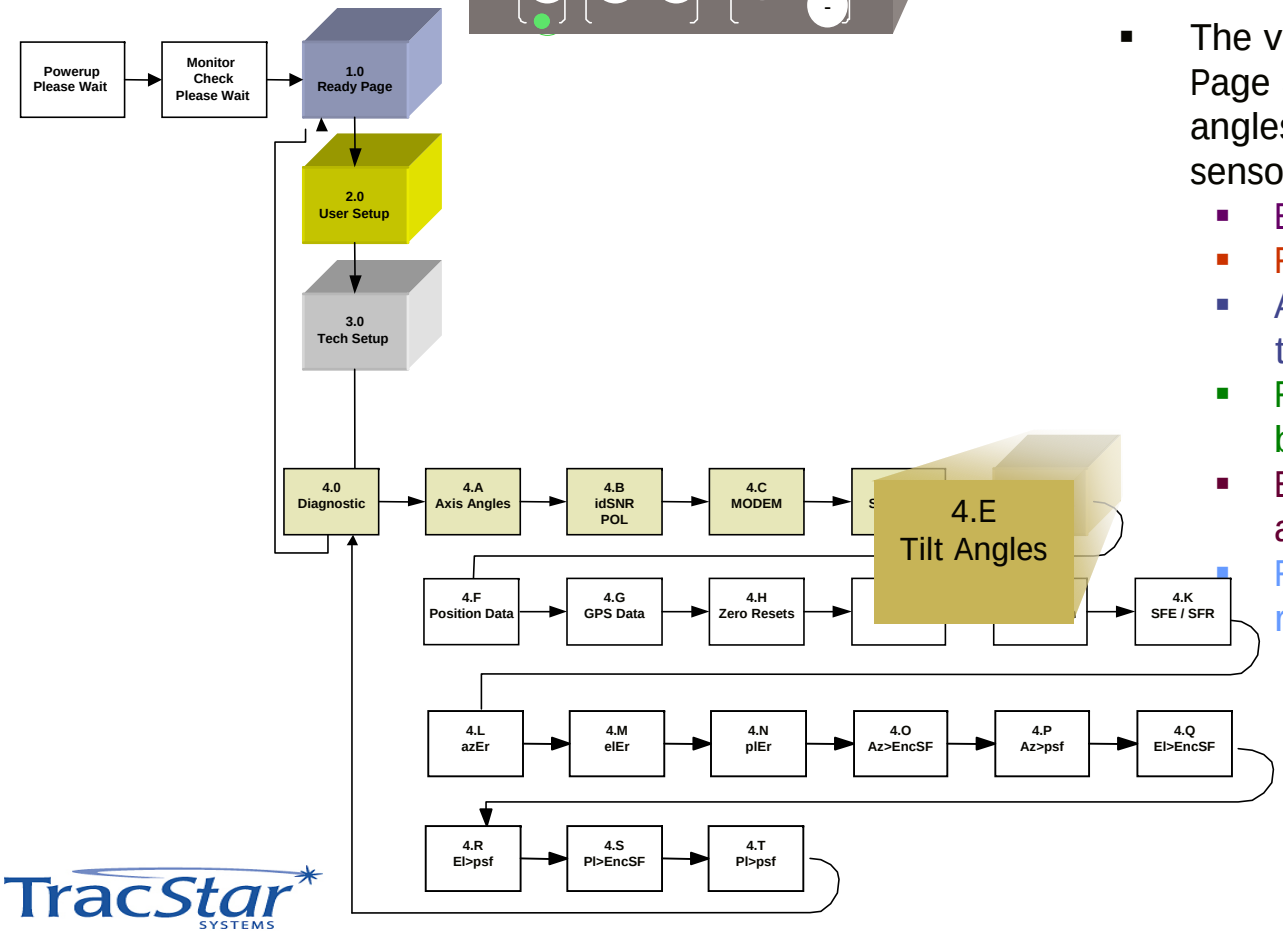


Eba 0.8 Afx 0.3

Rba 1.4 Rfx 2.2

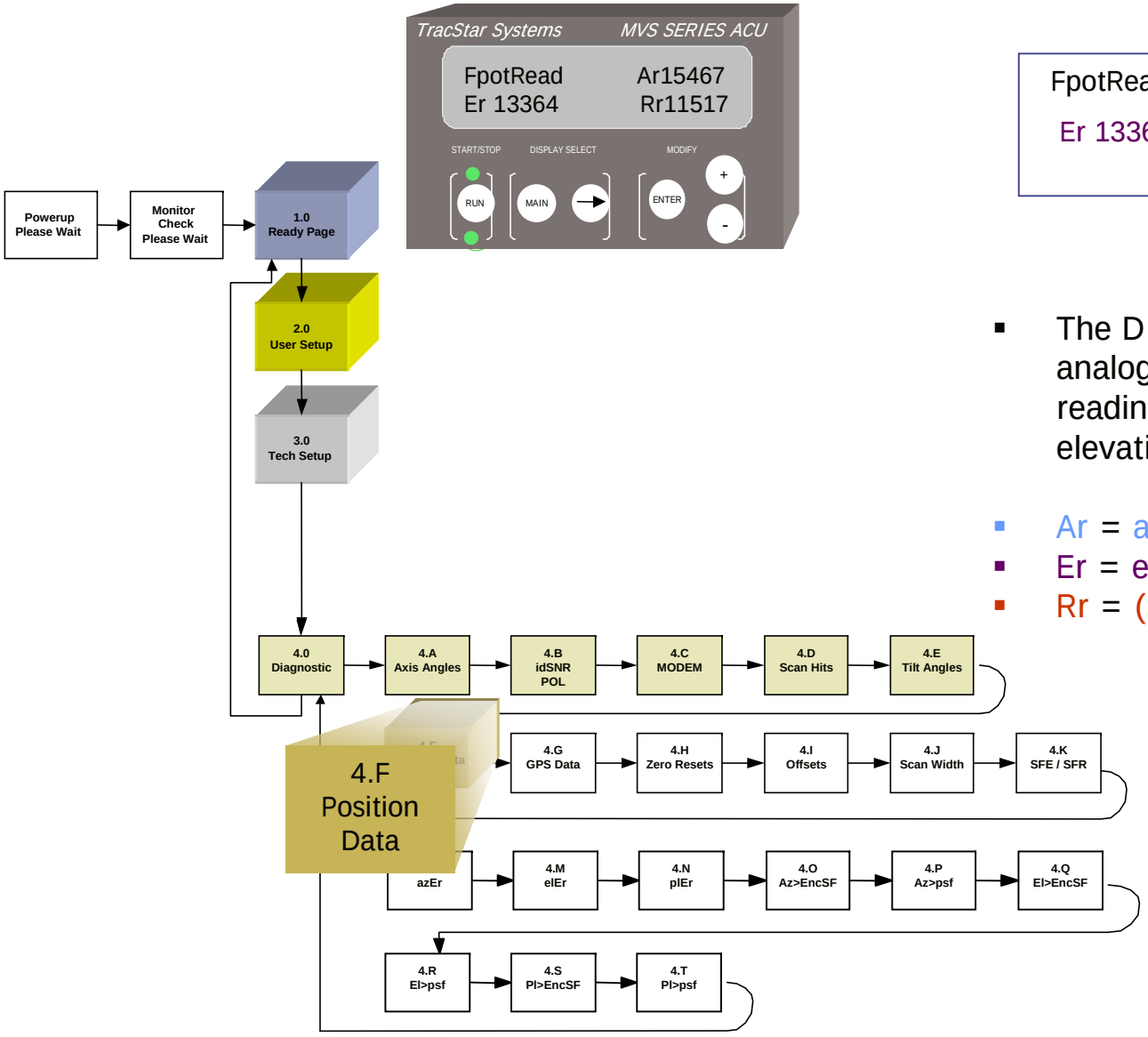
Elv 4.0 Afx1.7

Rlv 1.5 Rfx 1.4



- The values on the DIAGNOTICS E Page are the pedestal base tilt angles as measured by the tilt sensor.
  - Eba = elevation base angle
  - Rba = roll base angle
  - Afx = azimuth adjustment due to base tilt
  - Rfx = pol adjustment due to base tile
  - Elv = raw (unfiltered) el base angle reading
  - Rlv = raw (unfiltered) roll level reading

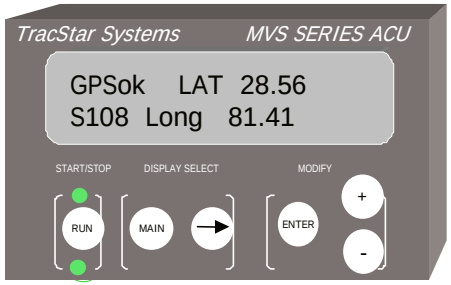
4.F Axis Position Transducer Readout



FpotRead Ar15467
Er 13364 Rr11517

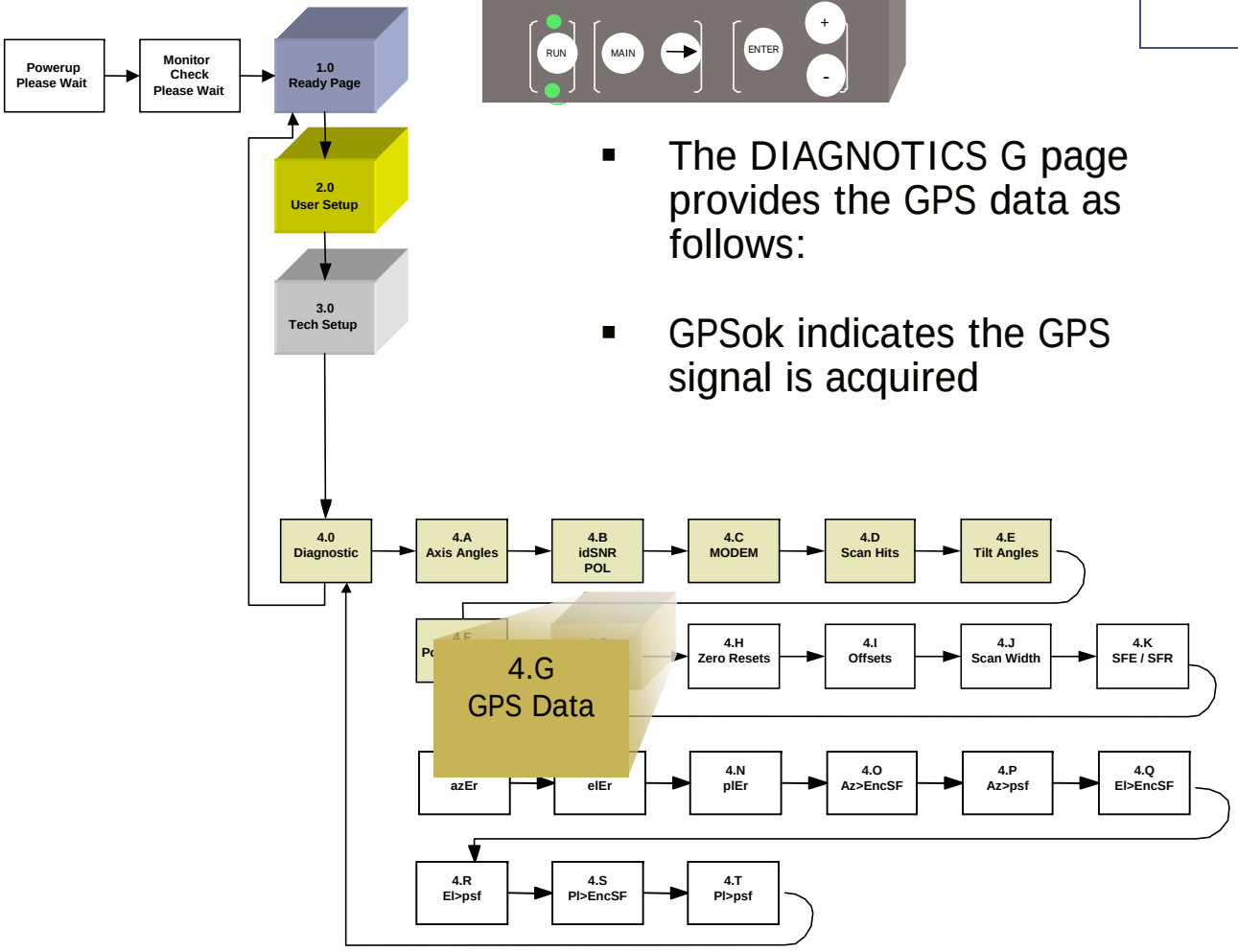
- The DIAGNOTICS F page is the analog position transducer reading from the azimuth and elevation axis.

- Ar = azimuth reading
- Er = elevation reading
- Rr = (not used)



GPSok LAT 28.56

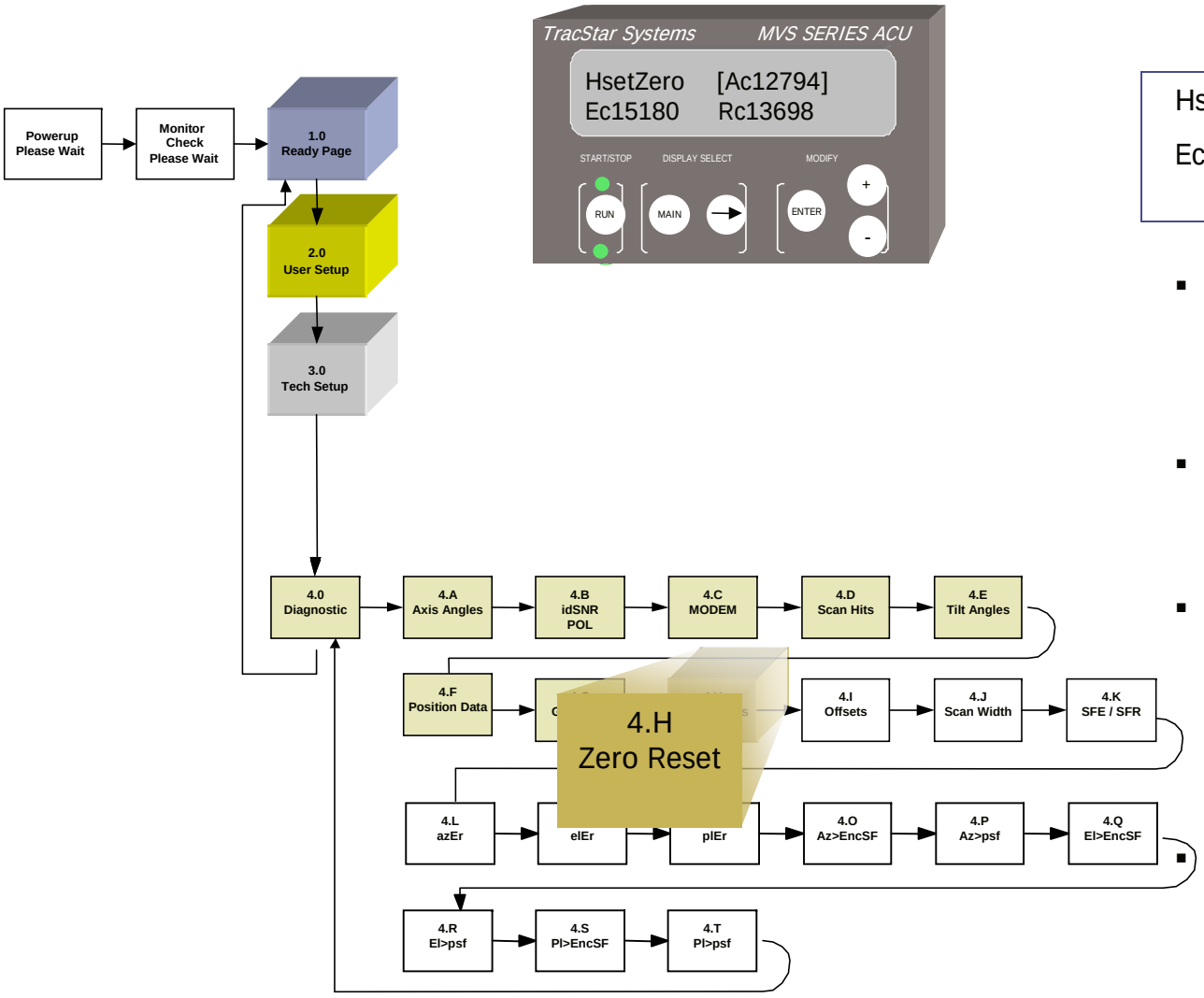
S108 Long 81.41



- The DIAGNOTICS G page provides the GPS data as follows:
- GPSok indicates the GPS signal is acquired

- LAT 28.56 indicates the current latitude of the antenna.
- MagD 5.10 indicates the magnetic deviation
- S108: 100 indicates GPS lock and 8 indicates the number of GPS satellites being received.
- Long 81.41 gives the longitude position of the antenna.

4.H Axis Zero Offsets



HsetZero [Ac12794]

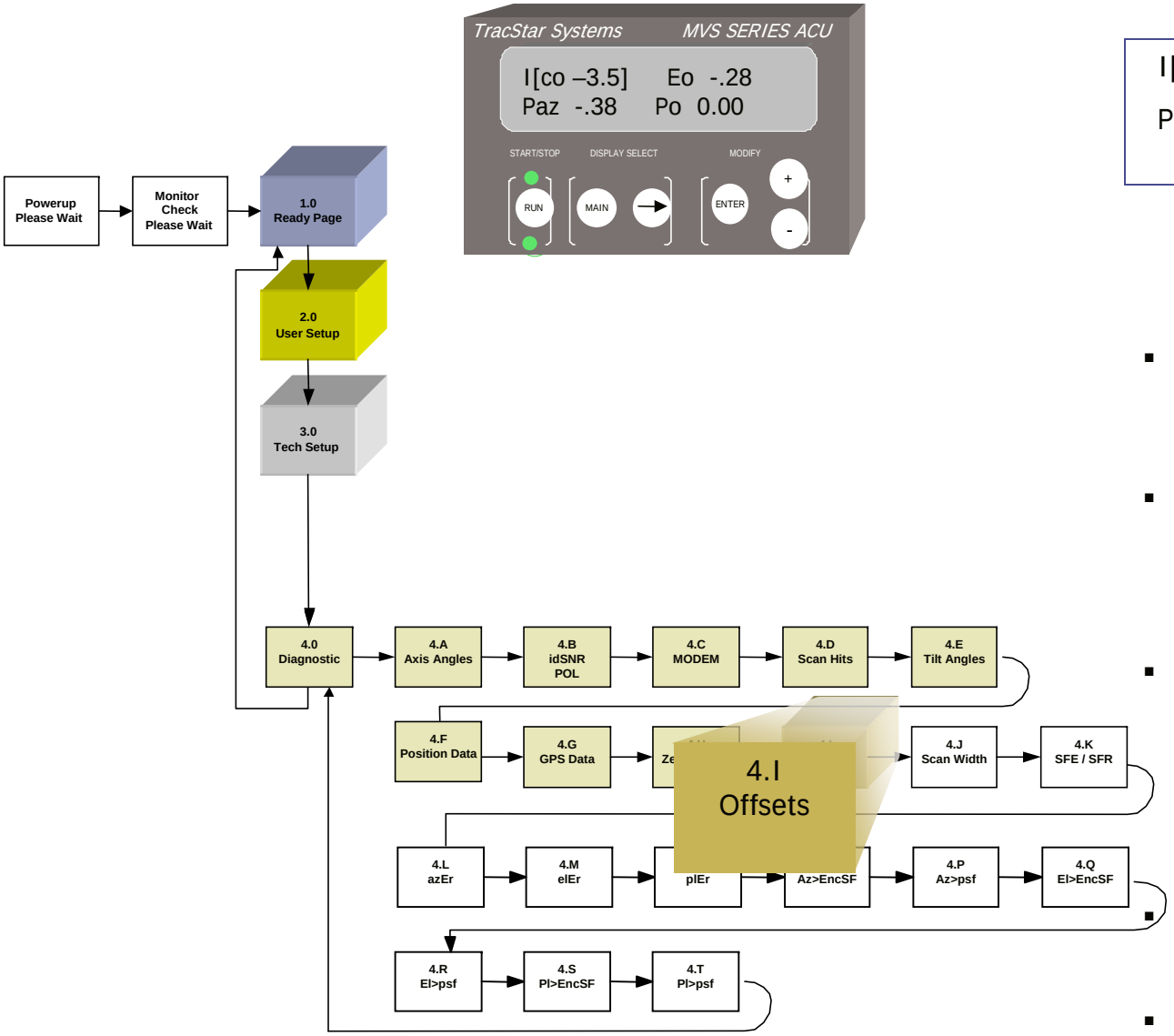
Ec15180 Rc13698

- The DIAGNOTICS H page allows the user to set the center value for each of the transducers as seen on the F page.
- Ac is the azimuth center value used to set azimuth 0 degree angle (stow position).
- Ec is the elevation center value used to set elevation 45 degree angle.
- Rc (not used)

4.H Axis Zero Offsets (con't)

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13 READY
Axis Zero Offsets Page (Page 4.8)	From Ready Page: Main 3x Arrow 8x	HsetZero [**Ac12794**] Ec15180 Rc 13698
When Ac (azimuth center) is flashing, the user can press + or – to change the azimuth value, then Enter.	+ or – then Enter	HsetZero [**Ac12794**] Ec15180 Rc 13698
When Ec (elevation center) is flashing, the user can press + or – to change the azimuth value, then Enter.	+ or – then Enter	HsetZero Ac12794 [**Ec15180**] Rc 13698
Rc = Not Used	+ or – then Enter	HsetZero Ac12794 Ec15180 [**Rc 13698**]

4.I Axis Offsets



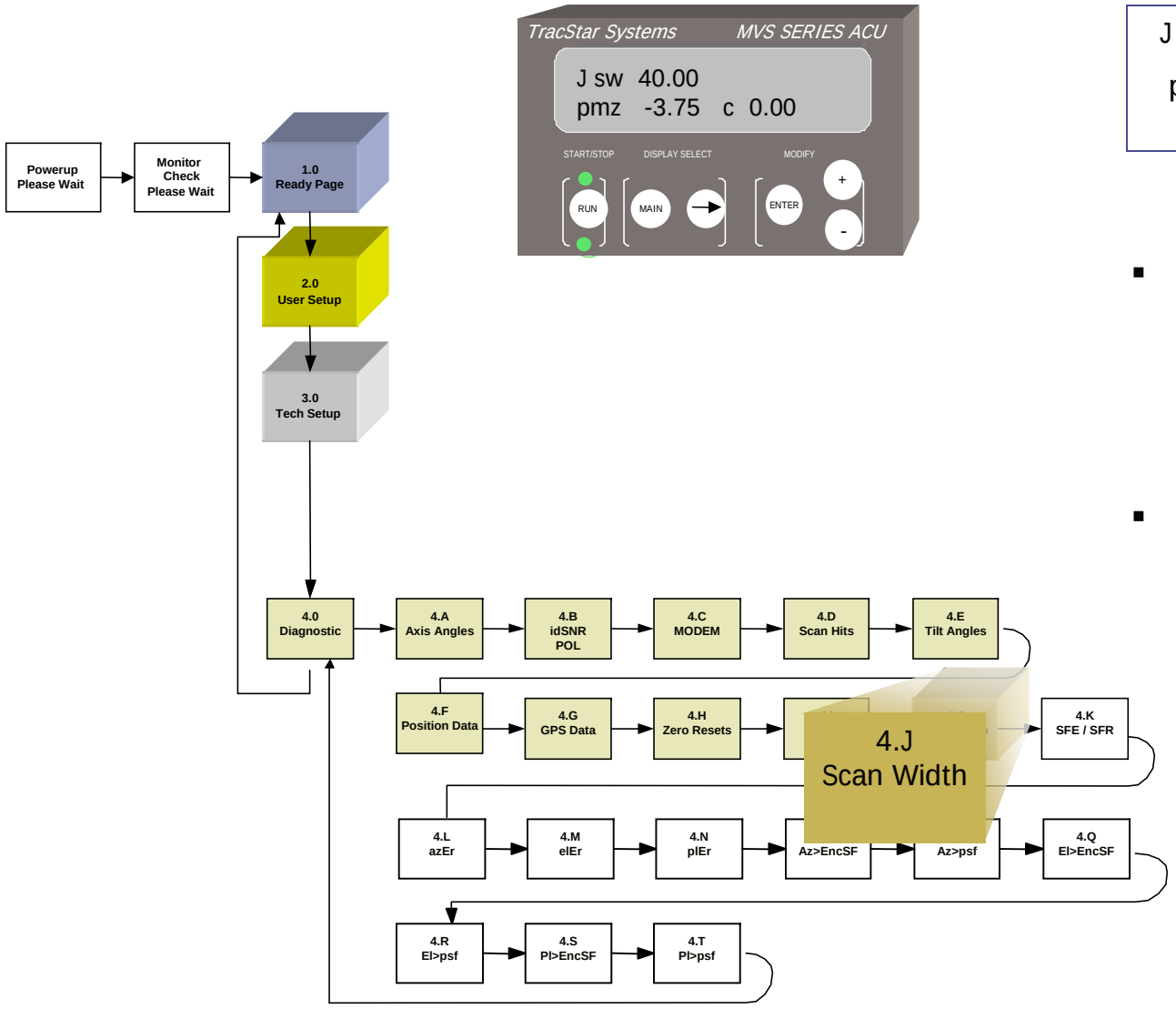
I[co -3.5] Eo -.28

Paz -.38 Po 0.00

- The DIAGNOTICS I page allows the user to view and set offsets in degrees for each axis.
- Co is the compass offset, this correction is self learning and updates itself on each acquisition.
- Eo is the elevation offset after each acquisition.
- Paz is the boresight offset for the RF beam.
- Pl is the polarization adjustment.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Axis Zero Offsets Page (Page 4.9)	From Ready Page: Main 3x Arrow 9x	I [**co -3.5**] Eo -.28 Paz -.30 Po 0.00
Co is the compass offset and updates automatically after each acquisition. The user should not change this value.	Enter	I [**co -3.5**] Eo -.28 Paz -.30 Po 0.00
Paz is the boresite offset for the RF beam. This value is set in test and should not be changed by the user.	Enter	I co -3.5 Eo -.28 [**Paz -.30**] Po 0.00
Po is an offset for the polarization axis. An offset can be permanently input by the user if necessary.	+ or – then Enter	I co -3.5 Eo -.28 Paz -.30 [**Po 0.00**]

4.J Azimuth Scan Width

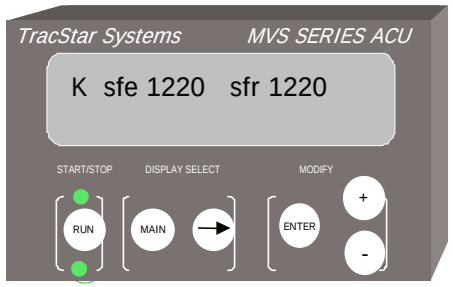


J sw 40.00

pmz -3.75 c 0.00

- The Diagnostics J page allows the user to set the width of the azimuth scan during the initial reference satellite acquisition.
- The default value is 40.0 degrees.
  - The max value is 100 degrees
  - The min value is 10 degrees.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Azimuth Scan Width Page (Page 4.10)	From Ready Page: Main 3x Arrow 10x	[**Sw 40.00**] pmz -3.75
The user can adjust the azimuth scan width from 10 to 100 degrees. 40 is the default.	+ or – then Enter	[**Sw 40.00**] pmz -3.75
		Sw 40.00 [**pmz -3.75**]

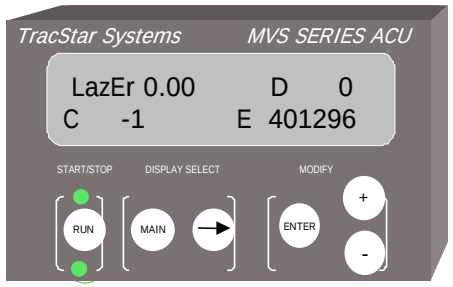


K sfe1220 sfr1220

- These values are the base angle level span calibrations for the e (elevation) and r (roll) tilt.

Description	Action	Display
Set Code (enables editing) (Page 3.0)	From READY page Main 2x + to code 13, Enter Main 2x	READY TECH SETUP Tech Setup CODE 13
Azimuth Scan Width Page (Page 4.11)	From Ready Page: Main 3x Arrow 11x	K sfe1220 sfr1220

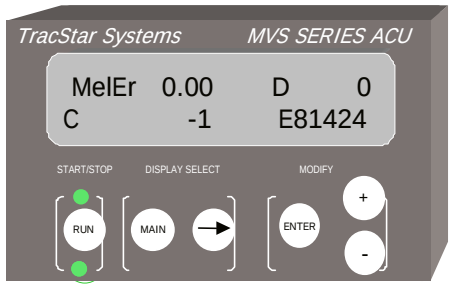
4.L Axis Diagnostics



LazEr	0.00	D 0
C	-1	401296

- Internal Readings from azimuth axis.
- Perform manual jog of the azimuth axis when "RUN" is 'on' and +/- buttons are depressed.
  - Er – Servo Position Error
  - D – DAC Value +/- 120
  - C – Current Value +/- 100
  - E – Encoder Counts

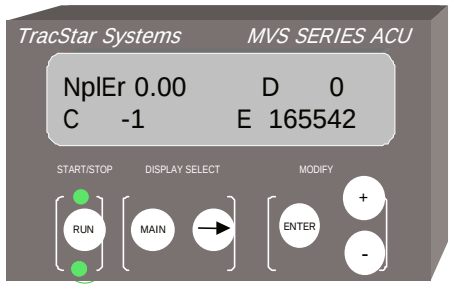
4.M Axis Diagnostics



MelEr	0.00	D	0
C	-1		E81424

- Internal Readings from elevation axis.
- Perform manual jog of the azimuth axis when "RUN" is 'on' and +/- buttons are depressed.
  - Er – Servo Position Error
  - D – DAC Value +/- 120
  - C – Current Value +/- 100
  - E – Encoder Counts

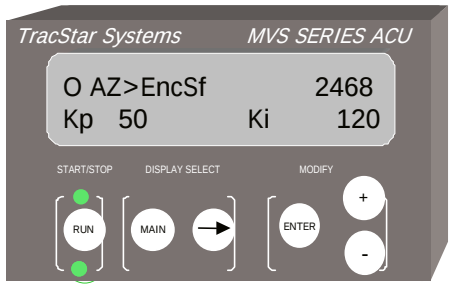
4.N Axis Diagnostics



NplEr	0.00	D	0
C	-1	E165542	

- Internal Readings from pole axis.
- Perform manual jog of the azimuth axis when "RUN" is 'on' and +/- buttons are depressed.
  - Er – Servo Position Error
  - D – DAC Value +/- 120
  - C – Current Value +/- 100
  - E – Encoder Counts

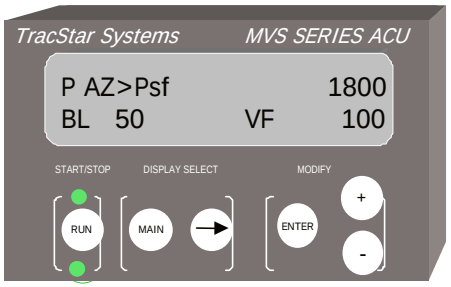
4.O Axis Diagnostics



O AZ>EncSf	2468
Kp 50	Ki 120

- Azimuth Encode Scale Factor
- Setup Readings for Azimuth Axis
- Kp and Ki are servo loop data

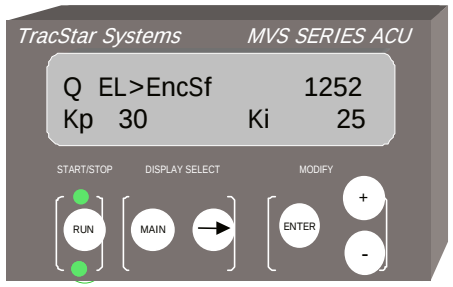
4.P Axis Diagnostics



P AZ>Psf	1800
BL 50	VF 100

- Azimuth Pot Scale Factor
- Additional Setup Readings for Azimuth Axis
- BL and VF are servo parameters

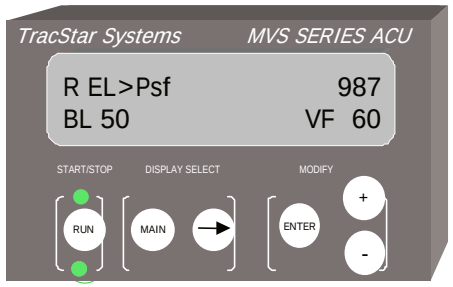
4.Q Axis Diagnostics



Q EL>EncSf	1252
Kp 30	Ki 25

- Elevation Encode Scale Factor
- Setup Readings for Elevation Axis
- Kp and Ki are servo loop data

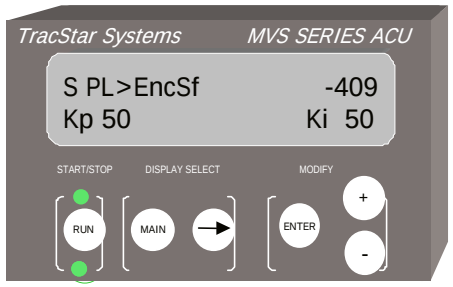
4.R Axis Diagnostics



R EL>Psf	987
BL 50	VF 60

- Elevation Pot Scale Factor
- Additional Setup Readings for elevation axis
- BL and VF are servo parameters

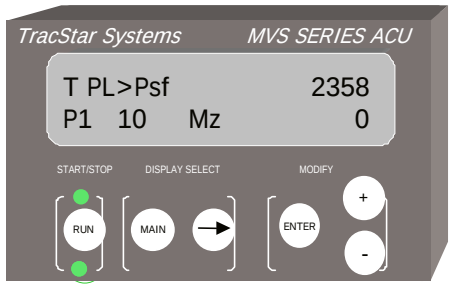
4.S Axis Diagnostics



S PL>EncSf	-409
Kp 50	Ki 50

- Pole Encode Scale Factor
- Setup readings for Pole axis
- Kp and Ki are servo loop data

4.T Axis Diagnostics



T PL>Psf			2358
P1	10	Mz	0

- Pole Pot Scale Factor
- Additional setup readings for pole axis

- Antenna has no power.
  Turn off Power. Check the power cord on the ACU and or the rack mount control panel. The antenna receives its power from one of these two respective locations. Check the antenna end of the grey cable with the black connectors as well. Reapply Power. Restore Power.

- OBSTRUCTIONS
  Ensure there is a clear unobstructed view towards the equator relative to the antenna's position.

- Antenna Not Responding
  When using the handheld controller, ensure the RJ11 (phone cord) connection is properly seated in the ACU and the handheld device.

- REF SAT NOT FOUND
  Select an alternate reference satellite (refer to page xx) and begin the acquisition process again. Should the message still occur, move the antenna base in a 90^0 arc and check the leveling of the antenna. Auto-correction features in the software will accommodate up to +/- 10^0 of error in the mounting plane of the antenna.

- Skyscan
  Skyscan can be engaged to find all available satellites in the sky. Refer to the operating manual for instruction on using Skyscan.

- Waiting Log On (iDirect)

  The TracStar controller 'logs' into the iDirect modem, when iDirect modem is selected. Make sure the DB9-RJ45 cable is in place between the controller and the modem, as this serves as the communication link. If communication still fails, set modem to NONE to allow antenna to lock onto satellite.

5: Description of System

TracStar MVS750 / AvL Model 750 iMoVSAT three-axis positioner

TracStar Controller

The complete system weighs approximately 95 lb. depending upon the options selected.

General

The Model MVS750 / iMoVSAT antenna system is an elevation over azimuth positioner featuring the simple, rugged Roto-Lok® drive system that produces very low backlash, high stiffness, and high reliability. It is driven by a low backlash gearbox with DC motors and all drive components are high-strength steel encased in lubricated-for-life housings, resulting in the most reliable, no-maintenance system with the minimum of weight. The reflector is a 75 cm equivalent Channel Master illuminated by a corrugated horn. The options for the placement of the transmitter vary depending upon the size: A 1 - 4 watt BUC can be installed on the feed boom.

RF System

The offset reflector/feed system produces co-polarization patterns that easily meet the FCC Section 25.209 requirements beyond 1.72 degrees in the transmit band and 1.95 degrees in the receive band. It is also fully compliant with the ITU Recommendation for international use.

Roto-Lok Drive System

The patented Roto-Lok drive system utilizes highly reliable aircraft control cables in a redundant configuration to achieve a lightweight, very stiff drive system with zero backlash. This high-tech performance is achieved using low-tech components - by simply wrapping the cable around the drive capstan several times before wrapping the larger drive drum. This method results in a minimum free-length of cable. The load cable on the main drum is exponentially reduced as it is wrapped around the drum. Therefore, the total elongation of the cable under load is minimized. The Roto-Lok system has up to 10 times less backlash than that of comparable gear systems. The cables are pre-tensioned and spring-loaded at the main drum attachment point, which eliminates backlash at installation and from any unexpected cable stretch in the future.

Secondary Drive System

The Az and El Roto-Loks are driven by a low backlash worm gear set with a 15:1 and 30:1 ratio respectively. The low backlash of the worm gear drive is reduced further by the Roto-Lok drive ratio. This results in a lash equivalent of only .1° in azimuth and .2° in elevation as seen by the reflector system. The gear sets are encased in a sealed housing allowing for continuous lubrication in synthetic oil, maximizing gear efficiency and minimizing wear.

Motor Drives

Lightweight, reliable, servo-quality DC motors with integral gearbox are used for Az, El, and Pol drives. The motors are also equipped with optical encoders that provide precise speed and positioning control, ensuring smooth operation when peaking the antenna. The 24V DC design provides current-limiting torque control and will allow for vehicle battery operation if necessary.

Controls

The antenna control system is produced by TracStar Systems and is integrated exclusively with the Roto-Lok pedestal assembly. The controller includes a tunable receiver, GPS system, and flux-gate compass. The main portion of the controller is located on the antenna positioner, placing it close to the optical encoders. The power supply and hand-held controller are separate and can be placed up to 25 feet away without special hardware. Special control cables can be obtained to place the power supply and hand-held up to 150 feet away from the antenna.

The TracStar controller was developed to achieve one-button, auto-acquisition of the satellite signal 100% of the time using a proprietary method. The controller peaks the antenna on the data satellite with greater accuracy than a human can achieve, thus assuring that there is no chance of adjacent satellite interference. Primary and secondary reference satellite menus and data satellite menus are available for an untrained operator. Any data satellite can be selected or pre-programmed by a trained operator. Semi-automatic modes are available in case of failure of GPS or a flux-gate to provide acceptable manual input of case heading and/or latitude and longitude. An *Auto-Select* mode is available for reference satellite selection in the TracStar software (domestic CONUS use only). The TracStar control system will work on any Ku Band satellite.

Construction

Except for the drive components and bearings, all components are aluminum, stainless steel or plastic to prevent rusting.

6: General Deploy and Assembly Instructions

The TracStar MVS750 / AvL Model 750 positioner has been fully tested with the TracStar controller prior to shipment. All position feedback, limit sensing, limit switches, and motor speeds have been calibrated or set. The positioner needs only to be deployed and the coax and control cables connected to the controller.

1. Model 750 shown in stowed position (Figure 1)

Figure 1

2. Connecting the coax cable first, make the appropriate electrical connections. (Figure 2.)

Figure 2

3. Press “+” on TracStar hand-held controller (Figure 4) and hold for 3 seconds until unit begins deploying.

4. Figure 3 shows the unit fully deployed.

Figure 3

Controller Operating Instructions

1. To activate system, turn on power to the TracStar Indoor Unit (IDU). The display should read "Ready".

2. Press the "+" key to begin satellite acquisition.

3. To stow the antenna, press and hold the "-" key for 3 seconds. To insure that transmit is disabled, there is a 3-second delay before the antenna begins to stow.

4. The user may stop the motion by pressing the Start/Stop, + or - key at any time, either during an acquisition (Display reads "Run") while locked or during a stowing operation (Display reads "Stow").

Complete operating instructions can be found in the TracStar Controller Operating Instructions included in this manuals Index.

7: Azimuth Positioning System

Azimuth Bearing

The azimuth platform sits on top of a ball bearing platform with a dynamic and static moment capacity of over four times the worst-case wind-load specification. The assembly is surrounded by a double seal to protect the bearing platform, which is permanently lubricated. This rests on the azimuth drum and the azimuth cables wrap around the drum and capstan. Because of the excess capacity, low rpm and low number of cycles compared to the bearings B10 design life, no wear is expected. No maintenance should be required over the life of the positioner.

Azimuth Gearbox

The azimuth gearbox is a low backlash worm gearbox. The worm gear drive isolates any backlash in the motor drive from the system. In addition, since it is a 15:1 ratio, it will not back drive, thus eliminating any need for a brake on the drive train. The motor drives the input worm via a quill/female hole and square key. The azimuth capstan is secured to the bore of the output shaft with a square key. The gearbox contains synthetic oil. Because of the design capacity of the gearbox, low rpm and comparative limited cycles experienced by the system, no wear or maintenance is expected.

Azimuth Motor

The azimuth drive motor is a servo quality and 24DC motor with integral 19.7:1 spur gear train. The motor armature rotates at up to 4000 rpm causing a high-frequency noise that will vary, depending on the loading condition of the motor. An optical encoder is mounted to the other end of the motor output shaft to provide real-time positional information to the TracStar controller. The maximum gearbox output speed is 253 rpm. The output shaft is "D" shaped with a special adapter with a slot for a square key. Since the low backlash worm gear drive isolates the backlash from the motor, any backlash between the shaft adapter, square key, or motor gear train will never be seen by the reflector boresight. Any backlash at any of these points is of no consequence to the system performance. No maintenance or wear of the elevation motor is expected.

Azimuth Roto-Lok Cable Drive

The patented azimuth Roto-Lok drive produces a drive system with zero backlash, high stiffness, no wear, no lubrication, and maximum reliability. The system consists of three 1/16 9x17 stainless steel aircraft control cables, reverse-wrapped twice around the capstan with solid connections on one end and high force, Belleville springs on the other end occurring at the azimuth spring block. One cable has the capacity to withstand an 80 mph wind load. The additional cables are used to

provide increased stiffness and drive redundancy. ***If a cable becomes damaged during usage, merely cut off the cable and continue to use the positioner. You can replace the cable at your maintenance facility whenever time permits.***

The cables are sized to last the life of the positioner. No replacement from wear is expected. The spring package at one end will automatically compensate for any elongation of the cable. At installation, the Belleville springs are collapsed until no "air" is seen between the springs. You should check this condition yearly to account for the slow settling of the cable strands. Use a 3/8 box-end wrench to tighten the nut. ***Be sure not to over tighten.***

Azimuth Position Feedback

The azimuth position feedback is produced by a 10-turn, 1K-ohm potentiometer driven by the output shaft of the worm gearbox. In addition, an optical encoder is mounted to the output shaft on the motor and provides redundant feedback on azimuth position. The encoder also provides precise redundant feedback on unit's position relative to zero degrees starting position. The potentiometer is mounted on an angle plate that is mounted to the azimuth gearbox. A gear mounted to the potentiometer is driven by a pinion on the output shaft of the gearbox. The potentiometer is mechanically set at the one-half travel position when the azimuth cable position is at zero degrees. The azimuth stow switch is a magnetic proximity switch mounted in the az platform. The limits are controlled by using inputs from the potentiometer and optical encoder together and are set in and controlled by the TracStar controller. The azimuth drive has the mechanical capability of ± 400° or ±200° from stow position.

8: Elevation Positioning System

Elevation Pivot Assembly

The elevation pivot assembly consists of two elevation drum assemblies pivoting between two clevis blades that house the high-tech, no-lubrication required, plastic bushings. No wear or maintenance is expected.

Elevation Gearbox

The elevation gearbox is a low backlash worm gearbox. The worm gear drive isolates any backlash in the motor drive from the system. In addition, since it is a 30:1 ratio, it will not back drive eliminating any need for a brake on the drive train. The motor drives the input worm via a quill/female hole and square key. The dual elevation drive shafts are driven with a square key. The elevation capstan is secured to the dual output shafts with a cap screw that clamps to the output shaft. The gearbox contains synthetic oil. Because of the design capacity of the gearbox, low rpm and comparative limited cycles experienced by the system, no wear or maintenance is expected.

Elevation Motor

The elevation drive motor is a 24V DC motor with integral spur gear train. The motor armature rotates at up to 4000 rpm causing a high frequency noise that will vary depending on the loading condition of the motor. An optical encoder is mounted to the other end of the motor output shaft to provide real time positional information to the TracStar controller. The maximum output speed is 133 rpm. The output shaft is a standard keyed shaft. The output torque capacity of the motor is rated for the operational wind load. Since the low backlash worm gear drive isolates the backlash from the motor, any backlash between the square key and motor gear train will never be seen by the reflector boresight. Any backlash at any of these points is of no consequence to the system performance. No maintenance or wear of the elevation motor is expected.

Elevation Roto-Lok Cable Drive

The patented azimuth Roto-Lok drive produces a drive system with zero backlash, high stiffness, no wear, no lubrication, and maximum reliability. The system consists of eight 1/16 9x17 stainless steel aircraft control cables, reverse-wrapped three times around the capstan with solid connections on one end and high force, Belleville springs on the other end occurring at the elevation cable termination block.

Four cables have the capacity to withstand an 80 mph wind load. The additional cables are used to provide increased stiffness and drive redundancy. ***If a cable becomes damaged during usage, merely cut off the cable and continue to use the positioner. You can replace the cable at your maintenance facility whenever time permits.***

The cables are sized to last the life of the positioner. No replacement from wear is expected. The springs package at one end will automatically compensate for any elongation of the cable. At installation, the Belleville springs are collapsed until no "air" is seen between the springs. You should check this condition yearly to monitor the slow settling of the cable strands.

Elevation Position Feedback

The elevation position feedback is produced by an electronic clinometer and encoder mounted on the output shaft of the motor. The clinometer has a resolution of 0.1 degrees with the accuracy/linearity of 1% of the 0-45° range and monotonic in the 45-90° range. The clinometer is rated for an outdoor environment. The encoder also provides precise feedback on the unit's position during operation. The limits are controlled by using inputs from the clinometer and optical encoder together and are set in and controlled by the TracStar controller. The clinometer is mounted on a bracket under the pol gear cover. The clinometer is covered with an aluminum cover to protect it from the mechanical damage and provide additional weather protection.

9: Polarization Feed and Drive Assembly

General

The feed assembly consists of the feed boom, feed housing, RF components and polarization drive. The feed boom is pivoted at the bottom of the reflector. The feed assembly is mounted to the feed boom.

Polarization Drive

The polarization drive motor is a 24DC gear motor. It is attached to the polarization gearbox. Polarization setting is accomplished by rotation of the reflector.

Polarization Gearbox

The azimuth gearbox is a worm gearbox. The worm gear drive isolates any backlash in the motor drive from the system. In addition, since it is a 30:1 ratio, it will not back drive, thus eliminating any need for a brake on the drive train. The gearbox contains synthetic oil. Because of the design capacity of the gearbox, low rpm, and comparative limited cycles experienced by the system, no wear or maintenance is expected.

Polarization Roto-Lok Cable Drive

The patented azimuth Roto-Lok drive produces a drive system with zero backlash, high stiffness, no wear, no lubrication, and maximum reliability. The system consists of two 1/16 9x17 stainless steel aircraft control cables, reverse-wrapped twice around the capstan with solid connections on one end and high force, Belleville springs on the other end occurring at the polarization spring block. One cable has the capacity to withstand an 80 mph wind load.

The additional cables are used to provide increased stiffness and drive redundancy. ***If a cable becomes damaged during usage, merely cut off the cable and continue to use the positioner. You can replace the cable at your maintenance facility whenever time permits.***

The cables are sized to last the life of the positioner. No replacement from wear is expected. The springs package at one end will automatically compensate for any elongation of the cable. At installation, the Belleville springs are collapsed until no "air" is seen between the springs. You should check this condition yearly to monitor the slow settling of the cable strands.

Polarization Position Feedback

The polarization position feedback is produced by the optical encoder mounted on the output shaft on the motor. The polarization stow and limit switch is mounted under the polarization platform and is accessible under the pol cover. The switch is fixed to a plate and is actuated by a rotation cam. The limits are controlled by using inputs from switches and optical encoder together and are set in and controlled by the TracStar controller. Pol stow is achieved by activating the stow switch mounted on the polarization cam. The polarization drive has the mechanical capability of ±75° or ±95°.

General

The TracStar MVS750 / AvL Model 750 iMoVSAT is constructed to require a minimum amount of regular maintenance.

The following 21-Point Check List should be undertaken on a regular basis and can be rectified in the field:

21 Point Check List

1. Any small chips on the reflector front surface should be cleaned, filled with aluminum-loaded car body filler, rubbed down, primed and touched in with two-pack polyurethane paint.
2. The feed horn should be checked for cracks or damage.

Azimuth:

3. Check for unusual noise in the azimuth bearing, azimuth gearbox, and azimuth motor
4. Run in azimuth and check for unusual noise in azimuth motor
5. Check position of azimuth drive cables on capstan at 0°# Az
6. Check drive cables for damage
7. Run both Az limits and observe cable tracking
8. Check for excessive backlash in gearbox
9. Inspect cable terminations
10. Inspect Az potentiometer

Elevation:

11. Check for unusual noise in elevation pivot bushings and elevation gearbox
12. Run in elevation and check for unusual noise in elevation motor
13. Run up to limit
14. Check tracking of elevation drive cables
15. Check drive cables for damage
16. Check for excessive backlash in gearbox

Polarization:

17. Check for unusual noise in polarization pivot bearings and polarization gearbox
18. Run in polarization and check for unusual noise in polarization motor

19. Check tracking of polarization drive cables
20. Check drive cables for damage
21. Check for excessive backlash in gearbox

Spare/Replacement Parts

Since no wear or maintenance is expected, only electrical parts are recommended as spares. These parts will not fail from activity, but may fail from environmental exposure.

Optional:

Description	**Manufacturer**	**Manufacturer's Part #**
Limit Switch	Omron	D2VW-5L2A-1HS
Potentiometer, 1k, 10T		Spectrol 01F8239
Proximity Switch		CDI PS811
Clinometer		Spectron 02110002-000
Spare Drive Cable Kit		AvL Technologies
Elevation Motor		Pittman GM9234E521
Azimuth Motor		Pittman GM9236E522
Polarization Motor		Pittman GM8724J199-R1

Data Sheets for TracStar Products

MVS750 SERIES
Mobile Broadband Satellite Communications

The MVS Series from TracStar allows non-skilled personnel to operate mobile Very Small Aperture Terminal (VSAT) satellite communications equipment enabling the user to access any broadband application over satellite.

The MVS Series antennas are typically owned and operated by:

- Corporations with remote or mobile office and monitoring applications
- Federal, state and local government agencies for law enforcement, emergency response and home-land security communications
- Military rapid deployment, SATCOM on the pause applications

With TracStar's MVS Series antennas, users enjoy the same reliable, secure, high-speed IP based data communications they are accustomed to in the office, while mobile. Users can get connected Anywhere/Anytime for applications such as:

- Secure, high-speed digital communications
- High-speed Internet access
- Voice and Fax communications
- Teleconferencing
- Wide area private network extension
- Video broadcasting

The MVS Series of auto-acquisition antennas feature:

- Automatic satellite acquisition with a single button push
- Rapid deployment and operation on every Ku-band satellite, worldwide
- Works with every satellite modem
- TracStar Technology eliminates the need for -
  - Special test equipment for alignment
  - Computers or peripheral equipment to operate the antenna
  - Phone calls to network operators or service providers

Every antenna comes equipped with the following standard equipment:

- High precision and stiffness, low backlash drive system
- Built-in GPS and compass
- Built-in satellite receiver
- Built-in level sensor
- Automatic polarization alignment
- Safe and easy installation, no calibrations required

Convert Any Vehicle to a Mobile Wireless Broadband Hot-Spot

TracStar SYSTEMS

Broadband Anywhere - Anytime

MOBILE WIRELESS BROADBAND

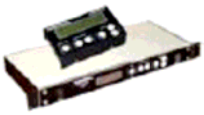
HIGH SPEED DATA - INTERNET - VOIP - FAX - VIDEO

MVS 750 / 750P Specifications

Mobile Satellite Link
The MVS750 will consist from stowed to automatically locked-on in a few minutes. The simple push of a button will put the unit in either mode. There are no external computers or other devices needed to operate the antenna. Serial communications are available including a GPS string for satellite modems.

Ease of Deployment
Easily configurable into any mobile environment, the MVS750 is ready to deploy anywhere. The base is designed to accommodate flat roof or rack mount vehicles. The antenna automatically compensates for sloped surfaces up to 10 degrees.

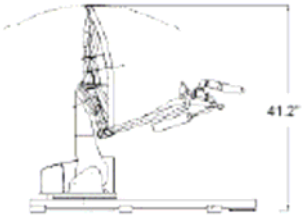
OPTIONS



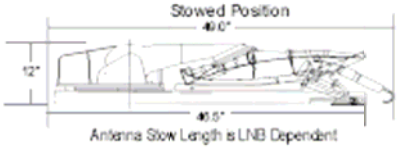
Control Panel
TracStar's One Touch Go and Slew technology maximizes ease of deployment. The menu driven control panel comes in a portable handheld unit or a 1U rack mount panel. The controller is used for standard operation, or for configuring the antenna for worldwide operation.

Portability MVS750P
The MVS 750P edition provides a rugged, portable container for a shippable and highly flexible rapid deployment requirement. Quick removal of the cover allows full access to a ready-to-deploy antenna.

General Use Position

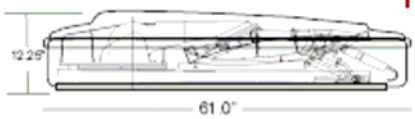


Stowed Position



Antenna Stow Length is LNB Dependent

MVS 750 Antenna POD



Reflector

Size	75cm Ku-band elliptical (89 cm wide x 62 cm high)
Mount	3-Axis: Polarization over Elevation over Azimuth
Polarization	Linear, Co or Cross-Polarized

Travel

Azimuth	400° or ± 200° from Stow Position
Elevation -Operational	0-65° (+) stow position
Polarization	±65°

Travel Velocity

Slewing/Deploying	Azimuth	10°/second
	Elevation	5°/second
Manual Jog		1.0° or 0.2°/second

Electrical Interface

RF	75Ω Tx / Rx Type F Connector (50Ω option)	Antenna only. Does not include RF or base band equipment.
Interfacility Link	30 ft. (ea. RG6 Coax, 1 Data Cable	
Motors	24VDC Variable Speed	
Controller (1U) / Power Supply	50/60Hz, 110/220VAC, Single Phase	
Power Consumption – Motors Active	250 Watts	
Power Consumption – Idle	20 Watts	

Antenna Characteristics

	Receive	Transmit
Frequency	11.7-12.75 GHz	13.75-14.5 GHz
Gain (± 2dBi)	37.8 dBi @ 11.95Ghz	39.3 dBi @ 14.25Ghz
VSWR		1.30:1
Beam width in Orbital Arc (degrees)		
-3dB	2.0 degrees @ 12.0Ghz	1.6 degrees @ 14.3Ghz
Antenna Noise Temperature @ 30° El		50°K
Polarization	Linear, Cross-pol Standard, Co-pol optional	
Sidelobe Envelope (Tx Co-Pol, Major Axis)		
	1.8° < θ <2.6° 29-25 Log θ dBi	
	2.6° < θ <26.3° -3.5 dBi	
	26.3° < θ <48° 32-25 Log θ dBi	
	48° < θ <180° -10 (Typical) dBi	

Physical Data

Approximate Weight (w/o BUC/LNB)	92 lbs
Max. Length with IFL Cables Connected	53 inches
Height	
Stowed	10.5 in Cross-pol, 12.5 in Co-pol
Deployed	42 inches
Case Dimensions	55"W x 43.5"D x 20"H
Approximate Case Weight w/o antenna (Hardigg case)	115 lbs

Antenna Controller

One button operation automatic satellite acquisition with integrated GPS/Compass/Level Sensors and user configurable satellite selection

Portable Power Supply/Display Unit

Weight: Power Supply (c ϵ Approved) / Display Only	4.5 lbs / 5 lbs.
Dimensions	Power Supply - 9"W x 10.25"D x 2.5"H
	Display - 5½"W x 3¼"D x 1-3/8"H

Rack Mount (1U)

Weight	4.5 lbs
Dimensions (inches)	19"W x 8.0"D x 1.75"H

Environmental

MVS750 - Wind	
Survival - Stowed	125 mph
Operational	60 mph at 60° F
MVS750P – Wind	
Operational	30 mph gusting to 45mph
Temperature	
Operational	-20°F to 125°F
Storage	-30°F to 150°F

Specifications are subject to change without notice

CE

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MVS960 SERIES
Mobile Broadband Satellite Communications

The MVS Series from TracStar allows non-skilled personnel to operate mobile Very Small Aperture Terminal (VSAT) satellite communications equipment enabling the user to access any broadband application over satellite.

The MVS Series antennas are typically owned and operated by:

- Corporations with remote or mobile office and monitoring applications
- Federal, state and local government agencies for law enforcement, emergency response and homeland security communications
- Military rapid deployment, SATCOM on the pause applications

With TracStar's MVS Series antennas, users enjoy the same reliable, secure, high-speed IP based data communications they are accustomed to in the office, while mobile. Users can get connected *Anywhere/Anytime* for applications such as:

- Secure, high-speed digital communications
- High-speed Internet access
- Voice and Fax communications
- Teleconferencing
- Wide area private network extension
- Video broadcasting

Convert Any Vehicle to a Mobile Wireless Broadband Hot-Spot

The MVS Series of auto-acquisition antennas feature:

- Automatic satellite acquisition with a single button push
- Rapid deployment and operation on every Ku-band satellite, worldwide
- Works with every satellite modem
- TracStar Technology eliminates the need for -
  - Special test equipment for antenna alignment
  - Computers or peripheral equipment to operate the antenna
  - Phone calls to network operators or service providers

Every antenna comes equipped with the following standard equipment:

- High precision and stiffness, low backlash drive system
- Built-in GPS and compass
- Built-in satellite receiver
- Built-in level compensation
- Automatic polarization alignment
- Safe and easy installation, no calibrations required

TracStar SYSTEMS

Broadband Anywhere - Anytime

MOBILE WIRELESS BROADBAND

HIGH SPEED DATA - INTERNET - VOIP - FAX – VIDEO

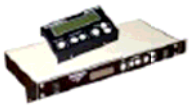
MVS960/960P Specifications

Mobile Satellite Link

The MVS960 will convert from stowed to automatically locked-on in a few minutes. The simple push of a button will put the unit in either mode. There are no external computers or other devices needed to operate the antenna. Serial communications are available including a GPS string for satellite modems.

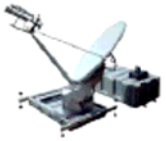
Mobile Satellite Link

Easily configurable into any mobile environment, the MVS960 is ready to deploy anywhere. The base is designed to accommodate flat roof or rack mount vehicles. The antenna automatically compensates for sloped surfaces up to 10 degrees.



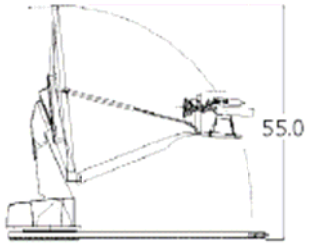
Control Panel

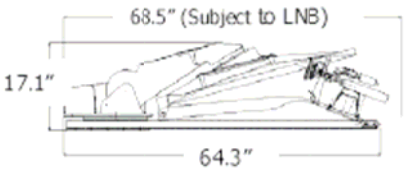
TracStar's One Touch Go and Stow technology maximizes ease of deployment. The menu driven control panel comes in a portable unit or a 1U rack mount panel for systems level configurations. Panel may be used for standard operation or performing custom configurations.



Portability MVS960P

The MVS 960P solution provides a rugged, portable container for a shippable and highly flexible rapid deployment requirement. Quick removal of the cover allows full access to a ready-to-deploy antenna.





CE

Reflector

Size	96cm Ku-band round
Mount	3 Axis Polarization over Elevation over Azimuth
Polarization	Rotation of Reflector/Feed System about bore sight

Travel

Azimuth	400° or ± 200° from Stow Position
Elevation -Operational	0-65° (+) stow position
Polarization	±65° or ± 95°

Travel Velocity

Slewing/Deploying	Azimuth	10°/second
	Elevation	5°/second
Manual Jog		1.0° or 0.2°/second

Electrical Interface

RF		75Ω Tx / Rx Type F Connector
Interfacility Link		30 ft 2ea. RG6 Coax, 1 Data Cable
Motors		24VDC Variable Speed w/Optical Encoders
Controller (1U) / Power Supply		50/60Hz, 110/220VAC, Single Phase
Power Consumption – Motors Active		300 Watts
Power Consumption – Motors Idle		20 Watts

Antenna only. Does not include RF or base band equipment.

Antenna Characteristics

	Receive	Transmit
Frequency	10.70-12.75 GHz	13.75-14.5 GHz
Gain (± 2dB) Midband	39.7 dB @ 11.95 GHz	41.2 dB
Beamwidth in Orbital Arc (degrees)		
-3dB	1.8 @ 12GHz	1.5 @ 14.3 GHz
Antenna Noise Temperature	10° Elevation Angle	53°K
	20° Elevation Angle	39°K
	30° Elevation Angle	32°K
Antenna Cross-Polarization		≥30dB in 1 dB Contour
Sidelobe Envelope (Tx, Co-Pol, dBi)		
	1.8°<θ<20°	29-25Log θ
	20°<θ<26.3°	-3.5
	26.3°<θ<48°	32-25Log θ
	48°<θ<180°	-10 (Typical)
VSWR		1.3:1 Max
Isolation	35dB Min	70dB Min
Feed Interface	WR75 cover Flange (UBR120)	WR75 cover Flange (UBR120)

Physical Data

Approximate Weight (w/o BUC / LNB)		100lbs
Max Length w/RL Cables Connected		68.3"
Height		
Stowed		17.1" – 15.25" Option
Deployed		55.0"
Case Weight / Dimensions	Pedestal Case	170 lbs. / 43.0"L x 28.5"W x 20.5"H
	Reflector Case	126 lbs. / 42.75"L x 42.0"W x 25.5"H

Antenna Controller

One button operation automatic satellite acquisition with integrated GPS/Compass/Level Sensors and user configurable satellite selection.

Portable Power Supply/Display Unit

Weight	Power Supply (€ Approved) – 4.5 lbs / Display Unit - 0.5 lbs	
Dimensions	Power Supply – 9"W x 10.25"D x 2.5"H	
	Display Unit – 5 ½"W x 3 ½"D x 1-3/8"H	

Rack Mount (1U)

Weight	4.5 lbs
Dimensions	19.0"W x 8.0"D x 1.75"H

Environmental

MVS960 - Wind	
Survival Stowed	125 mph
Operational	60 mph @ 60° F
MVS960P – Wind	
Operational	30mph gusting to 45mph
Temperature	
Operational	-20°F to 125°F
Storage	-30°F to 125°F

Specifications are subject to change without notice

TracStar Systems, Inc. • 2400 N. Orange Blossom Trail • Orlando, FL 32804
407.650.9054 • FAX 407.650.9086
www.tracstar.net sales@tracstar.net

TracStar SYSTEMS

MVS1200 SERIES
Mobile Broadband Satellite Communications

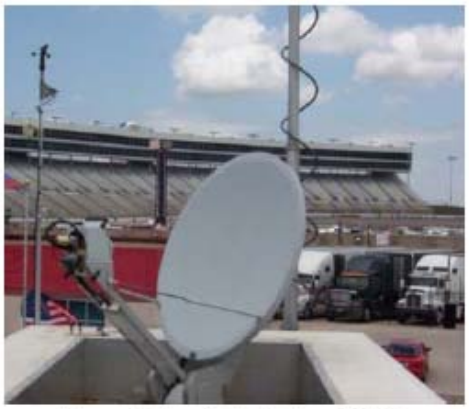
The MVS Series from TracStar allows non-skilled personnel to operate mobile Very Small Aperture Terminal (VSAT) satellite communications equipment enabling the user to access any broadband application over satellite.

The MVS Series antennas are typically owned and operated by:

- Corporations with remote or mobile office and monitoring applications
- Federal, state and local government agencies for law enforcement, emergency response and home-land security communications
- Military rapid deployment, SATCOM on the pause applications

With TracStar's MVS Series antennas, users enjoy the same reliable, secure, high-speed IP based data communications they are accustomed to in the office, while mobile. Users can get connected *Anywhere/Anytime* for applications such as:

- Secure, high-speed digital communications
- High-speed Internet access
- Voice and Fax communications
- Teleconferencing
- Wide area private network extension
- Video broadcasting



Convert Any Vehicle to a Mobile Wireless Broadband Hot-Spot

The MVS Series of auto-acquisition antennas feature:

- Automatic satellite acquisition with a single button push
- Rapid deployment and operation on every Ku-band satellite, worldwide
- Works with every satellite modem
- TracStar Technology *eliminates* the need for -
  - Special test equipment for antenna alignment
  - Computers or peripheral equipment to operate the antenna
  - Phone calls to network operators or service providers

Every antenna comes equipped with the following standard equipment:

- High precision and stiffness, low backlash drive system
- Built-in GPS and compass
- Built-in satellite receiver
- Built-in level compensation
- Automatic polarization alignment
- Safe and easy installation, no calibrations required

TracStar
Broadband Anywhere - Anytime

MOBILE WIRELESS BROADBAND
HIGH SPEED DATA - INTERNET - VOIP - FAX - VIDEO

MVS 1200 / 1200P Specifications

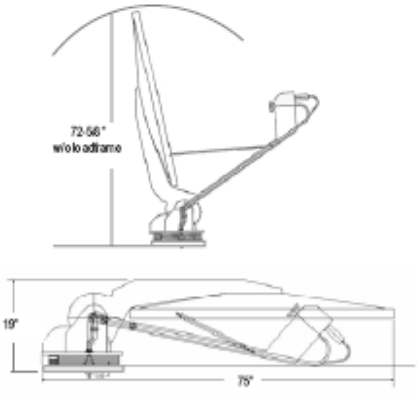
Mobile Satellite Link
The MVS1200 will connect from stowed to automatically locked-on in a few minutes. The simple push of a button will put the unit in either mode. There are no external computers or other devices needed to operate the antenna. Serial communications are available including a GPS string for satellite modems.

Ease of Deployment
Easily configurable into any mobile environment, the MVS1200 is ready to deploy anywhere. The base is designed to accommodate flat roof or rack mount vehicles. The antenna automatically compensates for sloped surfaces up to 10 degrees.

OPTIONS

Control Panel
TracStar's One Touch Go and Stow technology maximizes ease of deployment. The menu driven control panel comes in a portable hand-held unit or a 1U rack mount panel. The controller is used for standard operation, or for configuring the antenna for worldwide operation.

Portability MVS1200P2
The MVS1200P2 solution provides a rugged 2-piece reflector, with a portable container for a shippable and highly flexible rapid deployment requirement. Quick assembly of the reflector allows full access to a ready-to-deploy antenna in minutes.



*Loadframe is used for mounting antenna to rooftops to distribute weight across a greater area and provide additional structural integrity to the mount mechanism.

Reflector

Size	1.2M Prime Focus Offset
Offset Mount Geometry	Elevation over Azimuth
Polarization	Rotation of Feed

Travel

Azimuth	
Full Coverage	±200° Rotation from Stow Position
Elevation	
Standard Configuration	0-67° of reflector boresight
Polarization	±95°

Travel Velocity

Slewing/Deploying	2°/second
Peaking	5°/second
Manual Jog	1.0° or 0.2°/second

Electrical Interface

RF	75Ω Tx / Rx Type F Connector (50Ω option)	
Interfacility Link	30 ft. 2ea. RG6 Coax, 1 Control Cable	
Motors	28VDC Servo w/ Optical Encoder	
Controller (1U) / Power Supply	50/60Hz, 110/220VAC, Single Phase	*Antenna only. Does not include RF or base band equipment*
Power Consumption – Motors Active	250 Watts	
Power Consumption – Idle	30 Watts	

Antenna Characteristics

	Receive	Transmit
Frequency	10.95 – 12.75 Ghz	13.75 – 14.5Ghz
Gain (± 2dB)	41.5 dBi	43.0 dBi
	1.30:1	
Antenna Noise Temperature		
	20° EL	46°K
	30° EL	43°K
Antenna Cross-Polarization	Within 1dB contour	-30dB Max
	Any Angle off Axis	-25dB Max
Sidelobe Envelope Co-Pol, (dBi)		
	1.0° < Θ <20°	29-25 Log ΘdBi
	20° < Θ <26.3°	-3.5 dBi
	26.3° < Θ <48°	32-25 Log Θ dBi
	48° < Θ	-10 dBi (Typical)
VSWR		1.3:1 Max

Physical Data

Approximate Weight (w/o BUC/ LNB)	150 lbs (Est)
Max. Length with IFL Cables Connected	7'4"
Height	
Stowed (w/o loadframe)*	17"
Deployed (w/o loadframe) *	72.25"
Emergency Drive	Manual Handcrank of Az & El axis

Antenna Controller

One button operation automatic satellite acquisition with integrated GPS/Compass/Level Sensors and user configurable satellite selection

Portable Power Supply/Display Unit

Weight:	Power Supply/Display Unit	4.5 lbs / .5 lbs.
Dimensions	Power Supply (CE Approved)	9"Wx 10.25"Dx2.5"H
	Display Unit	5¼"W x 3¼"D x 1-3/8"H

Rack Mount (1U)

Weight	4.5 lbs
Dimensions (inches)	19"W x 8.0"D x 1.75"H

Environmental

Wind	
Survival - Stowed	100 mph
Survival - Operational	60 mph
Temperature	
Operational	-20°F to 125°F
Storage	-30°F to 140°F

Specifications are subject to change without notice

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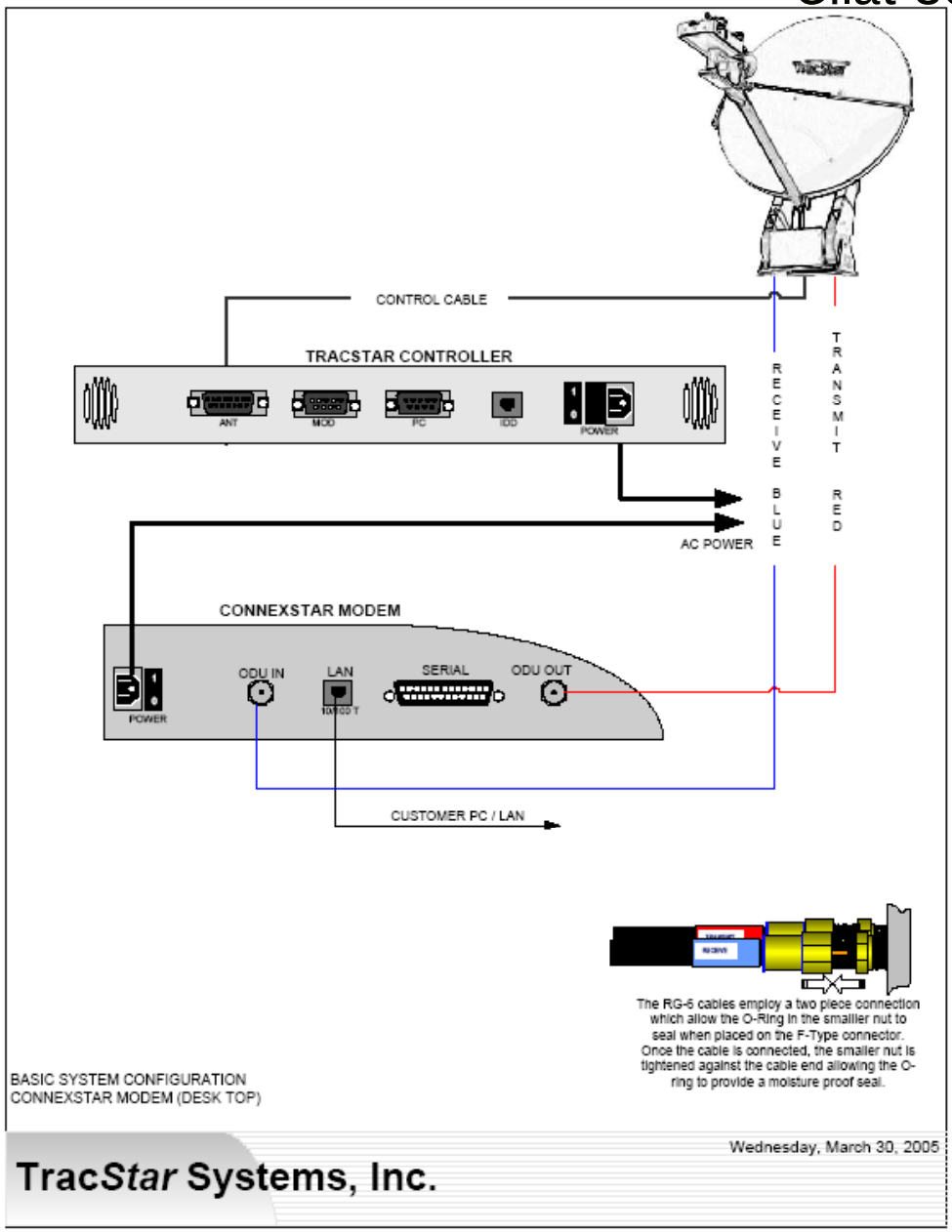
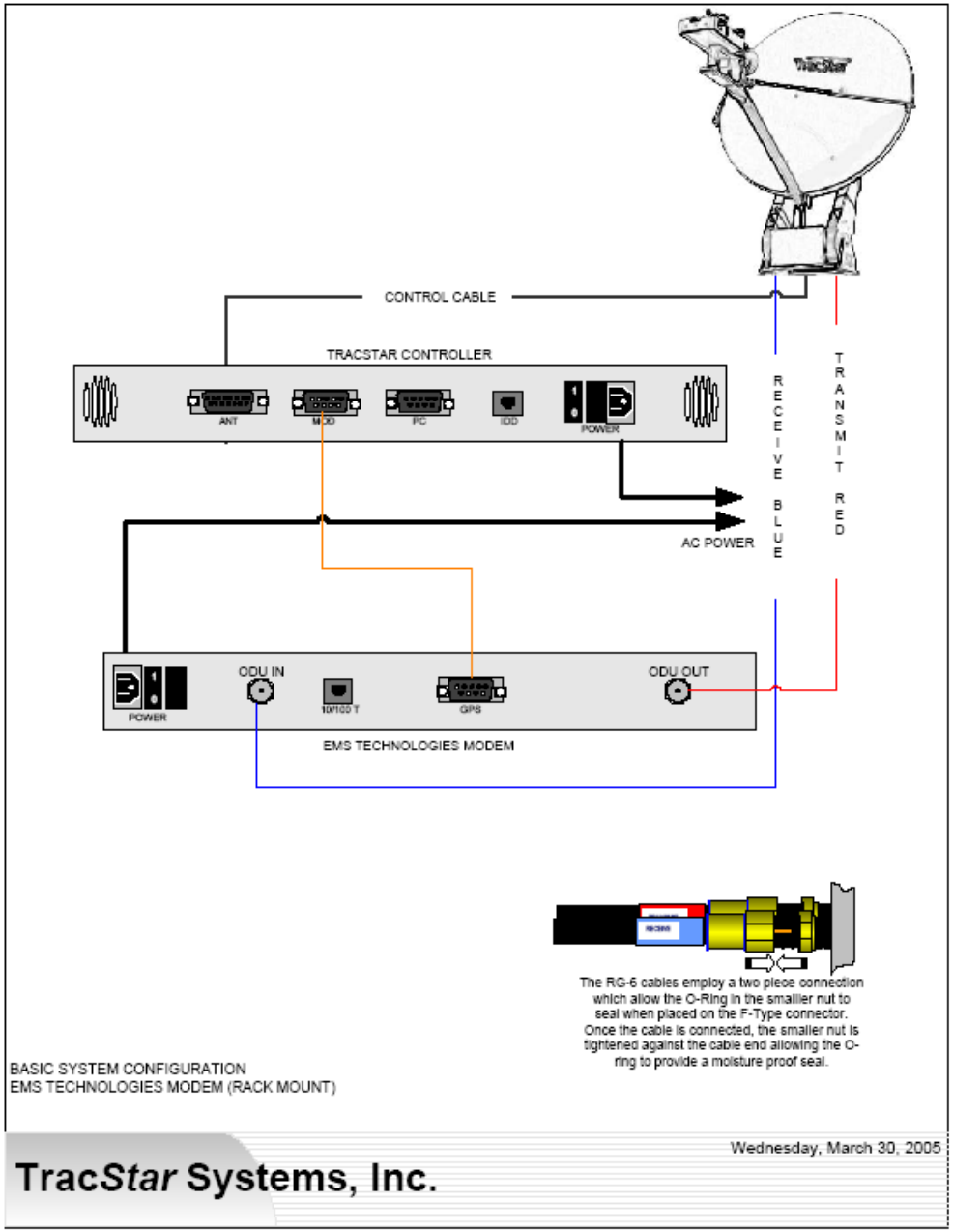
Modem and Voice Equipment Connection / Wiring Diagrams

NOTE: For VoIP follow EMS w/EdgeAccess connection information for the EdgeAccess Equipment

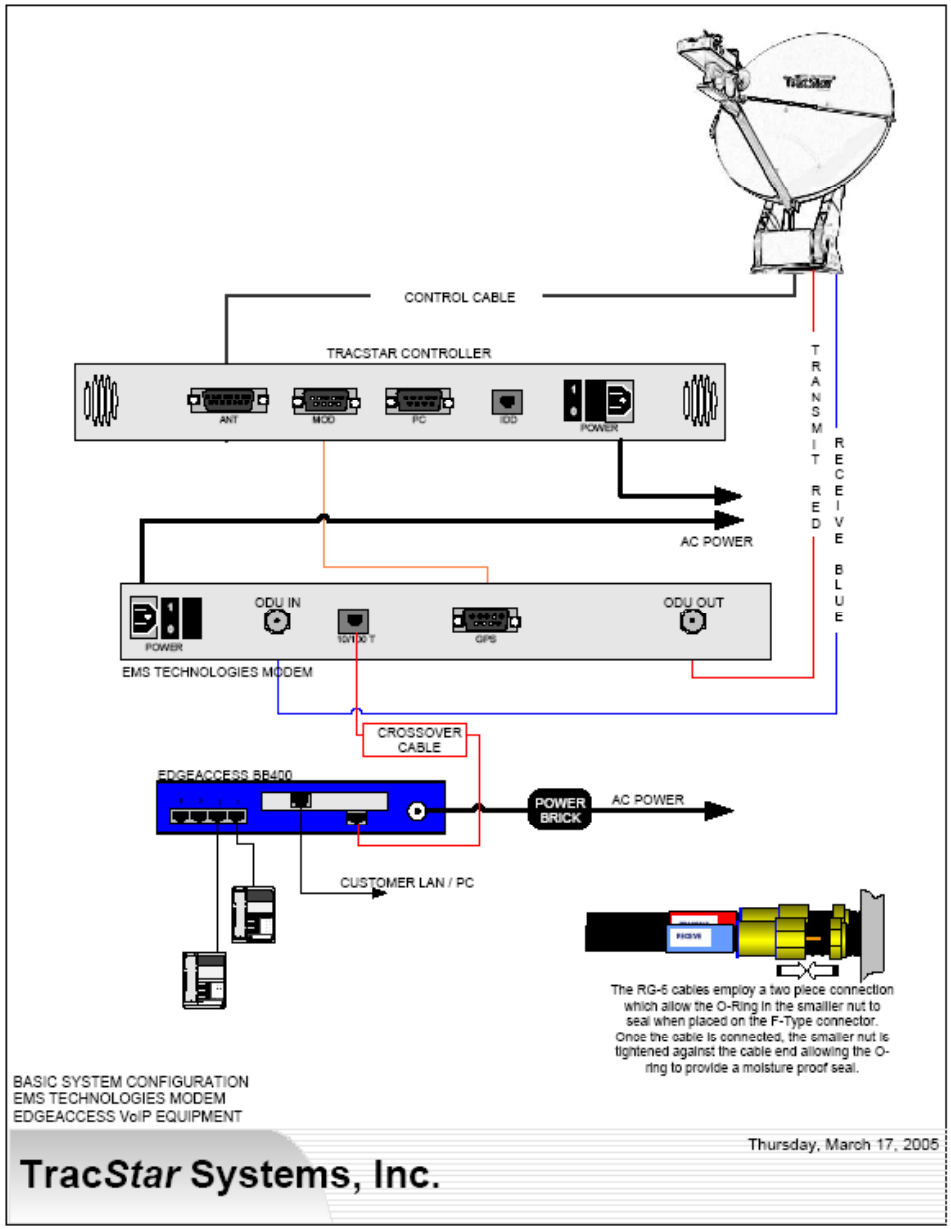
Gilat 360E Connection



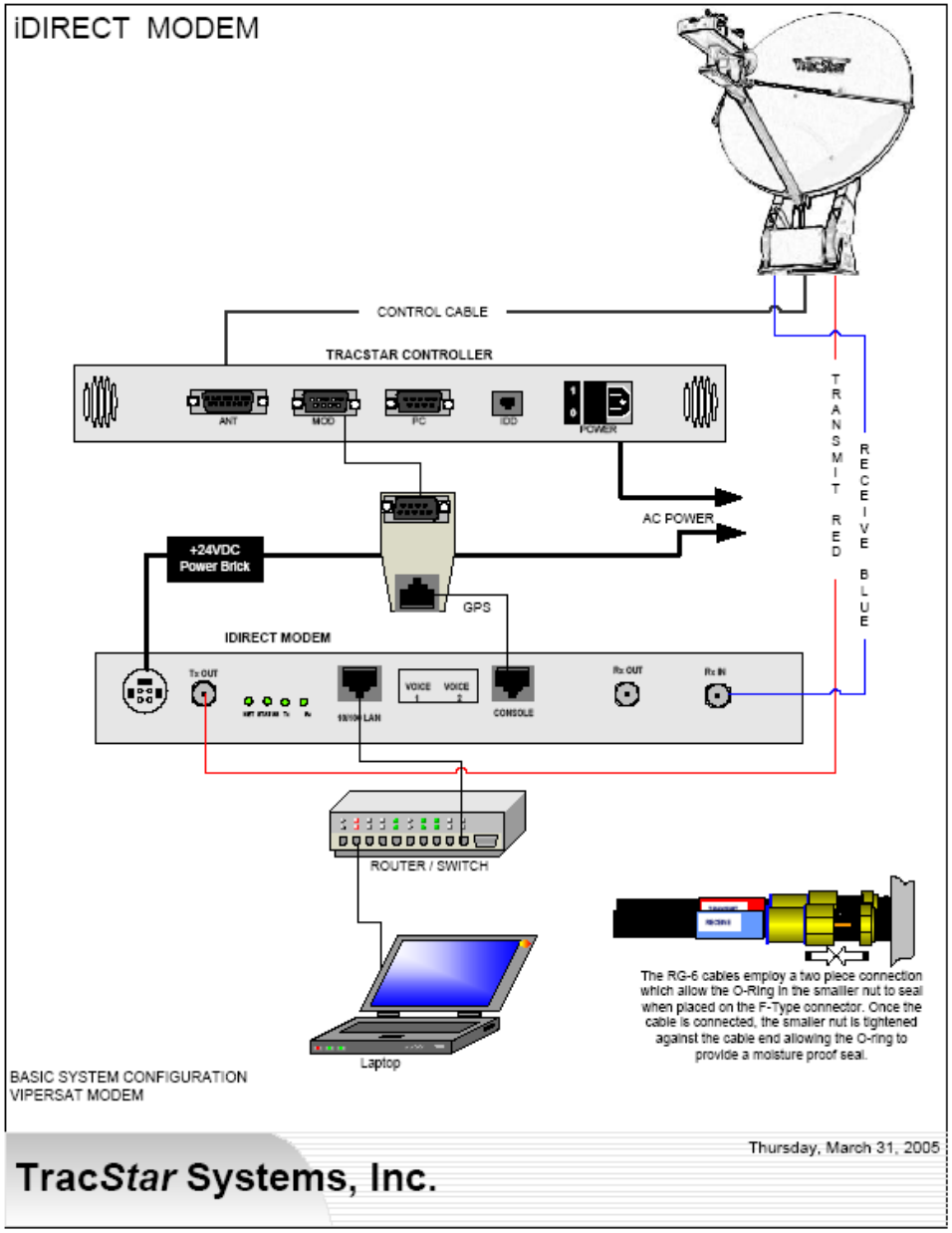
EMS Technologies Connection



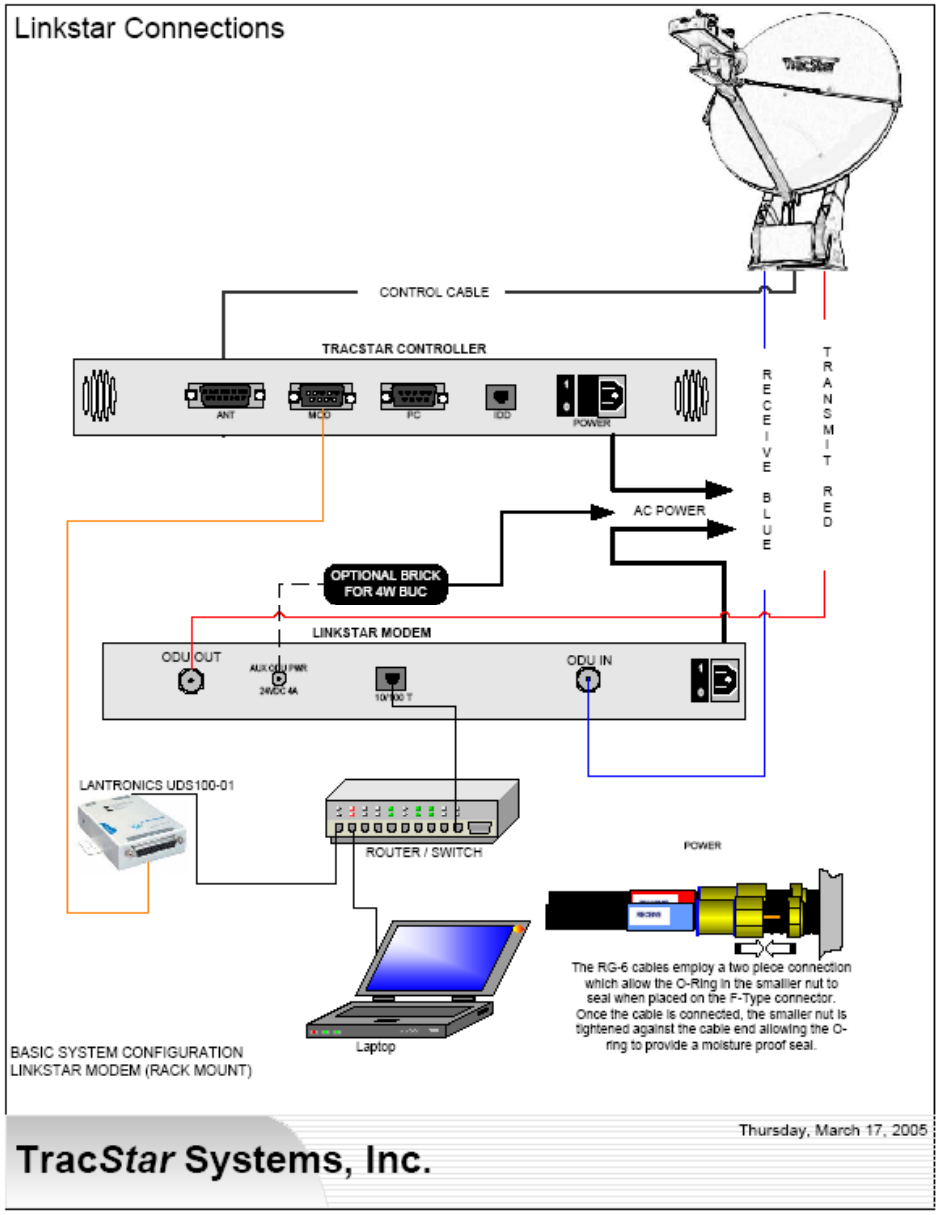
EMS with EdgeAccess Connection



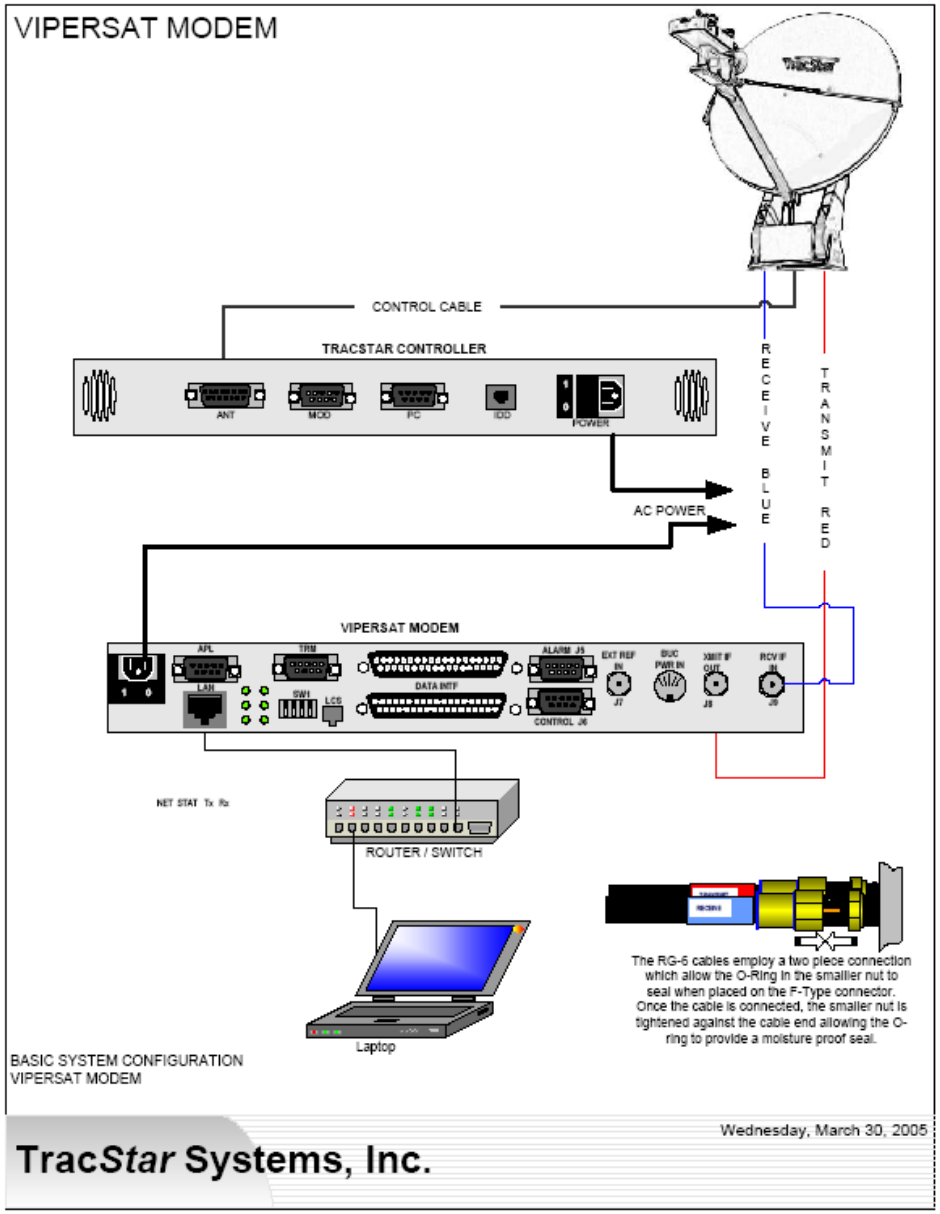
iDirect Connection



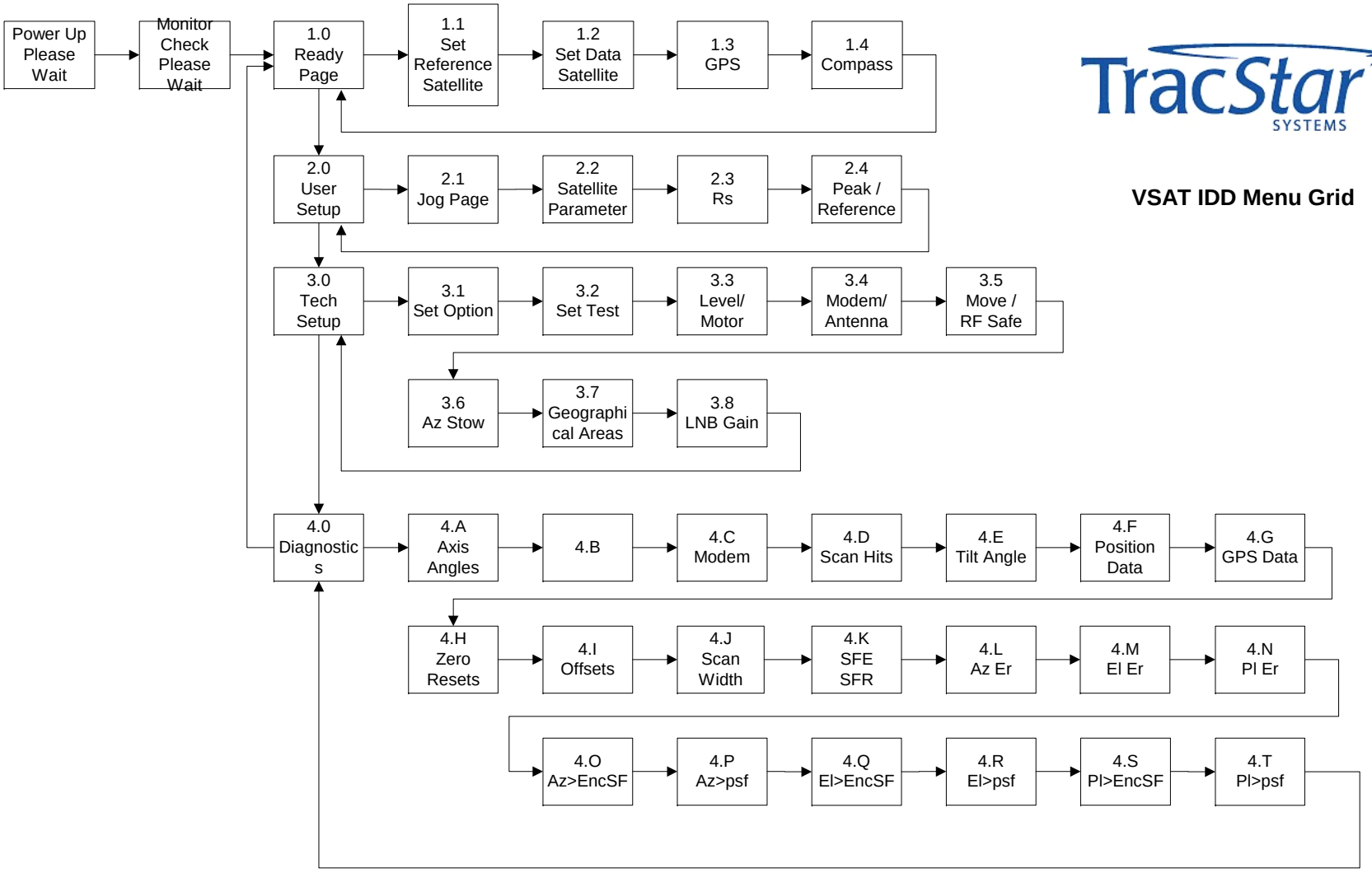
Linkstar Connection



Vipersat Connection



MENU GRID



VSAT IDD Menu Grid