**TO 31R4-2PSNII-ICL-I**
**TB 11-5825-291-10**
**EE174-AA-OPI-010/PSN-1 1**
**PCN 60000282100**

# SATELLITE SIGNALS NAVIGATION SETS

**AN/PSN-11**
NSN 5825-01-374-6643

and

**AN/PSN-11(V)1**
NSN 5825-01-395-3513

REVISED
15 SEPTEMBER 1995

## BASIC OPERATION

1. Turn unit on: ON/BRT key
2. Adjust screen backlighting: ON/BRT key plus up/down key for rapid change. Level display - use MENU key, STATUS.
3. Left/right arrow key moves cursor between fields and identifies changeable fields.
4. Up/down arrow key makes selections and changes contents of fields.
5. NUM LOCK key toggles the mode of the keypad: control or numeric. Numeric mode when N in lower right corner of page.
6. CLR key to re-enter numbers during numeric mode data entry.
7. On-line help: MENU key, HELP option, or left-arrow key and right-arrow key at the same time.
8. Keypad map: ON/BRT key and MENU key at the same time.
9. ZEROIZE: MARK key and NUM LOCK key at the same time.
10. Turn unit off: OFF key.

## PRE-MISSION

Press MENU key, select SETUP option to:

1. Operating mode: CONT. FIX, AVG, TIME, STBY 2dTNG, 3dTNG, RHRSL
2. Type of satellites to use: mixed, all-Y (default when keyed)
3. Coordinate system: MGRS-New, MGRS-Old, UTM/UPS, L/L-dm.. L/L-dms, BNG, ITMG
4. Distance units:
   - Metric (meters, km, km per hour)
   - English (feet, miles, miles per hour)
   - Naut (yards, nautical miles, knots)
5. Elevation units: meters, feet
6. Elevation reference: MSL, DTM
7. Angle units: Deg, Mil-μ
8 North reference: Mag, Grid, True
9. *Magnetic variation: Cal, Entr, Wp
10. Navigation display mode: SLO 2D FAST, 3D FAST, CUSTOM
11. Elevation hold mode enable: automatic, manual
12. Time reference: Zulu or Loc = Z±0000
13. Error display format: Figure of Merit (FOM) or distance
14. Datum: WGS-84 plus 51 other choices (reference horizontal data from map)

*AN/PSN-11 internal Magnetic Variation values are for 1995.

## PRE-MISSION (CONT)

15. Automatic off timer: 5 min  15 sec, 20 min, off
16. Serial port configuration: Standard, Instrum, Custom
17. HAVEQUICK: Off, On
18. IPPS: Off.  UTC, T-Mark
19. Automark: Mode (off, rpt, once), starting waypoint, start time and interval for storing automatic position marks.
20. Bullseye: 0FF  ON
21. Operator ID: WP000, enter ID
22. Approach:  08000 ft (range 1000-15,000 ft)

Press WP key to:

23. Enter, edit, copy, calculate, clear, or route waypoints

Press MENU key, select INIT option to:

24. Initialize position, time, date, direction, speed, user datum and crypto.

## CRYPTO KEY ENTRY VIA AN/CYZ-10 (SPECIAL ANCD)

1. Turn on the ANCD, read 'Radio/SOI/SUPERVISOR.'
2. Enter RADIO, read 'SEND/RECEIVE/DATABASE/SETUP/COM-SEC/TIME.'
3. Enter COMSEC.  read 'VG/LD/RV/AK/MK/VU.'
4. Enter LD, read 'Select TEK/KEK.'
5. Enter TEK.
6. Select the desired GPS key, then press ENTER.
7. Enter QUIT; read 'Connect ANCD TO RT ↓' - (DO NOT comply).
8. Press ↓, read 'Press LOAD on RT' - (DO NOT comply)
9. Turn the AN/PSN- 11 on, wait for self-test to complete.
10. Connect ANCD to the J1 port on the AN/PSN-11 - GPS key transfers automatically.
11. The ANCD reports: "1 Keys Transferred." The AN/PSN-I11 reports: "Key Loaded."
12. Disconnect ANCD from the J1 port on the AN/PSN- 11.

## OBTAINING A FIRST POSITION FIX

| ACTION | COMMENTS | REFERENCE |
|---|---|---|
| Turn the AN/ PSN-I I ON | Ensure the Power-On Self-Test completes with no faults. | 3.2 Turning ON/ OFI: |

| ACTION | COMMENTS | REFERENCE |
|---|---|---|
| Load crypto key if not already loaded | Check MENU (Second page). If CRYPTO is not displayed, load crypto key. | 3.6 Crypto Variable Operations 3.7.8 Crypto Key Initialization |
| Check all SETUP pages | SETUP pages should conform with operational mission. | 3.5 Setup and Mode Control |
| Initialize position, date, and time | The AN/PSN-I I will acquire and track satellites automatically; however, initializing will speed up the Time to First Fix. | 3.7 Initialization |
| Allow the AN/PSN-11 to track satellite signals . . | Allow the AN/PSN-I 1 to collect current almanac (Check Satellite Summary Page, POS key) and current key (Select CRYPTO on second page of MENU, then check Crypto Status Page), if they are not present | 4.2.4 Satellite Summary Page 3.6.2 Crypto Status Display |
| Check FOM or Position Error | A FOM of I is most desirable. You may have to select CONT mode to obtain a FOM of 1. FIX mode will also provide a valid position fix, but may not allow the FOM to decrease to 1 before switching to STBY. Always ensure the antenna has a clear view of the sky. | Table 3-6 or Quick Reference Guide |

**MISSION**

- Display operation status: MENU key, STATUS option
- Display current coordinates or change track mode: POS key
- Mark current position as a waypoint: MARK key

- Navigate to another position or access current NAV WP or RTE leg:
  NAV key

## MISSION OPERATIONS CHECKS

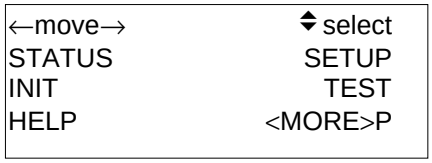
| INDICATION | ACTION | REFERENCE |
|---|---|---|
| High FOM/<br>Position Error | Ensure you are tracking 4 satellites. Check Satellite Summary Page (POS key) or Satellite Tracking Status Page (MENU).<br><br>Ensure the antenna is not masked. Move to position where antenna has clear view of the sky. If you cannot move and the antenna is masked by foliage, select the Dense Foliage function.<br>Ensure you are keyed and you have current key. Select CRYPTO on second page of MENU, then check Crypto Status Page. | 4.2.4 Satellite Summary Page<br><br>3.8.5 Satellite Tracking Status Page<br><br>4.4.9 Low Signal (Dense Foliage) Use<br><br>3.6.2 Crypto Status Display |
| Unexpected power off | Check Automatic-Off Timer (MENU SETUP)<br><br>Check for dead battery. If AN/PSN-11 will not power on at all, the battery Is dead. Replace it. | 3.5.7 and 3.5.7.2 Automatic-Off Timer<br><br>8.1.1.1 Power Battery Replacement |
| ON display sequence does not complete. AN/PSN- I1 shuts off when new battery is installed. | Press ON key repeatedly until AN/PSN- I stays on. If AN/PSN-l1 still does not turn ON, replace battery. | 8.1.1.1 Power Battery Replacement |

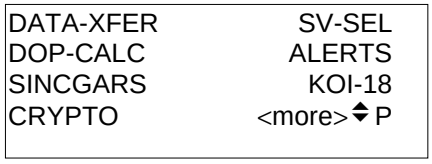
| INDICATION | ACTION | REFERENE |
|---|---|---|
| Obtaining a position fix takes too Long. | Initialize position date and time.<br><br>Ensure the antenna is not masked. Move to position where antenna has clear view of the sky. | 3.7 Initialization |
| AN,PSN-11 not tracking satellites | Ensure you are not in STBY, 2dTNG, 3dTNG, or RHRSL (MENU, SET-UP)<br><br>Ensure the antenna is not masked. Move to position where antenna has clear view of the sky.<br><br>If the AN/PSN- II has been in the CONT mode while masked, recycle power or select STBY and then FIX or CONT | 3.5.3 Selecting Operating Mode and Satellite Type |
| Position does not agree with map or other navigation sources. | Check for proper datum and spheroid (ellipsoid). | Table 3-9) or Quick Reference Guide |
| Navigation information does not agree with map or other navigation sources (Cont) | Ensure waypoint datum matches SETUP datum<br><br>Check coordinates system if using MGRS and second letter of 100,000 meter square designation is different. | 3.5.7 and 3.5 7.1 Datum Selection<br><br>3.5.4.1 Coordinate System |

| INDICATION | ACTION | REFERENCE |
|---|---|---|
| | Check for proper distance and velocity units (metric, English, or nautical) In SETUP. | 3.5 6.3.2 Selecting the Distance Units |
| Azimuth does not agree with other navigation sources. | Ensure MVAR type, direction, and value in SETUP matches your map or other navigation source.<br>Check for proper north reference (magnetic, grid, or true) | 3 5 5.1 Magnetic Variation Source<br><br>3.5.4.6 Selecting the North Reference |
| Elevation does not agree with map or other navigation sources | Check for proper elevation reference. MSL is normally used<br><br>Check to see if you are in elevation hold on POS display. Ensure you are tracking at least four satellites so that elevation can be calculated accurately. Select AUTOMATIC elevation hold in SETUP. | 3 5.4.4 Selecting the Elevation Reference<br><br>3.5.6.1 Elevation Hold Mode Enable |
| AN/PSN-11 will not compute ground speed, track, steering, time to go, minimum miss distance, or glide path deviation. | You may not be moving fast enough. You must move at least 0(.5 m/s (approx. 1 8 K/hr or 1<br><br>Ensure you are not in STBY In STBY. the AN/PSN-1 1 does not track satellites or compute navigation information. | 4 3 Navigation<br><br>mph).<br><br>3.5.3 Selecting Operating Mode and Satellite Type |

| INDICATION | ACTION | REFERENCE |
|---|---|---|
| Averaging counter will not increment | Ensure that the AN/ PSN- 1 has a good posi tion fix. The counter will not begin incrementing un- til 13 seconds after a posi- tion fix is obtained. | 4.4.1 Surveying |
| Multiple Symp- toms | Clear temporary receiver information faults (Receiv- er Version, Serial Port Xmit, Antenna and Power will not clear). | 3.8.8 Self-test Message Pages |

**MENU KEY:**




STATUS to bring up operation status displays.
SETUP to choose operating mode. SV-TYPE, POS format, units, magvar, ELHold, time and error format, datum. data port, automark, bullseye, operator ID, approach, and rehearsal.
INIT to initialize system data.
TEST to perform unit self-test.
HELP to bring up on-line help displays
DATA-XFR to initiate data transfer
SV-SEL to select/deselect satellites
DOP-CALC to calculate best SV i)OP
ALERTS to set up navigation alerts.
SINCGARS to load Time Fill data into a SINCGARS compatible radio
KO1-18 to load crypto key data via a KOI-18 COMSEC device.
CRYPTO: available only when crypto keys installed.

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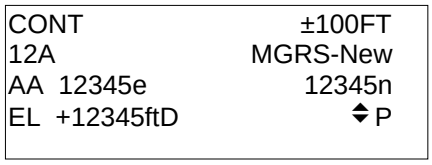
**POS KEY:**

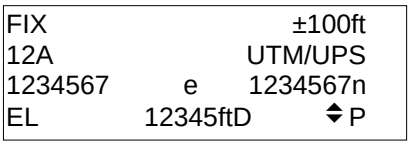
One of seven position formats: (BNG, ITMG not shown)
Position MGRS (Old or New)




Op mode & position error
Zone number & zone letter
Grid square & coordinates
Elevation

OR

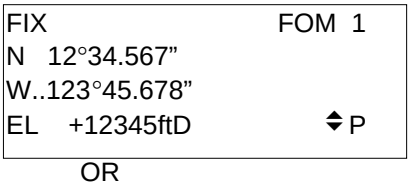
Position UTM/UPS




Op mode & position error
Zone number & zone letter
Coordinates
Elevation

OR

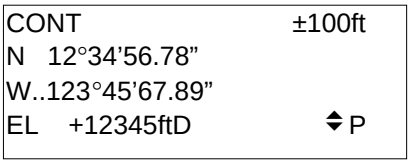
Position L/L-dm.




Op mode & FOM
Latitude
Longitude
Elevation

OR

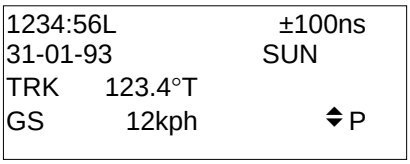
Position L/L-dm.




Op mode & position error
Latitude
Longitude
Elevation

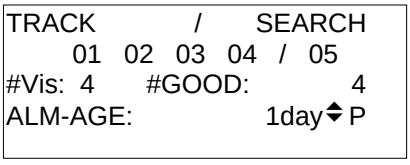
EL* indicates elevation hold mode may be entered.
ELh indicates In elevation hold mode.

Time, Date, Track, and Ground speed

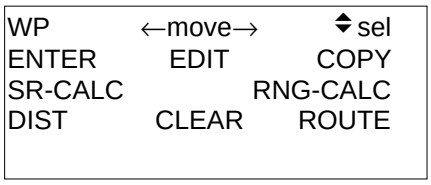



Time & time error
Date, day of week
Ground track
Ground speed

Tracking Summary



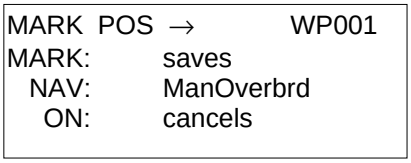

SVs tracked/SVs searched
SVs visible & SVs healthy
Almanac age




**WP KEY:**

ENTER to enter waypoints.
EDIT to modify or review waypoints.
COPY to one waypoint to another.
DIST to determine the distance between two waypoints.
SR-CALC to calculate the coordinates of a new waypoint using slant range.
RNG - CALC to calculate the coordinates of a new waypoint using range.
CLEAR to clear a waypoint or range of waypoints.
ROUTE to define mission routes.

**MARK KEY:**




MARK key marks current position as a waypoint or a Man Overboard (MOB).

**NAV KEY:**

Navigation setup page (shown In SLOW navigation mode).

Display mode, 2D FAST, 3D FAST, or CUSTOM
Destination (scrollable)

Nav Method, (scrollable) (CRS TO, CRS FROM, ROUTE, or APPROACH)

- SLOW and 2D FAST are 2D, 3D FAST is 3D, CUSTOM can be 2D or 3D navigation.
- DIRECT is from present position to destination.
- CRS TO is along an entered course to destination.
- CRS FROM is along an entered course from destination.
- ROUTE is along the legs of a defined route.
- APPROACH is along entered glide path to destination.

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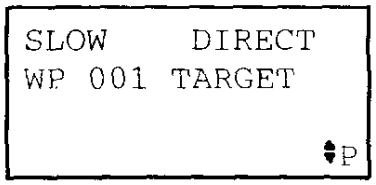
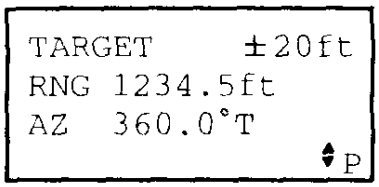
**NOTE:** All example navigation displays are for SLOW mode. The differences in 2D FAST and 3D FAST modes are explained near each example. CUSTOM mode is simply user-defined in CUSTOM NAV setup.

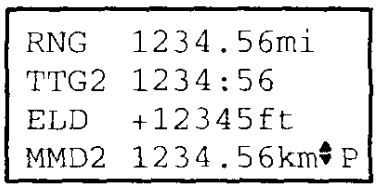
**DIRECT METHOD:**



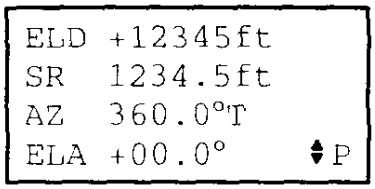

or 2D FAST, 3D FAST, CUSTOM Destination (Scrollable)




Waypoint label, error estimate
TRK and ground speed in 2D FAST, 3D FAST mode
STR in 2D FAST, 3D FAST mode

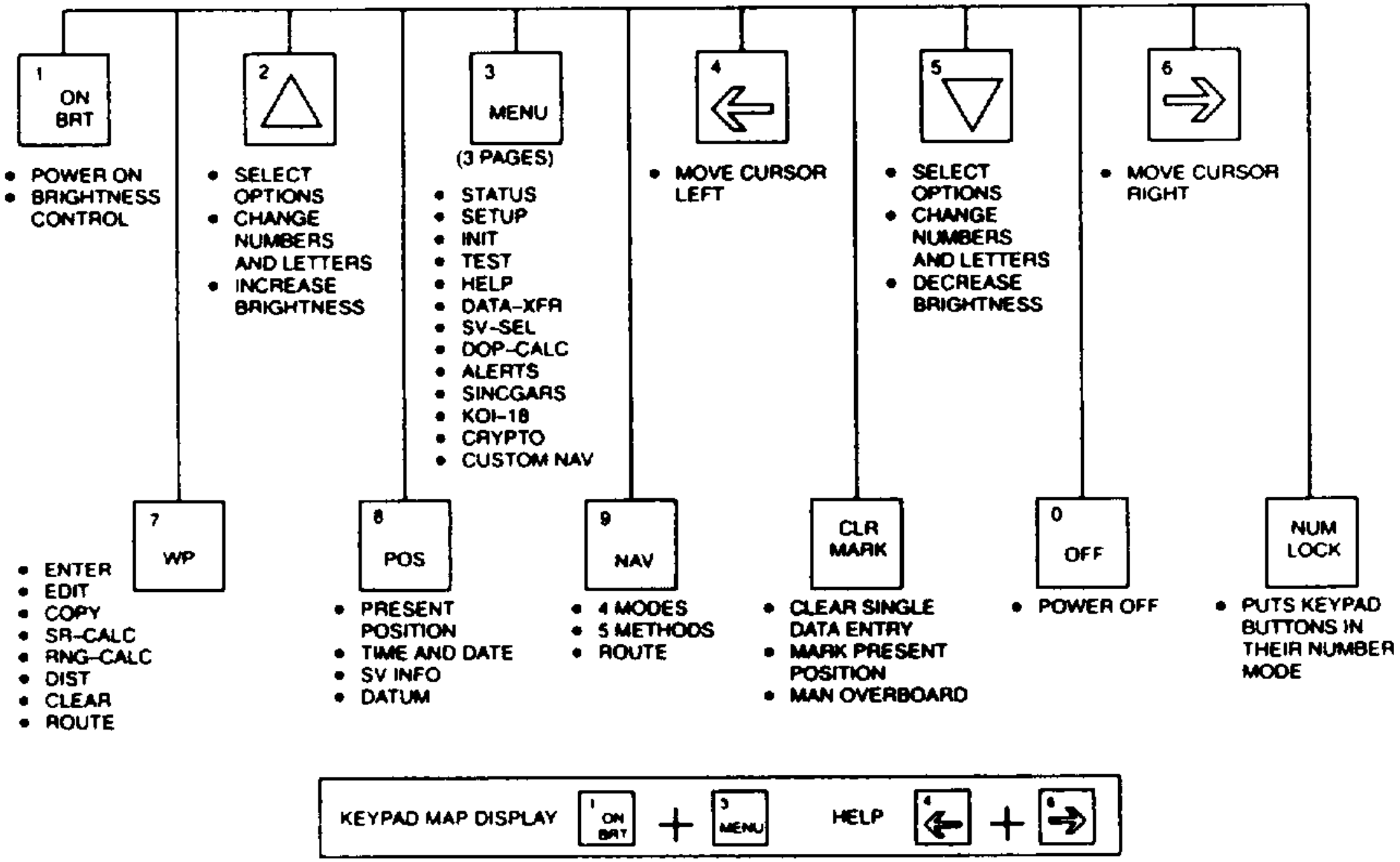



2D FAST, 3D FAST mode; not used in SLOW mode




Waypoint label, error estimate in 2D FAST, 3D FAST mode

# KEYPAD SUMMARY




KEYPAD MAP DISPLAY [1 ON BRT] + [3 MENU] HELP [4] + [6]

# KEYPAD SUMMARY

3 MENU (PAGE 1 OF 3)

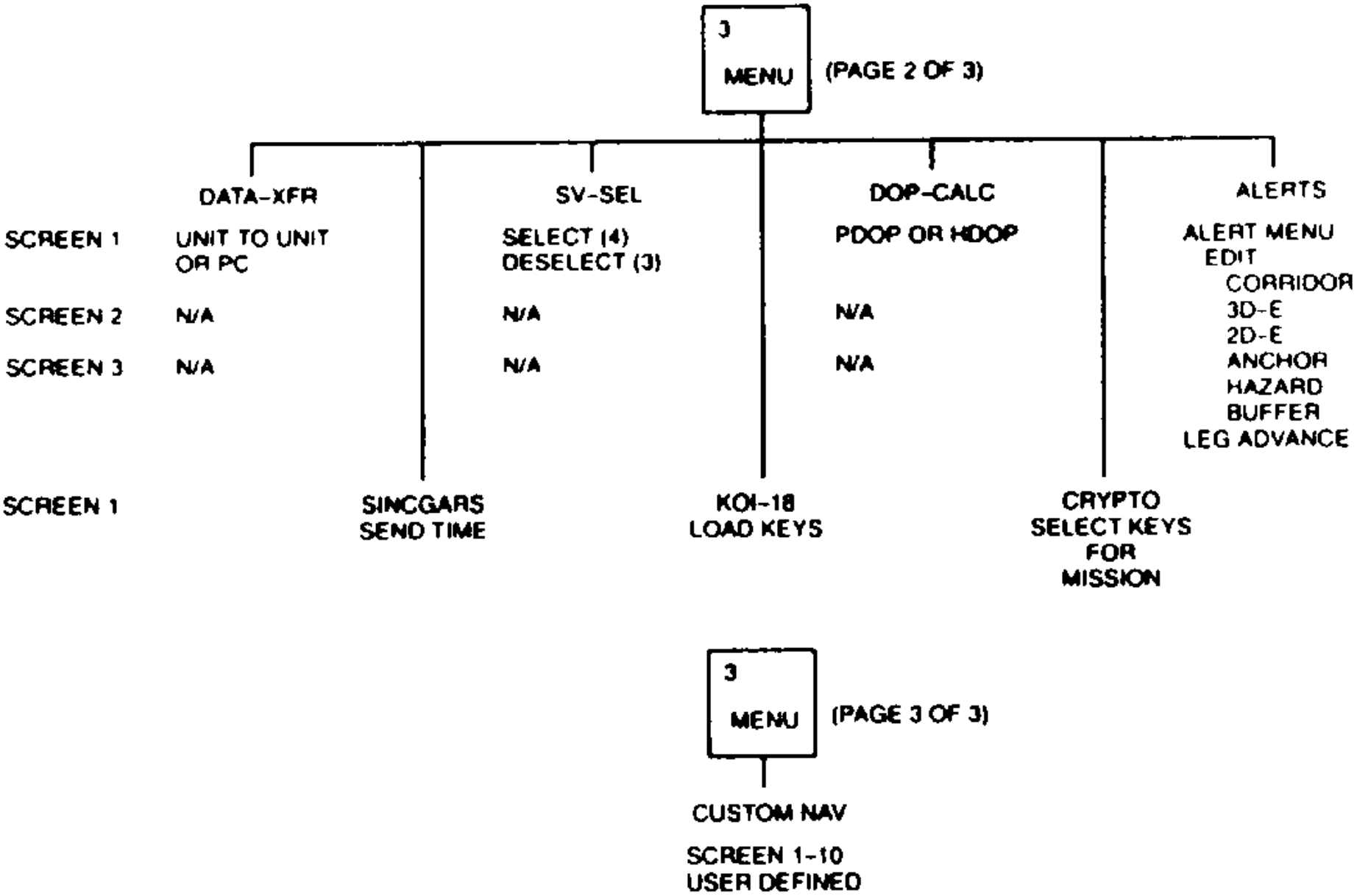
| STATUS | | SETUP | INIT |
|---|---|---|---|
| SCREEN 1 | SELF TEST<br>ANTENNA<br>POWER SOURCE | SETUP MODE CONT, FIX, AVG, TIME, STBY, 2dTNG, 3dTNG, RHRSL, SV TYPE MIXED, ALL-Y | POS OR PRECISE<br>COORDINATES ELEVATION |
| SCREEN 2 | BATTERY TYPE<br>TIME LEFT | SETUP UNITS<br>COORDINATE SYSTEMS (7) DISTANCE UNITS (3)<br>ELEVATION UNITS (2) REFERENCE (2)<br>ANGLE UNITS (2) REFERENCE (3) | DATE AND TIME |
| SCREEN 3 | INTERFACES:<br>DIFF GPS<br>1 PPS–IN<br>SERIAL<br>BRIGHTNESS | SETUP MAGVAR:<br>TYPES (3) | TRACK AND GROUND SPEED |
| SCREEN 4 | SV's BEING TRACKED OR SEARCHED | SETUP:<br>ELEVATION HOLD (2)<br>TIME (2)<br>ERROR (2) | USER LOCAL DATUM #1 OR #2<br>dA, dF, dE4<br>MGRS ADVANCE |
| SCREEN 5 | VISIBLE SV HEALTH AND LOCATION (UP TO 4 PAGES) | SETUP DATUMS (52)<br>AUTOMATIC–OFF TIMER (4) | USER LOCAL DATUM #1 OR #2<br>dX, dY, dZ |
| SCREEN 6 | SV COMMO MESSAGES | SETUP INTERFACES:<br>SERIAL DATA PORT (3)<br>HAVEQUICK (2)<br>1 PPS (3) | CRYPTO KEY ENTRY<br>(WHEN NO KEYS LOADED)<br>HEXIDECIMAL<br>DECIMAL |
| SCREEN 7 | FAULT CODES (DEPOT USE) | SETUP AUTOMARK | N/A |
| SCREEN 8 | CONFIG STATUS | SET BULLSEYE | N/A |
| SCREEN 9 | N/A | SETUP OPERATOR ID | N/A |
| SCREEN 10 | N/A | SETUP APPROACH (MUST HAVE 3D APPROACH ENABLED) | N/A |
| SCREEN 11 | N/A | SETUP REHEARSAL | N/A |

TEST
USER COMMANDED TEST

HELP
13 PAGES

DATA OBTAINED FROM DEFENSE MAPPING AGENCY (DMA)

# KEYPAD SUMMARY

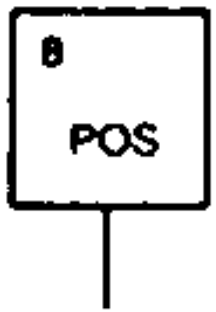


# KEYPAD SUMMARY

| | ENTER | EDIT | COPY | SR-CALC |
|---|---|---|---|---|
| SCREEN 1 | WP # & NAME<br>COORDINATES<br>ELEVATION | WP # & NAME<br>COORDINATES<br>ELEVATION | COPY WP FROM<br>ENTER OR EDIT<br>FILES | COMPUTE TARGET POSITION<br>USING SLANT RANGE +<br>AZ, ELA OR EL |
| SCREEN 2 | DATUM<br>MAGVAR<br>COORDINATE<br>SYSTEM | DATUM<br>MAGVAR<br>COORDINATE<br>SYSTEM | N/A | GRID PAGE |
| SCREEN 3 | N/A | N/A | N/A | STORE PAGE |

| | RNG-CALC | DIST | CLEAR | ROUTE |
|---|---|---|---|---|
| SCREEN 1 | COMPUTE TARGET POSITION<br>USING HORIZONTAL RNG +<br>AZ, EL OR ELA | COMPUTE RNG,<br>AZ & ELA BETWEEN<br>2 WAYPOINTS | ANY STORED<br>WAYPOINTS | ROUTE MENU: ENTER, EDIT,<br>COPY, OR CLEAR. CONNECT<br>UP TO 25 LEGS (26 WAY-<br>POINTS) TO FORM A ROUTE<br>(15 ROUTES MAX) |
| SCREEN 2 | GRID PAGE | N/A | N/A | OBSERVE ROUTE<br>SUMMARY |
| SCREEN 3 | STORE PAGE | N/A | N/A | N/A |

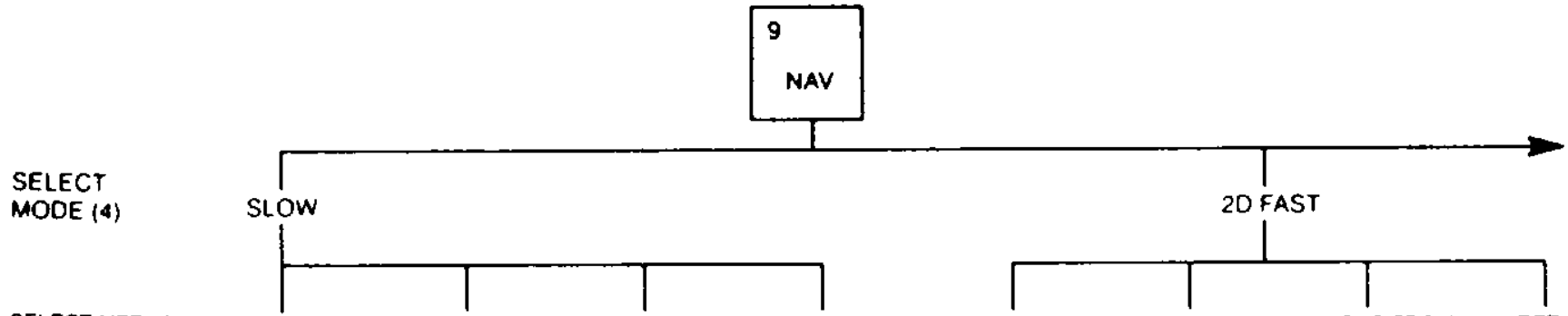
# KEYPAD SUMMARY




*HOLD POS DOWN FOR 4 SEC. RCV MODE WILL SWITCH TO STBY IF IN STBY, RCV MODE WILL SWITCH TO PREVIOUS RCV MODE.

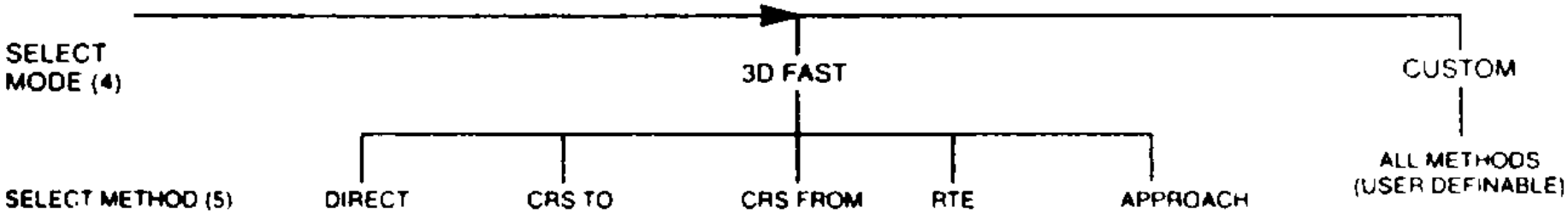
| | | |
|---|---|---|
| SCREEN 1 | MODE<br>PRESENT POSITION<br>COORDINATES AND ELEVATION | ERROR/MSF/ALERTS |
| SCREEN 2 | TIME<br>DATE AND DAY<br>TRACK, AZIMUTH<br>GROUND SPEED | ERROR/MSF/ALERTS |
| SCREEN 3 | SV's TRACK AND SEARCH<br>SV ID#<br>#SV VISIBLE AND HEALTHY<br>ALMANAC AGE | |
| SCREEN 4 | DATUM<br>MAGVAR<br>OPERATOR ID | |

# KEYPAD SUMMARY




| SELECT MODE (4) | SLOW | | | | 2D FAST | | | |
|---|---|---|---|---|---|---|---|---|
| SELECT METHOD (4) | DIRECT | CRS TO | CRS FROM | RTE | DIRECT | CRS TO | CRS FROM | RTE |
| SCREEN 1 | WP #/NAME | WP #/NAME<br>CRS TO | WP #/NAME<br>CRS FROM | LEG #<br>FROM WP #<br>/NAME TO<br>WP #/NAME<br>DIRECTION | WP #/NAME | WP#/NAME<br>CRS TO | WP #/NAME<br>CRS FROM | LEG #<br>FROM WP #<br>/NAME TO<br>WP #/NAME<br>DIRECTION |
| SCREEN 2 | WP # ERROR<br>RNG<br>AZ | WP # ERROR<br>RNG<br>AZ<br>XTE (L/R) | WP # ERROR<br>RNG<br>AZ<br>XTE (L/R) | WP # ERROR<br>RNG<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>STR (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) |
| SCREEN3 | ELD<br>SR<br>AZ<br>ELA | ELD<br>SR<br>AZ<br>ELA | ELD<br>SR<br>AZ<br>ELA | ELD<br>SR<br>AZ<br>ELA | RNG<br>TTG2<br>ELD<br>MMD2 | RNG<br>TTG2<br>ELD<br>MMD2 | RNG<br><br>ELD | RNG<br>TTG2<br>ELD<br>MMD2 |
| SCREEN 4 | N/A | N/A | N/A | N/A | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA |

# KEYPAD SUMMARY




| SELECT METHOD (5) | DIRECT | CRS TO | CRS FROM | RTE | APPROACH |
|---|---|---|---|---|---|
| SCREEN 1 | WP #/NAME | WP #/NAME<br>CRS TO | WP #/NAME<br>CRS FROM | LEG #<br>FROM WP #<br>/NAME TO<br>WP #/NAME<br>DIRECTION | WP #/NAME<br>CRS TO<br>GLIDEPATH ANGLE |
| SCREEN 2 | WP # ERROR<br>TRK GS<br>AZ<br>STR (L/R)<br>STR (U/D) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) | WP # ERROR<br>TRK GS<br>AZ<br>XTE (L/R) |
| SCREEN 3 | RNG<br>TTG3<br>ELD<br>MMD3 | RNG<br>TTG3<br>ELD<br>MMD3 | RNG<br><br>ELD | RNG<br>TTG3<br>ELD<br>MMD3 | RNG<br>GP DEV (LO/HI)<br>ELD<br>XTE (L/R) |
| SCREEN 4 | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA | WP # ERROR<br>SR<br>AZ<br>ELA |

## AP DATUM AND REGIONAL IDENTIFIERS

Always check the name of the Horizontal Datum and Spheroid (Ellipsoid) printed on our map For proper orientation with your map. select the map datum and ,spheroid (ellipsoid) that is the same as your map

## FIGURE OF MERIT (FOM) AND TIME FIGURE OF MERIT (TFOM) TO ESTIMATED POSITION ERROR

| FOM Value | Estimated Position Error | Estimated Time |
|---|---|---|
| | | Error |
| 1 | ≤25 meters (82 ft, 27 yd) | ≤1 nanosecond |
| 2 | ≤51 meters (164 ft, 55 yd) | ≤10 nanoseconds |
| 3 | ≤75 meters (246 ft, 82 yd) | ≤100 nanoseconds |
| 4 | ≤100 meters, (328 ft, 109 yd) | ≤1 microsecond |
| 5 | ≤200 meters (656 ft, 219 yd) | ≤10 microseconds |
| 6 | ≤500 meters (1640 ft, 547 yd) | ≤100 microseconds |
| 7 | ≤1000 meters, (3280 ft, 1193 yd) | ≤1 millisecond |
| 8 | ≤5000 meters (16400 ft, 5466 yd) | ≤10 milliseconds |
| 9 | >5000 meters, (16400 ft, 5466 yd) | >10 milliseconds |

## POST MISSION

- Download mission data. - Use MENU, I)AA-XFR (MUST be in Standard or Custom serial mode).
- Clear waypoint data - Use WP, CLEAR.
- Zeroizlng crypto key - Use MENU, CRYPTO, CLEAR.
- Clear all data - Use MARK and NUM LOCK keys together

## EMERGENCY

- ZEROIZE - Use MARK and NUM LOCK keys together.

## ADVERSE WEATHER

- Warm up to prevent cold soaking.
- Warm battery for improved life when cold.
- Cool battery for improved life when hot.

## TROUBLESHOOTING

- Perform self-test - Use MENU. TEST. Status and results under MENU, STATUS
- Check signal strength, antenna and power source under MENU, STATUS.
- Clear temporary Receiver Information faults - Use MENU, STATUS.

## MAINTENANCE

**CAUTION**

**To ensure proper AN/PSN-11 operation when installing or replacing both the power and memory batteries, ensure the power battery is installed or replaced prior to the memory battery.**

Operator maintenance:

- Replace power battery.
- Reset battery used time for accurate remaining time indication.

**NOTE:** The AN/PSN-11 is NOT to be opened in the field, except to change batteries Opening the receiver will void the warranty.

Organizational maintenance:'

- Replace memory battery annually.

By Order of the Secretary of the Army

DENIS J. REIMER
General, United States Army
Chief of Staff

Official:

YVONNE M. HARRISON
Administrative Assistant to the
Secretary of the Army

Distribution:

To be distributed in accordance with DA Form 12-6, block 9854. requirements for TE 11-5825-291-10.

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

**SOMETHING WRONG WITH THIS PUBLICATION?**

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

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| PUBLICATION NUMBER | PUBLICATION DATE | PUBLICATION TITLE |
|---|---|---|
| | | |

BE EXACT. . .PIN-POINT WHERE IT IS

| PAGE NO. | PARA-GRAPH | FIGURE NO | TABLE NO. |
|---|---|---|---|
| | | | |

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

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DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

# THE METRIC SYSTEM AND EQUIVALENTS

## 'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

## 'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

## LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

## SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

## CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

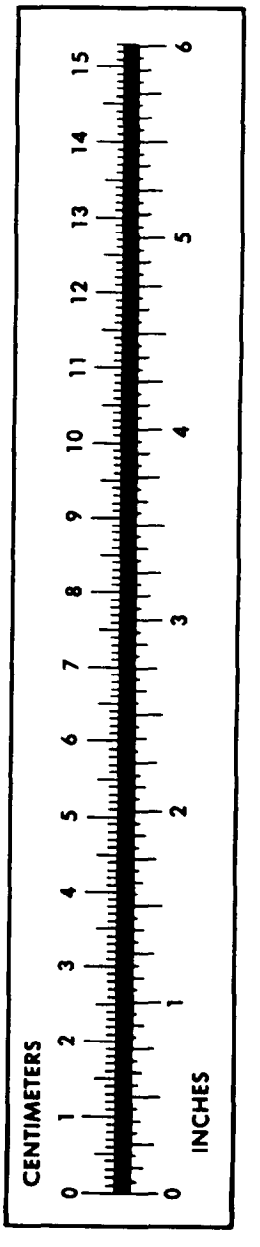
## TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

## APPROXIMATE CONVERSION FACTORS

| TO CHANGE | TO | MULTIPLY BY |
|---|---|---|
| Inches | Centimeters | 2.540 |
| Feet | Meters | 0.305 |
| Yards | Meters | 0.914 |
| Miles | Kilometers | 1.609 |
| Square Inches | Square Centimeters | 6.451 |
| Square Feet | Square Meters | 0.093 |
| Square Yards | Square Meters | 0.836 |
| Square Miles | Square Kilometers | 2.590 |
| Acres | Square Hectometers | 0.405 |
| Cubic Feet | Cubic Meters | 0.028 |
| Cubic Yards | Cubic Meters | 0.765 |
| Fluid Ounces | Milliliters | 29.573 |
| ıts | Liters | 0.473 |
| arts | Liters | 0.946 |
| allons | Liters | 3.785 |
| Ounces | Grams | 28.349 |
| Pounds | Kilograms | 0.454 |
| Short Tons | Metric Tons | 0.907 |
| Pound-Feet | Newton-Meters | 1.356 |
| Pounds per Square Inch | Kilopascals | 6.895 |
| Miles per Gallon | Kilometers per Liter | 0.425 |
| Miles per Hour | Kilometers per Hour | 1.609 |

| TO CHANGE | TO | MULTIPLY BY |
|---|---|---|
| Centimeters | Inches | 0.394 |
| Meters | Feet | 3.280 |
| Meters | Yards | 1.094 |
| Kilometers | Miles | 0.621 |
| Square Centimeters | Square Inches | 0.155 |
| Square Meters | Square Feet | 10.764 |
| Square Meters | Square Yards | 1.196 |
| Square Kilometers | Square Miles | 0.386 |
| Square Hectometers | Acres | 2.471 |
| Cubic Meters | Cubic Feet | 35.315 |
| Cubic Meters | Cubic Yards | 1.308 |
| Milliliters | Fluid Ounces | 0.034 |
| Liters | Pints | 2.113 |
| Liters | Quarts | 1.057 |
| ers | Gallons | 0.264 |
| ms | Ounces | 0.035 |
| ograms | Pounds | 2.205 |
| Metric Tons | Short Tons | 1.102 |
| Newton-Meters | Pounds-Feet | 0.738 |
| Kilopascals | Pounds per Square Inch | 0.145 |
| lometers per Liter | Miles per Gallon | 2.354 |
| meters per Hour | Miles per Hour | 0.621 |



**PIN: 074603-000**