# PSM

PROGRAMMABLE SURVEILLANCE MONITOR

# USER MANUAL

8.4", 10.4", 12.1", 15.0" TFT LCD

**DIGITAL SYSTEMS ENGINEERING, INC. (DSE)**
17491 NORTH 93RD STREET | SCOTTSDALE, AZ 85255
**DSE SERVICE CENTER: 480-515-1110**
**SERVICE@DIGITALSYS.COM | WWW.DIGITALSYS.COM**


technology in motion

## OWNER RECORD

We recommend an easy-to-locate place to record the Display's serial number and warranty period. The serial number label is on the back of the enclosure. That label's date code starts the Display's warranty period.

If the Display ever requires service, please refer to this information when contacting the **DSE Service Center at 480.515.1110.**

| PRODUCT | SERIAL NUMBER | MANUFACTURE DATE |
|---|---|---|
| PSM | ____ ____ ____ ____ ____ | _____ |

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# PSM

## TABLE OF CONTENTS

# WELCOME.

With this purchase of this Programmable Surveillance Monitor (PSM), we welcome you to Digital System Engineering's family of harsh-duty mobile display products.

Housed in a milled billet aluminum case, the slim-profile PSM is light weight and water-tight, with fully sealed IP67 connectors. Engineered to operate on low power consumption, the PSM manages Composite Video Input Signals: a Source select bezel key provides quick movement between video inputs. With 20 programmable softkeys, this 'smart' PSM offers ASCII or HEX code protocol for control of external systems and/or internal display features.

A critical design feature of this PSM Series is an integrated Digital Video Recorder (DVR). The internal DVR provides real-time recording of high frame-rate (30 fps) 24-bit hi-resolution imagery, along with accurate frame time stamping up to 1/100th of a second.

Our DVR offers solid state memory options and MPEG-4 data compression for immediate video playback on the PSM Display; snapshots are saved in the JPEG format. A plug and play USB 2.0 video download port is installed for easy transporting of recordings to a PC. Instantaneous playback and access to data and hi-resolution image output gives the PSM User unprecedented advantages for immediate image analysis and processing.

Incorporated into the PSM is the latest in optical engineering to achieve optimal viewability in all lighting conditions. This bright sunlight-readable 800 x 600 SVGA flat panel LCD Display is engineered to thrive wherever it is put to work. (The 15" model LCD is XGA (1024 x 768).) The rugged mobile Display is specifically designed to handle a wide-range of harsh environments (dust, water, cold (integrated heater), vibrations) making it the go-to selection of many industries for their mobile applications.

The PSM offers productivity-oriented options: Red/Green NVIS Compatibility, 64GB Video Storage, with up to 64 Hours Record Time (approximately 1hr/GB) and various mount installations.

We are Digital Systems Engineering, keeping rugged ***Technology in Motion.*** Our Digital Technology Team is at the ready to support your system projects. We also value your satisfaction and encourage your feedback. Please visit our Customer Feedback page at www.digitalsys.com, under Support.

# GENERAL SAFETY

## SAFETY ICONS

Safety icons are displayed throughout the User Manual to draw attention to specific User Caution and Warning Instructions.


**WARNING! SHOCK HAZARDS**

This icon is intended to tell the User of a potential risk of electrical shock.


**CAUTION! INSTRUCTIONAL**

This icon is intended to tell the User of important operating and/or maintenance instructions.

## GENERAL SAFETY INSTRUCTIONS

- Before operating the PSM Display, read this User Manual thoroughly
- Keep this User Manual for future use
- Verify the system capability (see System Setup) to ensure operation of the Display
- For expeditious installation, follow these User Manual instructions in sequence
- Adhere to all Caution and Warnings on system and as stated in this User Manual
- User Manual instructions for installation and operation should be followed precisely
- Adjust only those controls covered by this User Manual's instructions; improper adjustment of other controls voids Display's warranty and may result in Display damage, and
- Adhere to local installation codes.

## GENERAL DISPLAY SAFETY

- Always disconnect Display from power source before cleaning
- Do not operate Display with a damaged cable, and
- Do not operate if Display has been dropped or damaged. Unit should be inspected by qualified DSE Service Personnel.


**GENERAL SAFETY PRECAUTIONS**

- Power cable must be connected to a properly wired and grounded power source
- Any system to which the Display is attached must also be connected to properly wired and grounded power sources
- Do not connect or disconnect Display during an electrical storm
- Do not open Display enclosure – there are no User serviceable parts
- Do not disassemble or modify Display to avoid possibility of electrical shock, damage to electrical components or scratching the Display surface, and
- Disassembly of Display voids warranty.

# LCD AND ELECTRICAL SAFETY

## LCD DISPLAY SAFETY

It is recommended Users adhere to personal safety in the instance the PSM display screen should be shattered. Aside from obvious glass shards, the fluids in the LCD are a known skin irritant.


**FLUIDS FROM LCD DISPLAY**

- If Display should become shattered, do not touch fluids from LCD Screen
- If fluid should get on hands or clothing, immediately wipe off with liquid soap or rubbing alcohol on a clean towel; wash with water; immediately consult with a doctor, and
- If fluid gets in the eyes, flush eyes immediately with water for a minimum of 15 minutes; immediately consult with a doctor.

# ELECTRICAL


**EMI/RFI**

Product has been engineered to meet or exceed international industry standards addressing product design and enclosure protection against EMI/RFI.

## CONNECTING CABLES

- Disconnect power to system when Display is being installed
- Upon installation, verify power input connector is securely seated on Display
- Position power cable so it is not in contact with hot surfaces
- Do not allow anything to rest on power cable, and
- Protect power cable from extreme heat sources.

## POWER SOURCE

- Always connect to a properly grounded DC (standard) power source
- Unit may be powered with a qualified AC/DC Adapter (ask DSE for details)
- Any equipment to which Display is attached must also be connected to properly wired and grounded power sources
- Operational voltage is 10 - 36 VDC (Input is 12, 24, 28 VDC nominal), and
- Power Consumption is: 30 Watts maximum.


**POWER CONSUMPTION**

PSM power consumption is listed at 30 Watts maximum.


**DISPOSAL**

Should a product be retired, dispose responsibly through a technology electronic (E-waste) recycler.

## PRODUCT CARE

This PSM Display has been designed to provide optimum performance and service without any required scheduled maintenance other than occasional cleaning. Prior to use, remove the protective film from the Display screen.


Disconnect Display from power source before cleaning Display, optional Touch Screen or Display's enclosure.


- Do not use abrasive or solvent-based (flammable) cleaners on Display enclosure or any other electrical device (cables, power cable, etc.)
- Do not use paper products as they may scratch Display screen, and
- Do not directly apply cleaning solutions to Display screen.

### DISPLAY SCREEN CLEANING

- A vinegar-based cleaner is preferred: prevents streaking, degradation of coatings
- A nonabrasive glass cleaner may be used, as in professional foam glass cleaner
- Apply cleaning solution to a soft clean cloth, dampening slightly
- Keep a fresh side of cleaning cloth towards screen surface to avoid scratching it with accumulated grit as Display screen is made of glass, and
- To minimize risk of abrasion to glass screen, air drying is recommended.

### DISPLAY ENCLOSURE

- Clean Display enclosure with soft clean cloth lightly dampened with a mild detergent solution
- Wipe down with clean water; dry with a soft clean cloth.


*In marine or similar environments, a benefit of a vinegar-based cleaner is its effectiveness in dissolving mineral and salt deposits.*

### LONG-TERM STORAGE

- For long-term storage, it is suggested Display be stored in a normal indoor environment and Display glass be protected from accidental damage
- For pedestal mount units, disconnect cable(s) and loosen arm adjustment to a point where ball can be removed from arm, or
- For Flush or Panel Mount units, cover product with a protective covering that will not scratch or transfer any dyes to Display screen.


Disassembling Display voids warranty. To avoid risk of electrical shock, do not disassemble enclosure; Users cannot service. User maintenance is restricted to cleaning or power cable replacement, as explained.

# MAINTENANCE

## MAINTENANCE

### OTHER MAINTENANCE

Only DSE Qualified Service Personnel should perform all other maintenance except for cleaning and power cable replacement as described.


**POWER CABLE**

To avoid shock and fire hazards, replaced Display's power cable if:

- Insulation becomes damaged, or
- A loose connection is suspected.

## PROTECTION ON SERVICING

### SERVICING - USER

- User Servicing is limited to cleaning the Display
- Do not disassemble or modify the Display to avoid the possibility of electrical shock, damage to its electrical components or scratching the Display surface, and
- Disassembly voids the warranty.

### SERVICING - DSE

DSE Qualified Service Personnel may be required to service the Display if:

- Does not operate normally when installation instructions are followed
- Does not operate normally when operating instructions are followed
- Has been dropped or damaged, or
- Exhibits a distinct change in performance, indicating a need for service.

## SHIPPING

If Display should need to be shipped to the DSE Service Center, the original packing material should be used to ensure safety of Display in shipping. Repack Display as it would have originally been received from manufacturer. Protect the Display screen.

### SHIPPING BOX CONTENTS

The PSM is shipped in a custom box with enhanced packaging. Installer should save box and all packaging materials in the instance Display is returned to the DSE Service Center. Shipping box contents are:

- PSM Display

# SYSTEM SETUP

The PSM accepts Composite Video signals; (4) RS170 Inputs; (1) RS170 Output.

# INSTALLATION

The PSM can be installed with: Front Mount (M4), Panel Mount (M4); RAM Mount (M4), Side Mount (M4), or VESA Mount (75mm / M4). Follow known-good practices during installation.

# DISPLAY CONNECTORS

## CABLES

With a wide range of system installations requiring varying cable lengths, the PSM does not ship with cables. Special-order cables are available; otherwise, all cables are supplied by the end User.

CAUTION! Use caution when coupling or uncoupling cables and connectors.

## CONNECTORS

The PSM Connectors are fully sealed and rated to IP67. See Figure 1, Table 1 for Connector assignments.

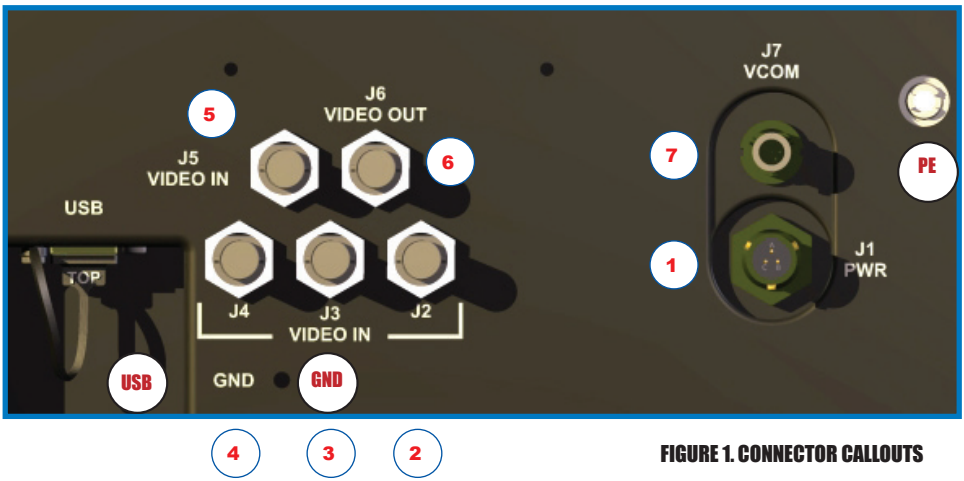



FIGURE 1. CONNECTOR CALLOUTS

| POSITION | CONNECTOR | CALL - OUT |
|---|---|---|
| 1 | POWER | J1 |
| 2 | VIDEO IN | J2 |
| 3 | VIDEO IN | J3 |
| 4 | VIDEO IN | J4 |
| 5 | VIDEO IN | J5 |
| 6 | VIDEO OUT | J6 |
| 7 | VCOM | J7 |
| PE | PRESSURE EQ. | N/A |
| USB | USB | USB |
| GND | GROUND | GND |

TABLE 1. CONNECTOR ASSIGNMENTS

# DISPLAY CONNECTORS (CONTINUED)

## POWER CONNECTOR (J1)

The military grade sealed Power Connector is J1. See Table 2.

- Align up with J1 connector; See Figure 1, #1
- Add a turn to lock
- Connector is sealed (IP67)
- End-User supplies cable

***PIN C. No Connect, Chassis GND (if applicable)***

| POWER CONNECTOR | |
|---|---|
| J1 PWR | |
| **PIN** | **SIGNAL** |
| **A** | 28 VOLT DC |
| **B** | 28 VOLT RTN |
| **C** | NO CONNECT* |
| **AMPH** | 71-533721-33P |
| **MATE** | PT06E-833SSR |

**TABLE 2. J1 POWER**

## COMPOSITE - VIDEO IN (J2 - J5)

The center pin BNC Connectors - VIDEO IN (J2-J5) allow input of auxiliary composite video signals (RS170). See Table 3.

- Align with J2-5, VIDEO IN connector; See Figure 1: #2 (J2), 3 (J3), 4 (J4), 5 (J5)
- Add a turn to lock
- BNC receptacle is sealed (IP67)
- End-User supplies cables

| BNC CONNECTOR - IN | |
|---|---|
| J2 - J5 VIDEO IN | |
| **PIN** | **SIGNAL** |
| **1** | VID_IN |
| **2** | GROUND |

**TABLE 3. J2 - J5 VIDEO IN**

## COMPOSITE - VIDEO OUT (J6)

The center pin BNC Connector - VIDEO OUT (J6) provides pass-through of composite video signal. See Table 4.

- Align with J6, VIDEO OUT connector; See Figure 1, #6 (J6)
- Add a turn to lock
- BNC receptacle is sealed (IP67)
- End-User supplies cable

| BNC CONNECTOR - OUT | |
|---|---|
| J6 VIDEO OUT | |
| **PIN** | **SIGNAL** |
| **CENTER** | VID_OUT |
| **SHELL** | GROUND |

**TABLE 4. J6 VIDEO OUT**

# DISPLAY CONNECTORS (CONTINUED)

## VCOM (J7)

The VCOM (J7) connector allows for communications with external device. See Table 5. External communication is only active when Video Input 1 (J2) is displayed.

- Align with J7 - VCOM connector; See Figure 1, #7 (J7)
- Connector is sealed (IP67)
- End-User supplies cable

| VCOM | |
|---|---|
| J7 VCOM | |
| **PIN** | **SIGNAL** |
| **1** | RS422 TX+ COM |
| **2** | RS232 TXD COM |
| **3** | RS232 RXD COM |
| **4** | DIGITAL GROUND |
| **5** | RS422 RX+ COM |
| **6** | RS422 TX- COM |
| **7** | RS422 RX- COM |
| **AMPH** | 803-015-07ZN6-7PN |
| **MATE** | 803-001-06ZN6-7SN |

**TABLE 5. J7 VCOM**

## USB-A CONNECTOR (USB)

The USB-A Connector (USB) provides the link to download saved mp4 and jpg files from the Media Gallery. See Table 6.

- Align with USB connector; See Figure 1, USB
- Connector is sealed (IP67)
- End-User supplies cable

| USB-A CONNECTOR | |
|---|---|
| USB-A | |
| **PIN** | **SIGNAL** |
| **1** | NO CONNECT |
| **2** | DATA - |
| **3** | DATA + |
| **4** | GROUND |
| **AMPH** | P-MUSB-A511-00 |

**TABLE 6. USB-A**

## PRESSURE EQUALIZER VALVE

There is a Pressure Equalizer Valve on the far right side of the chassis back enclosure (Figure 1). In the final installation, do not block or constrain the Pressure Equalizer Valve. For a close-up of the valve, see Figure 2.

**CAUTION!**

CAUTION!

Do not block or constrain the Pressure Equalizer Valve.

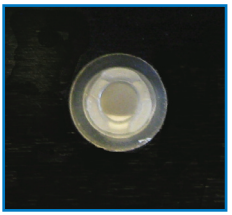


**FIGURE 2. PRESSURE EQUALIZER VALVE**

## DIGITAL VIDEO RECORDER (DVR)

The Digital Video Recorder (DVR) captures real-time recording of high frame-rate (30 fps) 24-bit hi-resolution imagery. Video files are compressed in industry-standard MPEG-4 format (mp4 file extension). Snapshots are saved in JPEG format, (jpg file extension). Video and Snapshot files are stored in the Media Gallery (Media Menu, Figure 13).

**DVR OPERATING MODES.** The DVR has two operating modes: Standard (as in Live Video Feed) and Playback, through Media Gallery viewing. See Media Menu, Figure 13.

**RECORD.** From Menu Off View (Power ON), select the Record key to start a Video Recording of the selected Channel Video Input. Videos are saved with the current Time/Date stamp. Record button is preset and can be moved to another softkey in Program Button set-up (See Utility Menu, Figure 27). ***The DVR stops recording when User is in the Media Menu (Figure 13).***

- **Single Source Layout.** Recording Starts/Stops with key press
- **PIP Layout.** Record Video Input Source saved in PIP Options (Figure 20) is default for recording; PIP Record Menu opens (Figure 8). Saves to Media Gallery (Figure 13)
- **POP Layout.** *Recording in Picture-Over-Picture mode is not available*
- **QUAD Layout.** Input Source Channel Record saved in QUAD Options Menu (Figure 22) is default for recording; QUAD Record Menu opens (Figure 10). Saves to Media Gallery (Figure 13)

**STOP RECORDING.** To STOP a Recording, press the RECORD button to stop the process.

**SNAPSHOT.** Takes a Snapshot (jpg) of Video Input Source image in view. Opens up the Snapshot Viewer Menu (Figure 19). Snapshot image is saved to the Media Gallery (Media Menu, Figure 13) with the current Time/Date stamp of recording. Snapshots can be taken of a Video image. Snapshot (SNAP) is preset and can be moved to another softkey in the Programmable Button set-up. (To access, see Utility Menu, Figure 27).

**VIDEO RECORDING TIME.** For full motion, full color feed, NTSC recording time is approximately 1GB/hour. PAL recording time is just over 2GB/hour. Black and white feed (i.e. Infrared (IR) Camera) and/or lesser bandwidth signals should result in Media storage using less than 1GB/hour for NTSC, and less than 2GB/hour for PAL.

**MEDIA FILE NAMES.** Video or Snapshot File names reference Military naming format: YY-MM-DD_HR_MN_SEC. ***Example: January 15, 2016, 9:15.47 AM Video Recording is read as 16-01-15_09-15-47.mp4.*** File names are readable when Display is connected to a PC and viewed as a remote disk drive. When the USB is connected Windows will recognize the display as a storage device. However, the PSM must be in download mode first (PC Download Menu, Figure 16).


***CAUTION!***

***DVR STOPS RECORDING WHEN USER IS IN MEDIA LIBRARY MENU.***

# MEDIA STORAGE

**MEDIA FILE STORAGE CAPACITY.** Total Media File Storage Capacity is based on memory GB installed. Memory is not field-upgradeable or replaceable. If display's memory capacity is unknown, User can determine capacity when display is connected to a PC for Media Gallery PC Download (Figure 16).

## MEDIA MEMORY STATUS BAR

In the upper left of the display screen, a yellow Recording Media Memory Status Bar Indicator depicts available DVR recording memory. (Figure 3). This yellow bar decreases as DVR storage memory is filled. Note that the Bar Indicator disappears in Media Menu (Figure 10) as recording is not available at that point. A ***Red Dot Indicator,*** placed to the right of the Available Media Storage Bar, flashes when DVR is recording (Figure 4).

FIGURE 3. BAR INDICATOR; 25% USED


FIGURE 4. FLASHING RED DOT (RECORDING), 10% REMAIN MESSAGE

## AVAILABLE MEMORY BAR

When 10% of available Recordable Media Storage is remaining, a 10% REMAIN message appears under the Media Storage Bar (Figure 4). When 5% of available Recordable Media Storage is remaining, a 5% REMAIN message appears (Figure 5).

## MEMORY FULL

Memory Full is reported when there is no free memory in the storage device. If there is a failure of the DVR to delete the oldest file while performing Continuous Recording, a MEMORY FULL message will appear under the Storage Indicator Bar (Figure 6).


FIGURE 5. NOT IN RECORD MODE (NO RED DOT) , 5% REMAIN MESSAGE

## OPTIONAL CONTINUOUS RECORDING

The Display may have been ordered with a Continuous Recording option, meaning DVR Media Storage will delete approximately 1GB of the oldest Media files (Videos or Snapshot images) from the Media Storage System to provide memory space for new recordings.

When the oldest Media files are deleted, a warning message posts: 'Continuous Recording. Old files deleted.' If there is a failure of the DVR to delete the oldest file and perform Continuous Recording, a MEMORY FULL message will appear under the Storage Indicator Bar. Memory Full is reported when there is no free memory in the storage device. Recording stops when user is in Media Menu.


FIGURE 6. MEMORY FULL MESSAGE

# VIDEO STATUS POPUP WINDOW

In the bottom center of the screen, a popup information window (aka 'toast') displays the video status as it changes. It will list both physical port and resolution (or no video) detected, then close after approximately 5 seconds.

# MENU OFF VIEW

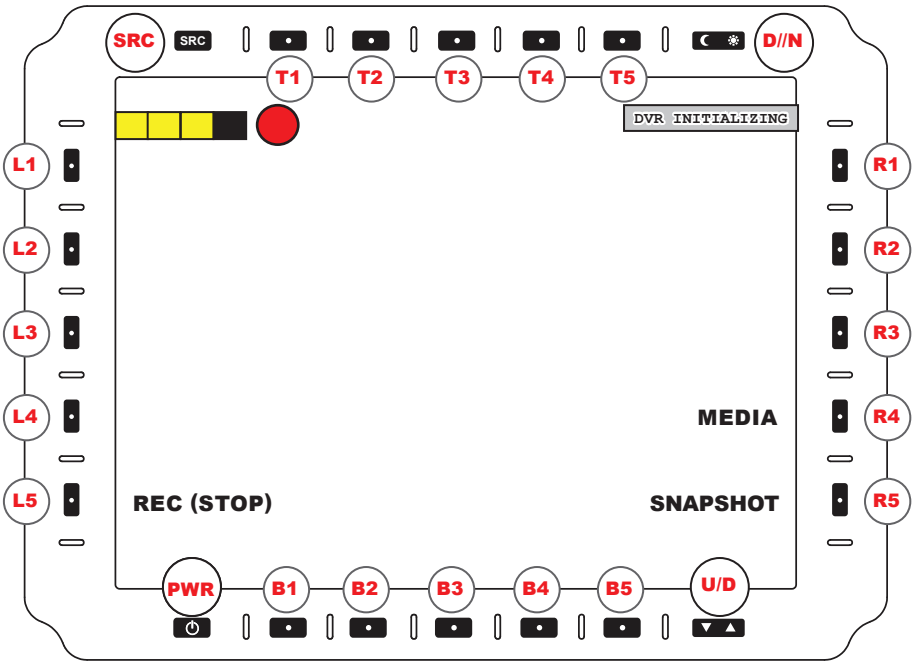



FIGURE 7. MENU OFF VIEW

## MENU OFF VIEW (POWER ON VIEW)

Select **POWER ON** button (**PWR**) (bottom left) to Power ON Display. Rapid power cycling (ON/OFF/ON) is not supported. Menu Off View (Figure 7) appears; default programmable buttons are labeled. Other buttons are programmed and labeled by User. (See Utility Menu, Figure 27, for submenu access).

**MEMORY STATUS.** In top left, Memory Status icon indicates Available Recording Memory. Yellow bar disappears as Memory fills up. Example shows 75% free space.

**DVR STATUS.** DVR Status displays in top right: 'DVR Initializing', 'DVR Error' or 'DVR Recording'.

**DVR ERR, PLEASE CYCLE PWR.** Error message **DVR ERR, PLEASE CYCLE PWR** will post across screen if DVR is not working properly. Unit has to go through Power Cycle (reboot) to reset DVR.

**POWER DOWN.** Hold Power (PWR) button for a few seconds to Power DOWN. At Power DOWN, in upper left screen, DVR status reads 'DVR SHUTTING DOWN'. If DVR was in record mode, file is saved and file name is splashed across bottom of screen.

**REC.** Starts recording of selected input feed and opens the RECORD menu. When pressed, text (and action) toggles between Record and Stop. Red Dot flashes when DVR is recording.

**MEDIA.** Opens Media Menu, Figure 13.

**SNAPSHOT.** Takes a Snapshot of selected input feed.

# PICTURE-IN-PICTURE (PIP) RECORD MENU

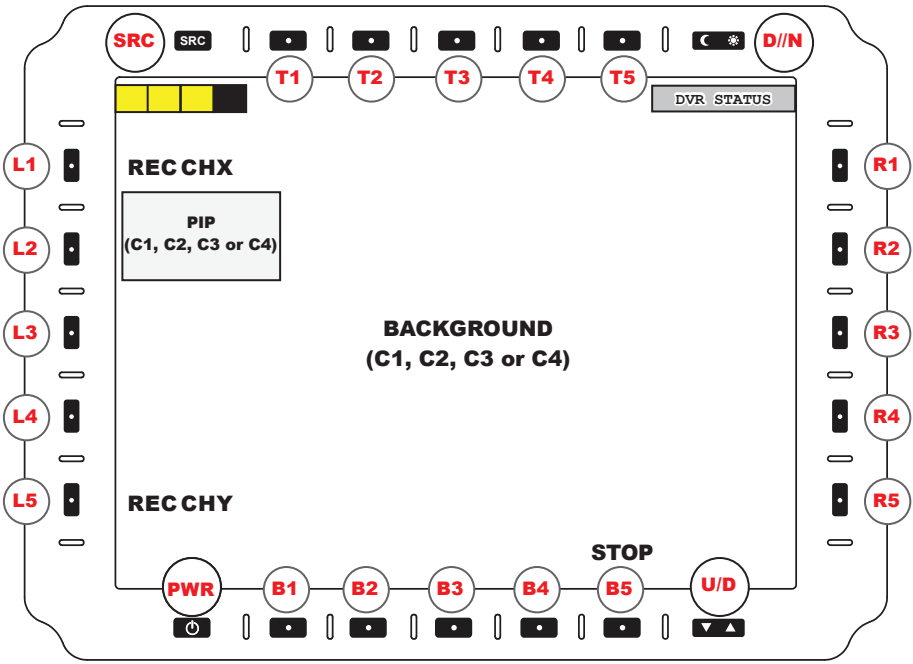



FIGURE 8. PIP RECORD MENU

## PICTURE-IN-PICTURE (PIP) RECORD MENU

Picture-in-Picture (PIP) Record Menu offers a channel feed superimposed over a second channel feed that stretches across the screen (Figure 8). By default, PIP box is in the upper left screen and can be moved in the Utility Menu (Figure 27). A highlight border is drawn around feed that will be recorded. Channel positions (PIP or Main) and default channel for Video recording are set in Video Mode Menu (Figure 12). Only the selected default channel feed is recorded. Videos/Images are saved in the Media File with current Time/Date stamp.

***Only (1) Video Input Source can be recorded at a time; a border draws around the recorded feed.***

**MEMORY STATUS.** Top left Memory Status Bar indicates available memory for recording to the Media Gallery. Yellow indicate storage remaining. When Memory is full, MEMORY FULL - UNABLE TO REC(ORD) replaces the Memory Status bar.

**DVR STATUS.** Initializing, DVR Error or Recording Status displays in top right.

**REC CHX (L1).** Sets CHX as record path Video Input Source and closes Record Menu. CHX will display (C1, C2, C3 or C4) to match current PIP Video Input Source. Setting holds through power cycles.

**REC CHY (L5).** Sets CHY as record path Video Input Source and closes Record Menu. CHY will display (C1, C2, C3 or C4) to match current Background Video Input Source. Setting holds through power cycles.

**STOP (B5).** Stops recording and closes the Record Menu.

# PICTURE-OVER-PICTURE (POP) RECORD MENU

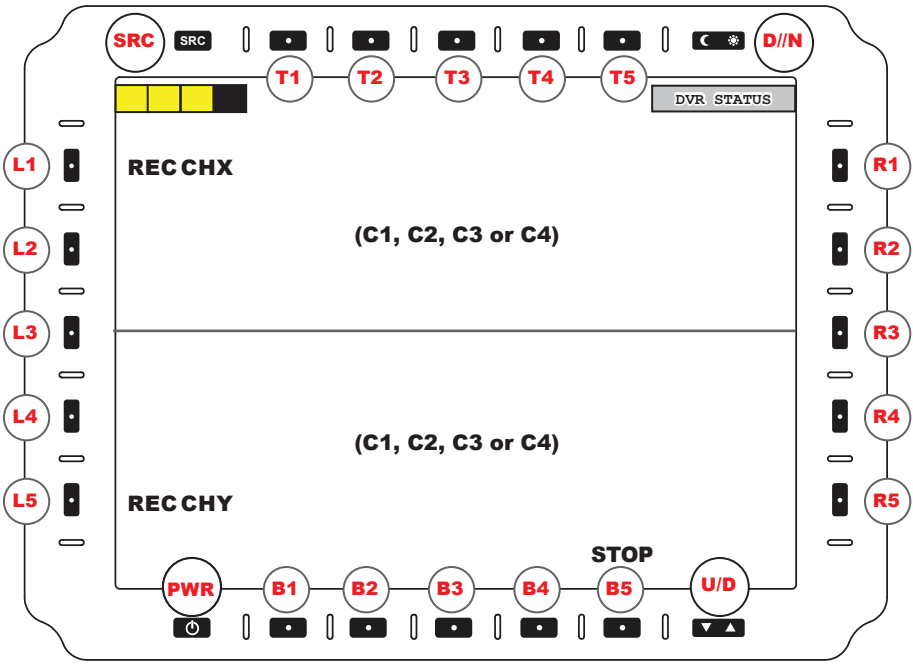



FIGURE 9. POP RECORD MENU

## PICTURE-OVER-PICTURE (POP) RECORD MENU

Picture-Over-Picture (POP) Record Menu offers a view with a two-channel view splitting the screen horizontally (Figure 9). Channel positions (top or bottom) and default channel for Video recording are set in the Video Mode Menu (Figure 12). Only the selected default channel feed is recorded, not both channel feeds. Videos/Images are saved in the Media File with the current Time/Date stamp.

*Recording in Picture-Over-Picture mode is not available; only the default channel will record.*

***Only (1) Video Input Source can be recorded at a time; a Border draws around the recorded feed.***

**MEMORY STATUS.** Top left Memory Status Bar indicates available memory for recording to the Media Gallery. Yellow indicate storage remaining. When Memory is full, MEMORY FULL - UNABLE TO REC(ORD) replaces the Memory Status bar.

**DVR STATUS.** Initializing, DVR Error or Recording Status displays in top right.

**REC CHX (L1).** Sets CHX as record path Video Input Source and closes Record Menu. CHX will display (C1, C2, C3 or C4) to match top POP source. Setting holds through power cycles.

**REC CHY (L5).** Sets CHY as record path Video Input Source and closes Record Menu. CHX will display (C1, C2, C3 or C4) to match bottom POP Video Input Source. Setting holds through power cycles.

**STOP (B5).** Stops recording and closes the Record Menu.

# QUAD RECORD MENU

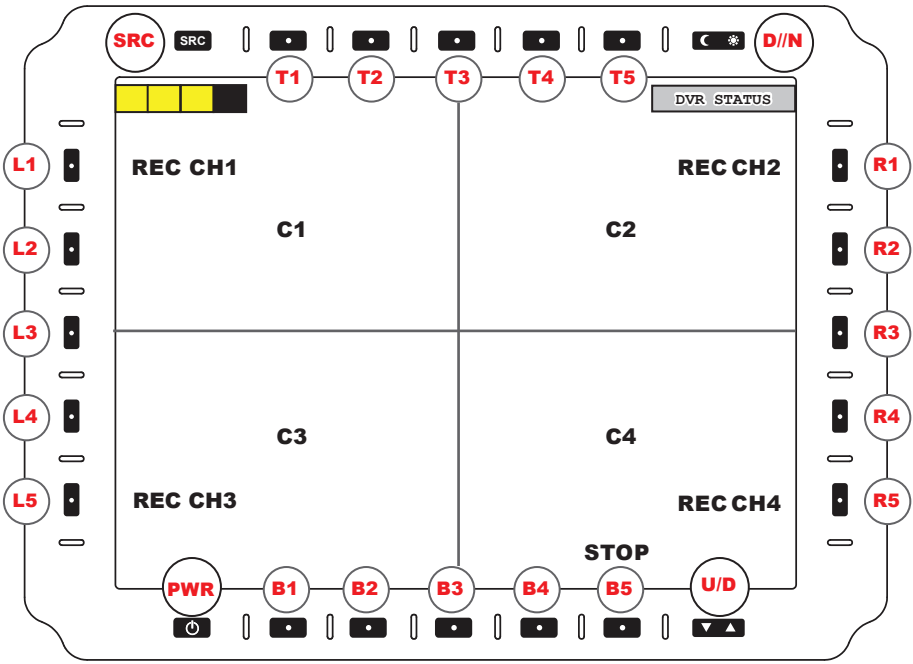



FIGURE 10. QUAD RECORD MENU

## QUAD RECORD MENU

The QUAD Record Menu offers viewing from four independent Video feeds (Figure 10). The screen is divided into four equal parts. A highlight border is drawn around recorded feed, set in Video Mode Menu (Figure 12). Videos/Images are saved with current Time/Date stamp.

***Only (1) Video Input Source can be recorded at a time; a Border draws around the recorded feed.***

**MEMORY STATUS.** Top left Memory Status Bar indicates available memory for recording to the Media Gallery. Yellow indicate storage remaining. When Memory is full, MEMORY FULL - UNABLE TO REC(ORD) replaces the Memory Status bar.

**DVR STATUS.** Initializing, DVR Error or Recording Status displays in top right.

**REC CH1 (L1).** Sets CH1 as recording path Video Input Source and closes Record Menu.

**REC CH2 (R1).** Sets CH2 as recording path Video Input Source and closes Record Menu.

**REC CH3 (L5).** Sets CH3 as recording path Video Input Source and closes Record Menu.

**REC CH4 (R5).** Sets CH4 as recording path Video Input Source and closes Record Menu.

**STOP (B5).** Stops recording and closes the Record Menu.

# MAIN MENU

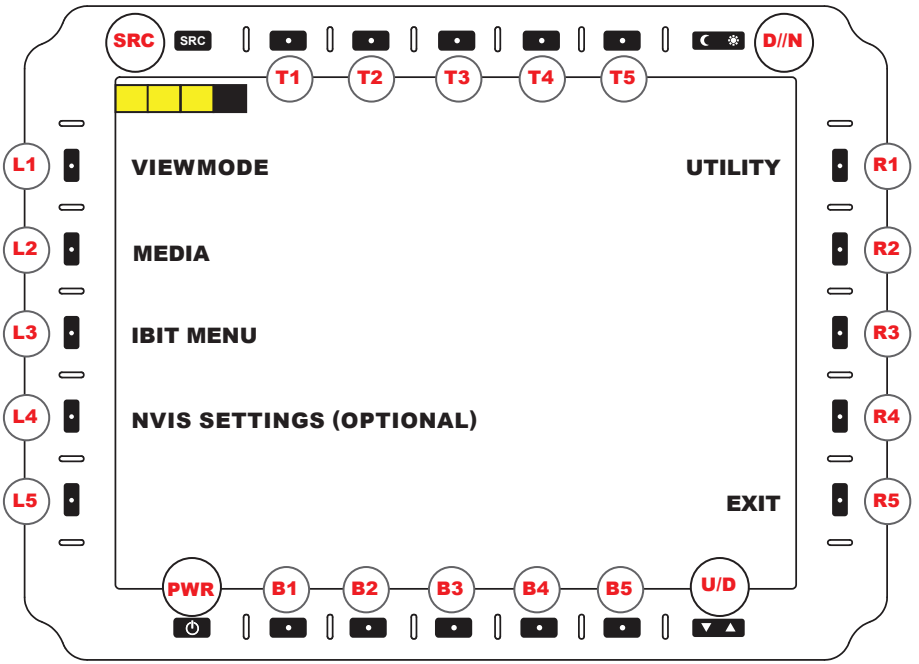



FIGURE 11. MAIN MENU

## MAIN MENU ACCESS

Several User Menus are available in the PSM. The Main Menu is a starting point to access the PSM's submenus (Figure 11). Hold down the SRC (SOURCE) key for three (3) seconds (top row, far left) to access the Main Menu from any other menu screen.

SRC SOURCE button (SRC) is on top row left. From other menu screens, hold down for (3) seconds to return to Main Menu.

## MAIN MENU

The Main Menu is the entry portal to submenus. The following submenus are accessed, which open additional tiers of submenus.

**VIEW MODE (L1).** Enter View Mode submenu (Figure 12).

**MEDIA (L2).** Access to the Media Gallery (Figure 13), a thumbnail grid of recorded Video and Snapshot files.

**IBIT (L3).** Enter Initiate Built-In-Test (IBIT) menu (Figure 26). Checks system functionality.

**NVIS SETTINGS (L4).** (Optional feature). Enter NVIS Settings submenu (Figure 25).

**UTILITY (R1).** Enter Utility (Tools) submenu (Figure 27). (Factory Reset, Programmable Buttons, Button Text, Startup, J7 VCOM Menu.)

**EXIT (R5).** Returns to Menu OFF (Power ON) view (Figure 7).

# VIEW MODE MENU

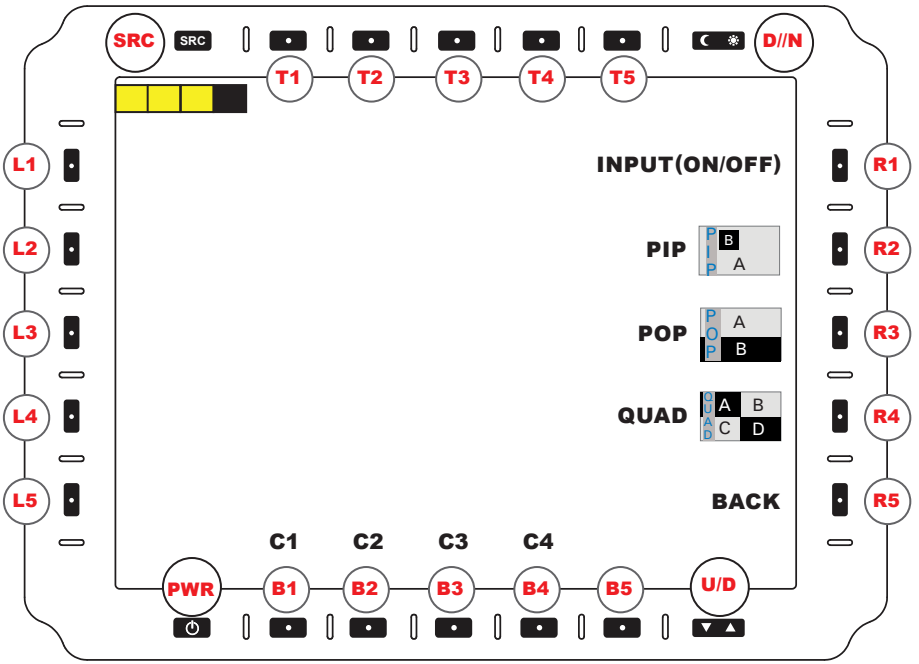



FIGURE 12. VIEW MODE MENU

## VIEW MODE MENU

The View Mode Menu is where Video View settings are assigned to each physical connector, and that Video feed (Figure 12). Each channel view setting is independent of each other. View Mode Menu is accessed from L1 in the Main Menu (Figure 11). Access the Video Channel feeds through the 'B' (Bottom) softkeys, then set Video Scaling Option (R2 - 4). Channel displayed in bracket is the default feed. Example: [C4].

***Only (1) Video Input Source can be recorded at a time; a border draws around the recorded feed.***

### VIDEO MODE SELECTIONS

**C1 (B1).** Edit Composite 1 Video options.
**C2 (B2).** Edit Composite 2 Video options.
**C3 (B3).** Edit Composite 3 Video options.
**C4 (B4).** Edit Composite 4 Video options.

**INPUT OP/OFF (R1).** Enables or Disables Video Input for Source (SRC) button selection.

**PIP (R2).** Select to enter submenu Picture-In-Picture (PIP) layout options (Figure 8).

**POP (R3).** Select to enter submenu Picture-Over-Picture (POP) layout options (Figure 9).

**QUAD (R4).** Select to enter submenu QUAD layout options (Figure 10).

**BACK (R5).** Returns to Main Menu (Figure 11).

# MEDIA MENU

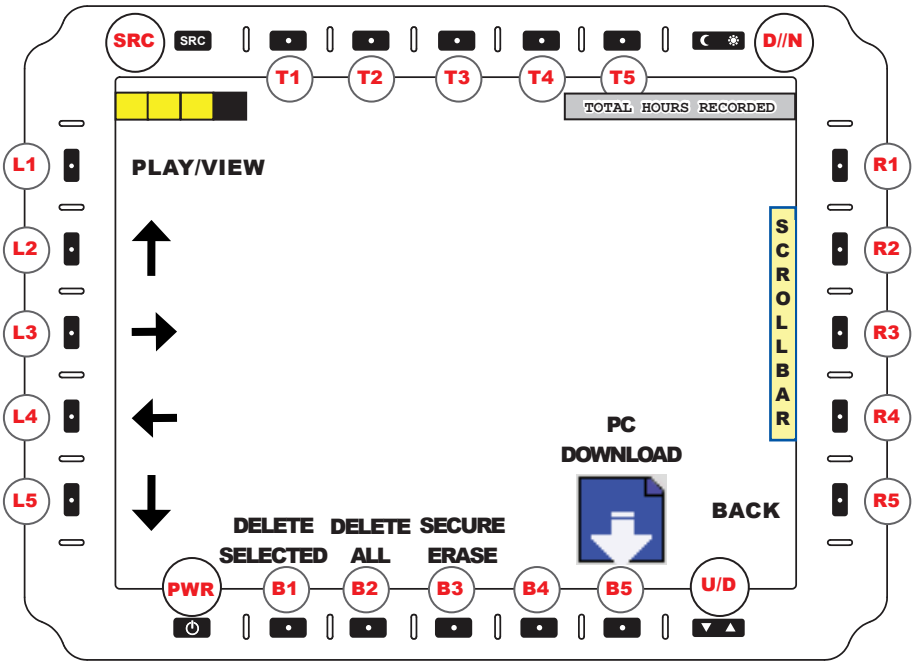



FIGURE 13. MEDIA MENU

## MEDIA MENU

The Media Menu provides access to the Media Gallery (Figure 13). The chronological-stored (oldest file first) Video (mp4) and Snapshot (jpg) files are viewed in a 4 x 3 thumbnail grid. Files are named with a Time/Date stamp indicating Video recording start time or Snapshot record time. The most recent recording defaults to last position in grid.

**TOTAL HOURS RECORDED.** A Total Hours Recorded message appears in the screen's upper right corner. ***Example: 5 hours, 30 minutes.***

**MEDIA SCROLLBAR.** The small narrow yellow Media Scrollbar on the right screen edge indicates where User is in the Media Gallery thumbnails.

**PLAY (L1).** Displays PLAY if Video is selected to view. Press to start selected file playback. See submenu Video Playback (Figure 18).

**VIEW (L1).** Displayed if image is selected, then shows selected file. This takes User to submenu Snapshot Viewer (see Figure 19).

**UP (L2).** Use the Arrow UP icon key to navigate UP a row in the Media Gallery.

**RIGHT (L3).** Use the Arrow RIGHT icon key to navigate (right) to Next Media File.

**LEFT (L4).** Use the Arrow LEFT icon key to navigate (left) to Previous Media File.

**DOWN (L5).** Use the Arrow DOWN icon key to navigate to next Row of Media Files.

**BACK (R5).** Returns to Main Menu (Figure 11).

# DELETE KEYS MENU (CONTINUED FROM MEDIA MENU)

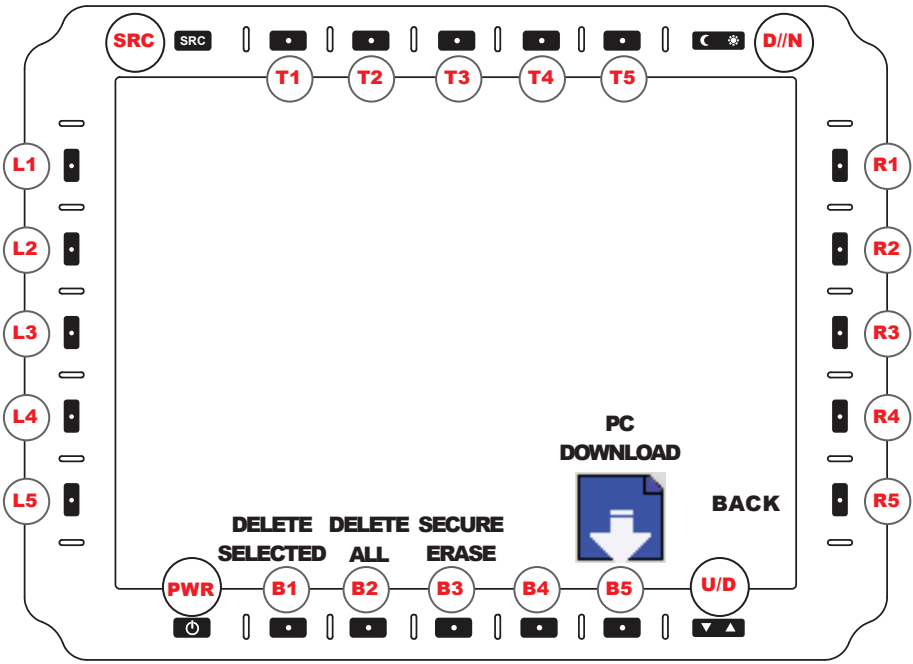



FIGURE 14. DELETE KEYS MENU

## DELETE KEYS MENU (CONTINUED FROM MEDIA LIBRARY MENU)

Accessed from the Media Menu, use bottom row Delete keys (B1 - B3) to remove or transfer (B4) Media Gallery files. Selections Delete Selected (B1), Delete All (B2), Secure Erase (B3) or PC Download (B5) (download Media files to a PC). Selecting any of these softkeys opens submenu Confirm Delete (Figure 15). ***A deleted Media file is not retrievable.***

**DELETE SELECTED (B1).** Opens submenu Confirm Delete (Figure 15) to Delete the Selected Media file, surrounded by a highlight border box.

**DELETE ALL (B2).** Opens submenu Confirm Delete (Figure 15) to Delete All Media files.

**SECURE ERASE (B3).** Opens submenu Confirm Delete (Figure 15) to securely wipe all data (Videos and Snapshots) from the Media Gallery.

**PC DOWNLOAD (B5).** Use the shaded Arrow DOWN icon key to open the submenu PC Download (Figure 16).

**BACK (R5).** Returns to Main Menu (Figure 11).

CAUTION!

***REMEMBER!***

***A DELETED MEDIA FILE IS NOT RETRIEVABLE.***

# CONFIRM DELETE MENU

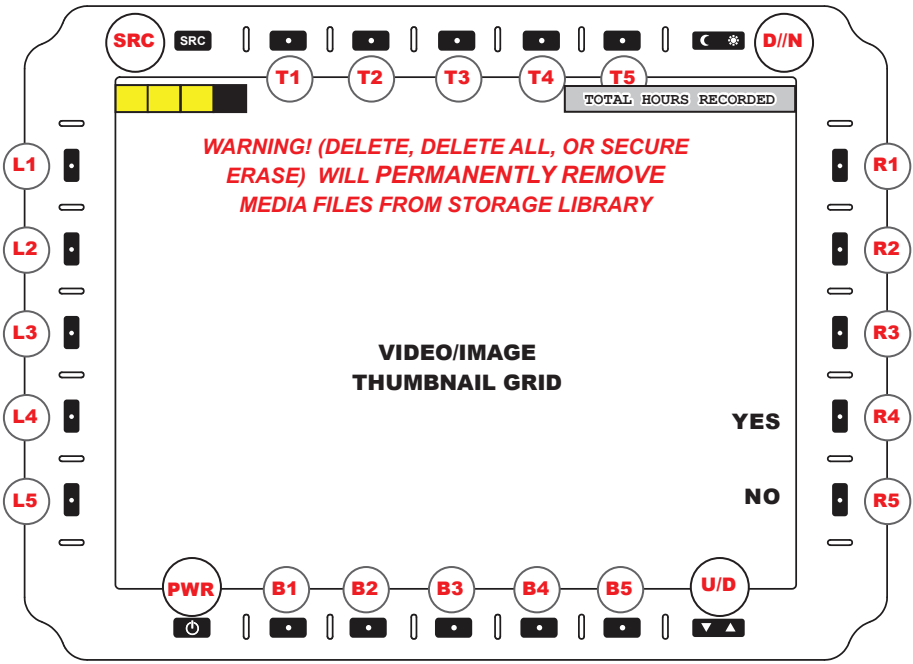



FIGURE 15. CONFIRM DELETE MENU

## CONFIRM DELETE MENU

Selecting any Delete action keys (B1 - B3) from Media Menu (Figure 13) opens the submenu Confirm Delete (Figure 15).

Confirm Delete Selected, Delete All or Secure Erase before performing action. Note the screen Warning Message: ***WARNING! DELETE SELECTED, DELETE ALL, OR SECURE ERASE WILL PERMANENTLY REMOVE MEDIA FILES FROM STORAGE LIBRARY***

**YES (R4).** Confirms Delete Action: Delete Selected, Delete All, or Secure Erase. For more details on the Secure Erase process, see Secure Erase Menu (Figure 17).

**NO (R5).** Aborts selected key action and returns to Media Menu (Figure 13).

CAUTION!

***REMEMBER!***

***A DELETED MEDIA FILE IS NOT RETRIEVABLE.***

# PC DOWNLOAD MENU

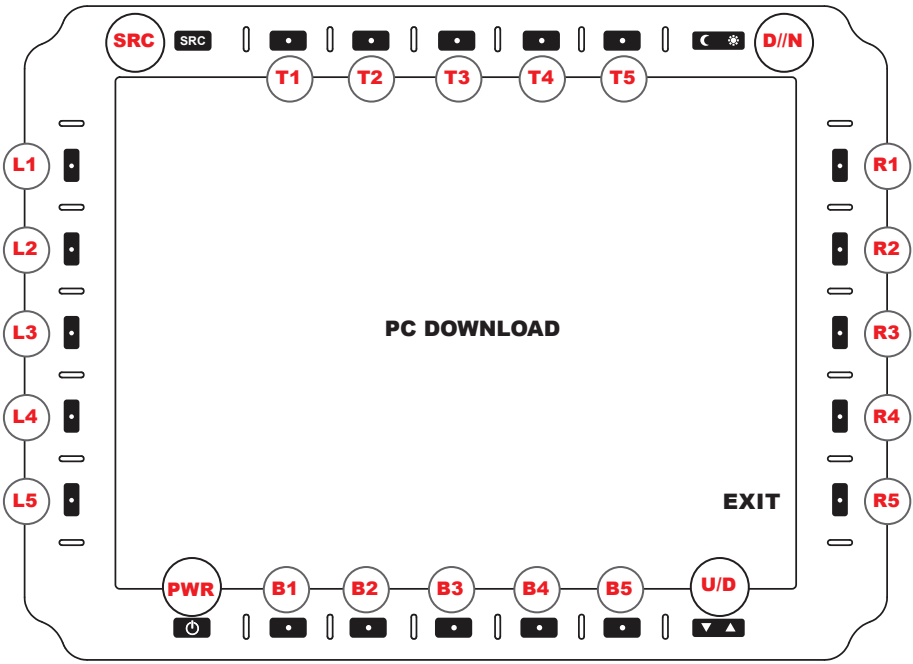



FIGURE 16. PC DOWNLOAD MENU

## PC DOWNLOAD MENU

Video Files can be transferred from DVR to a PC (laptop or computer) using the USB ports. In PC Download Mode (Figure 16), Display appears as a remote disk drive when connected to a PC. ***Caution! Do not connect USB cable between Display and PC until Display reads PC Download Mode.***

- DVR is unavailable for playback or recording in PC Download Mode
- Connect USB Cable to Display; ***Do not connect cable to PC***
- Power ON Display; go to Media Menu (Figure 13); Select PC Download Key (B5)
- Screen message banner reads PC DOWNLOAD (above, Figure 16)
- Power ON PC; when initialized, connect Display's USB Cable to PC
- Verify PC reads DVR as a Disk Drive
- On PC, open DVR's Media file in Disk Drive to view files; Control A to copy all; drag highlighted files to PC folder destination (or Control C (copy), then Control V (paste)
- Wait for download to complete; may take several hours dependent on Media File volume
- EXITING PC DOWNLOAD message banner appears in upper left screen as DVR and PC disconnect. Wait for disconnect to complete.

**EXIT (R5).** Exits the PC Download process. Returns to Main Menu (Figure 11).

CAUTION!

CAUTION! *USB STICK WILL NOT TRANSFER FILES OFF THE DVR.*

# SECURE ERASE MENU (CONTINUED)

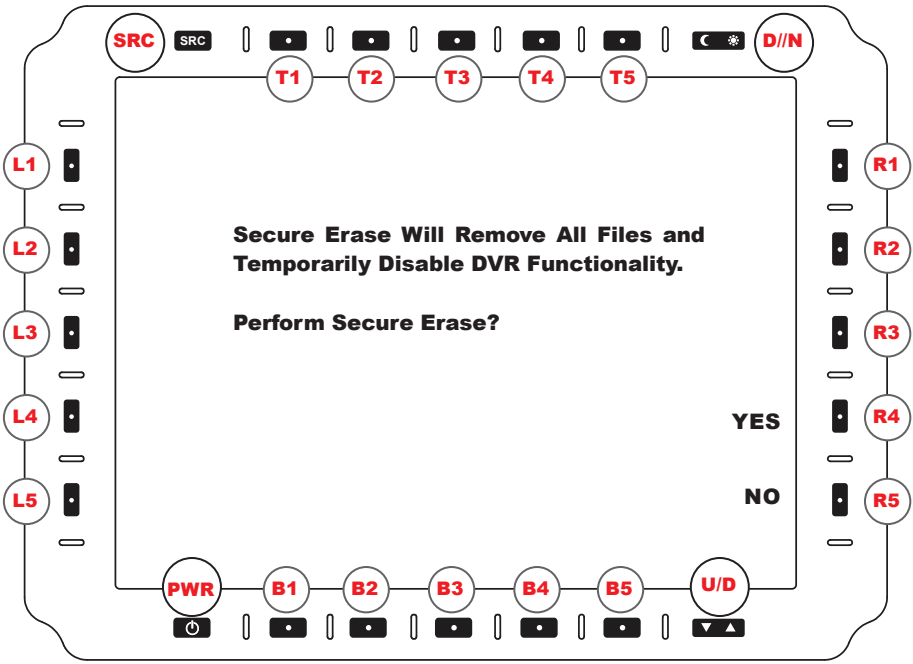



FIGURE 17. SECURE ERASE MENU

## SECURE ERASE MENU

Suggested use of the submenu Secure Erase (SE) function (Figure 17) is any event requiring User to leave no Video or Snapshot data behind. Secure Erase reformats the Media drive.

- Access SE, B3 key, from the Media Menu (Figure 13)
- Warning Message appears: ***SECURE ERASE WILL REMOVE ALL FILES AND TEMPORARILY DISABLE DVR FUNCTIONALITY. PERFORM SECURE ERASE?***
- Select YES (R4) to start Secure Erase.
- Select NO (R5) to Abort Secure Erase; Screen returns to Media Menu (Figure 13).
- SE takes approximately 10 seconds to complete; screen will read ***SECURE ERASE In Progress***
- ***While SE is in process, DVR recording functions are disabled***
- Live Feed Video and some other menus should be available during Secure Erase

***Instructions continued on next page.***

**CAUTION!**

***SECURE ERASE REFORMATS THE MEDIA DRIVE. ALL FILES ARE WIPED.***

# SECURE ERASE MENU (CONTINUED)

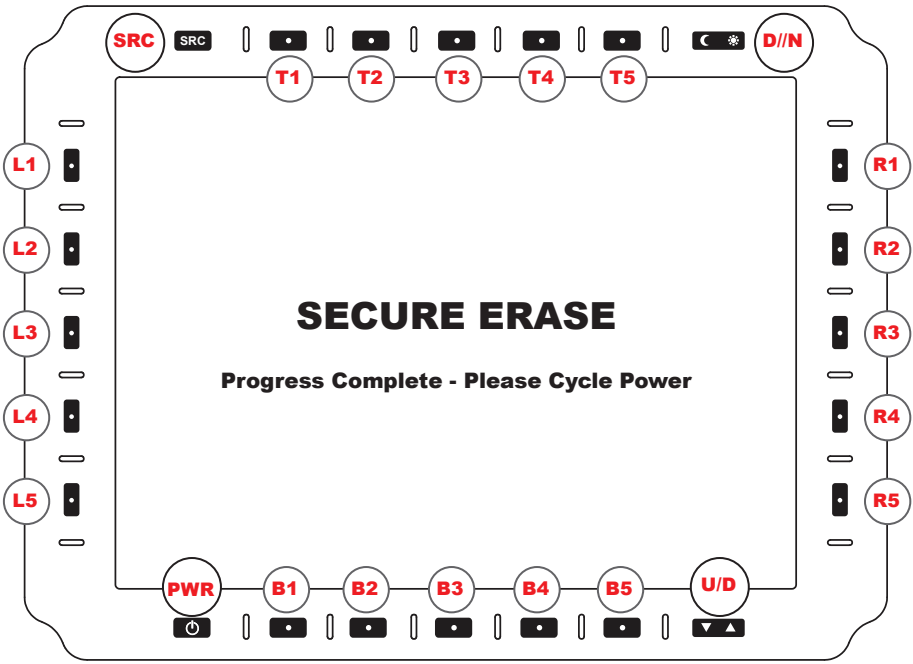



FIGURE 18. SE PROGRESS COMPLETE. PLEASE CYCLE POWER.

## SECURE ERASE MENU

Instructions continued from previous page.

- When SE is complete, screen reads ‘Secure Erase Progress Complete; Please Cycle Power’ which means ‘Reboot the unit’ (Figure 18)
- When Reboot is complete, the display will Power ON in its default state without a menu screen open. Refer to Figure 7, Menu OFF View (Power ON View).
- Power must be applied to unit during the SE process; ***If unit looses power during SE, process will complete upon next Power ON; follow on-screen instructions.***

CAUTION!

***IF UNIT LOOSES POWER DURING SECURE ERASE, PROCESS WILL COMPLETE UPON NEXT POWER ON.***

# VIDEO PLAYBACK MENU

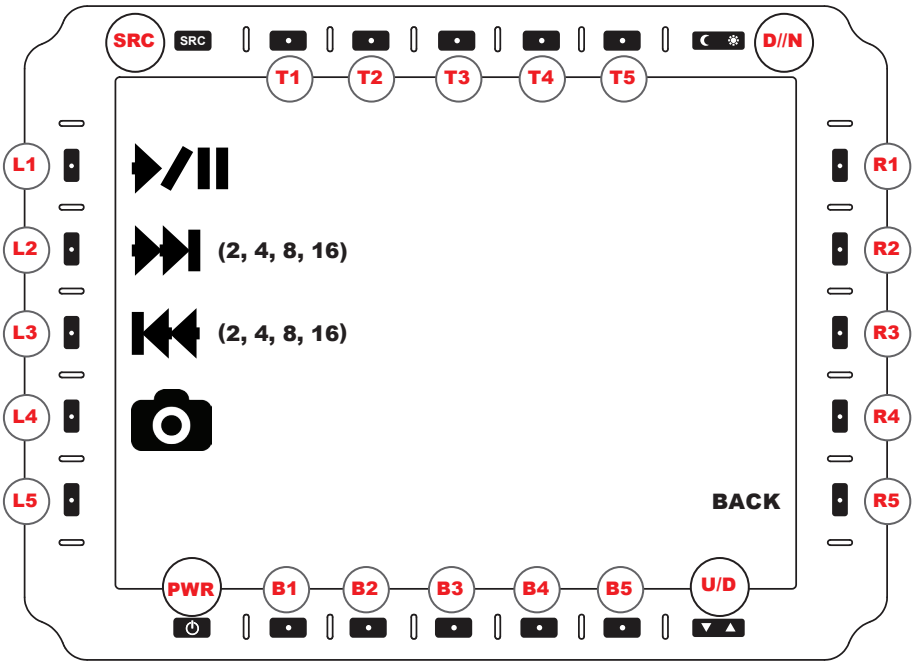



FIGURE 19. VIDEO PLAYBACK MENU

## VIDEO PLAYBACK MENU

Access the submenu Video Playback (Figure 19) by selecting key L1 Play/View from the Media Menu (Figure 13). This menu allows User to review previously recorded Videos. Select Video to play from Media Gallery (Figure 13).

**PLAY/PAUSE (L1).** Select to toggle between Video Play and Pause.

**FAST FORWARD (L2).** Press Fast Forward key to move through Video at incremental rates of 2x, 4x, 8x and 16x.

- Press PLAY/PAUSE to stop fast forward action, and
- Press PLAY/PAUSE again to resume Video play.

**REWIND (L3).** Rewinds Video at incremental rates of 2x, 4x, 8x and 16x.

- Press PLAY/PAUSE to stop rewind action, and
- Press PLAY/PAUSE again to resume Video play.

**SNAPSHOT (L4).** Press to take a Snapshot of Video Playback frame from the saved Video in play; Snapshot is saved to Media Gallery (Figure 13) with current Time/Date stamp. After Snapshot is taken, screen returns to Video in play.

**BACK (R5).** Returns to Main Menu (Figure 11).

# SNAPSHOT VIEWER MENU

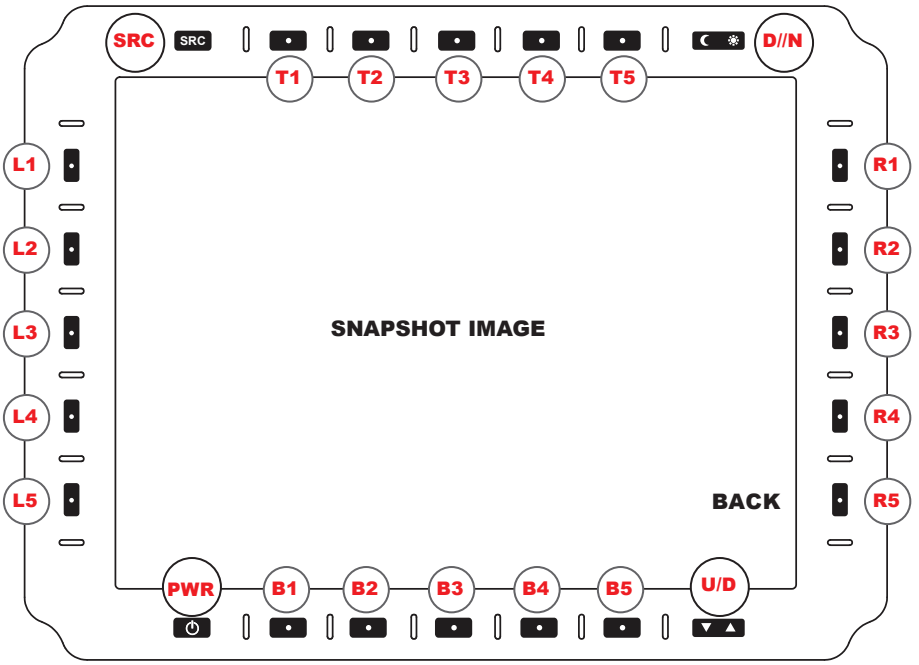



FIGURE 20. SNAPSHOT VIEWER MENU

## SNAPSHOT VIEWER MENU

The submenu Snapshot Viewer screen (Figure 20) appears when accessed through the Snapshot Key (R5) in the Media Menu (Figure 13). This menu screen allows the User to view the Snapshot image.

**BACK (R5).** Returns to Main Menu (Figure 11).

***This section is intentionally left blank.***

# PICTURE-IN-PICTURE (PIP) OPTIONS MENU

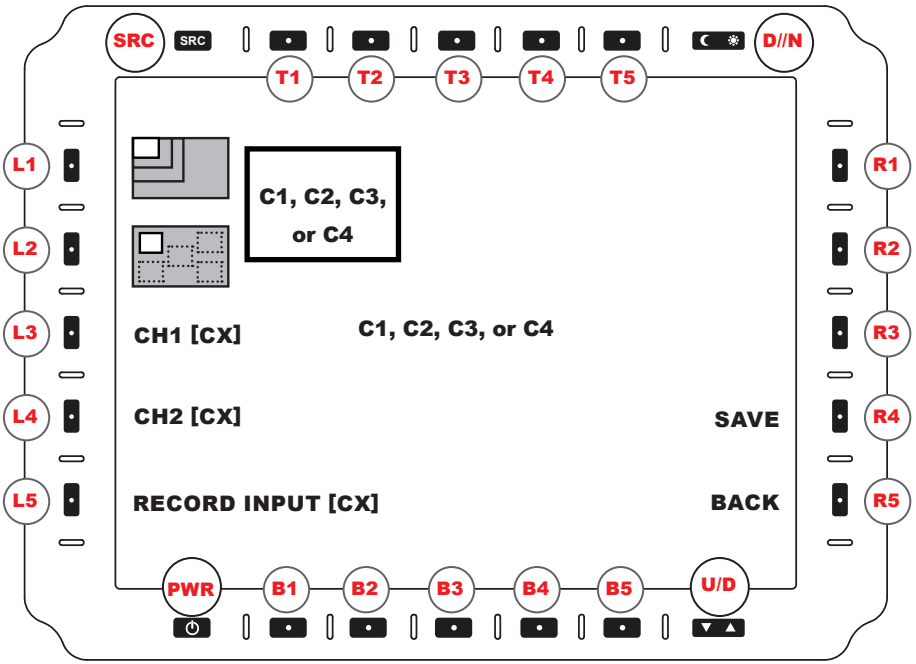



FIGURE 21. PIP OPTIONS MENU

## PICTURE-IN-PICTURE (PIP) OPTIONS MENU

To enter the submenu Picture-In-Picture (PIP) Options (Figure 21), select PIP (R2) from View Mode Menu (Figure 12). User determines Video feed assigned to PIP view setting. A highlight border draws around the recorded feed.

**PIP SIZE (L1).** Cycles through three (3) PIP window sizes: Small, Medium, and Large. Each press increases size, then returns to PIP default (Small).

**LOCATION (L2).** Cycles through five (5) PIP screen locations: Top Left, Top Right, Center, Bottom Left, and Bottom Right.

**CH1 [CX] (L3).** Cycles CH1 Video Input Sources for configuration in PIP view. Default channel feed (X=1-4) for CH1 is indicated by brackets. Example: CH1 [C4]

**CH2 [CX] (L4).** Cycles CH2 Video Input Sources for configuration in PIP view. Default channel feed (X=1-4) for CH2 is indicated by brackets. Example: CH2 [C1]

**RECORD INPUT (L5).** Select Input to Record. Border draws around recorded feed.

**SAVE (R4).** Opens Save View Menu (Figure 24).

**BACK (R5).** Returns to View Mode Menu (Figure 12).

# PICTURE-OVER-PICTURE (POP) OPTIONS MENU

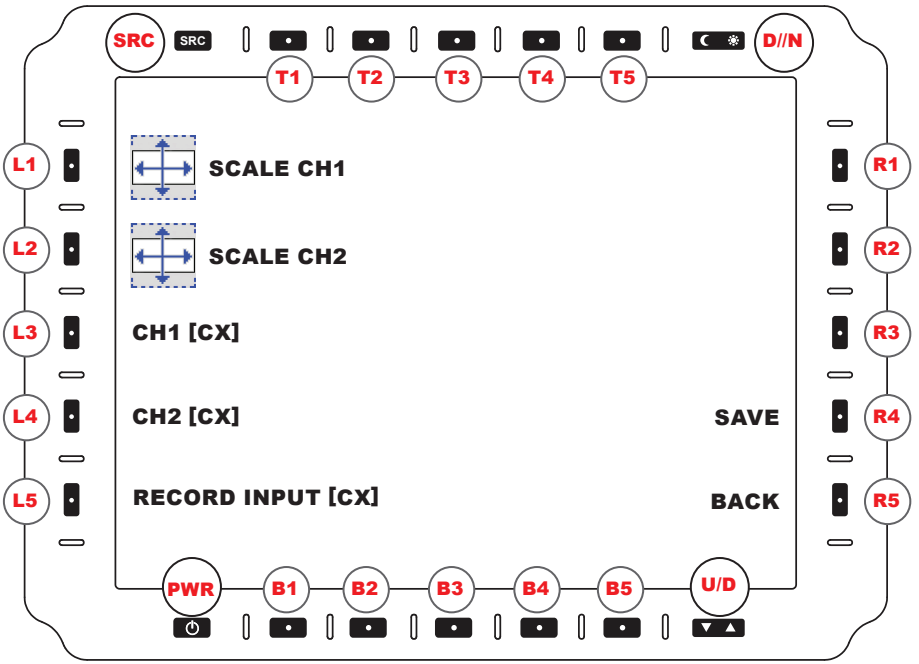


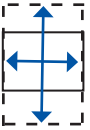

FIGURE 22. POP OPTIONS MENU

## PICTURE-OVER-PICTURE (POP) OPTIONS MENU

To enter the submenu Picture-Over-Picture (POP) Options (Figure 22), select POP (R3) from View Mode Menu (Figure 12). User determines input feed assigned to dual-view POP setting. A highlight border draws around the recorded feed.

POP settings are Stretched or Cropped. Stretch fills the screen; Cropped scales the middle 50% of Video and crops the top and bottom by 25%. ***Recording in Picture-Over-Picture (POP) Mode is not available.***

**SCALE CH1 (L1).** Cycles Top Window options: **STRETCHED** **CROPPED**



**SCALE CH2 (L2).** Cycles Bottom Window options: Stretched or Cropped.

**CH1 [CX] (L3).** Select CH1 Video Input from cycling through channel feed (X=1-4) sources.

**CH2 [CX] (L4).** Select CH2 Video Input from cycling through channel feed (X=1-4) sources.

**RECORD INPUT (L5).** Select Input to Record. Border draws around recorded feed.

**SAVE (R4).** Opens Save View Menu (Figure 24).

**BACK (R5).** Returns to View Mode Menu (Figure 12).

# QUAD OPTIONS MENU

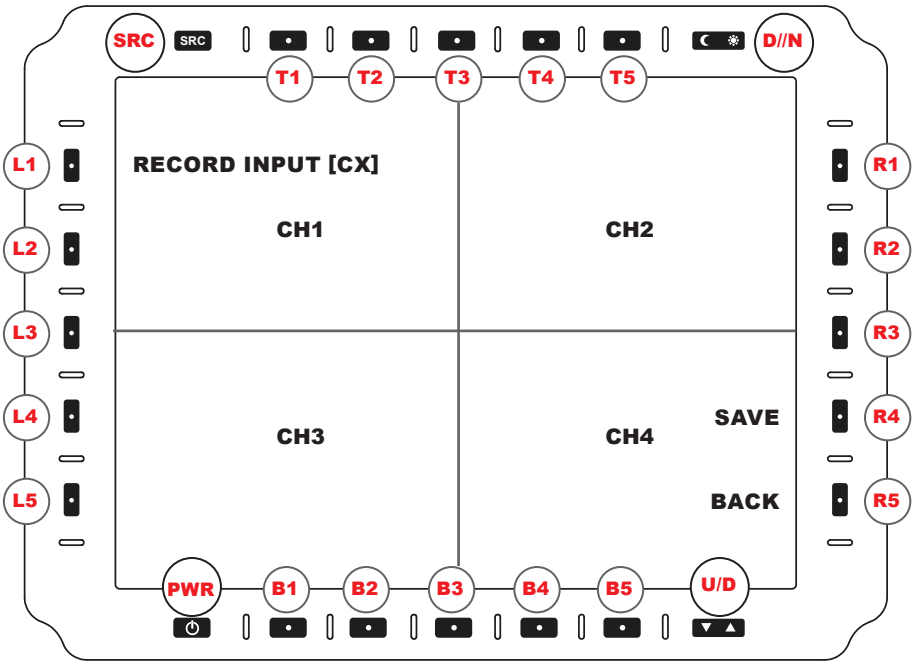



FIGURE 23. QUAD OPTIONS MENU

## QUAD OPTIONS MENU

The QUAD Options Menu allows for up to (4) Video Input Sources to be viewed (Figure 23). This submenu is accessed from (R4) in View Mode Menu (Figure 12). If a Video feed is unavailable, that quadrant should appear black. A highlight border draws around the recorded feed.

- **CH1 FEED.** Top Left screen quadrant.
- **CH2 FEED.** Top Right screen quadrant.
- **CH3 FEED.** Bottom Left screen quadrant.
- **CH4 FEED.** Bottom Right screen quadrant.

**RECORD INPUT (L5).** Select Input to Record. Border draws around recorded feed.

**SAVE (R4).** Opens Save View Menu (Figure 24).

**BACK (R5).** Returns to View Mode Menu (Figure 12).

# SAVE VIEW MENU

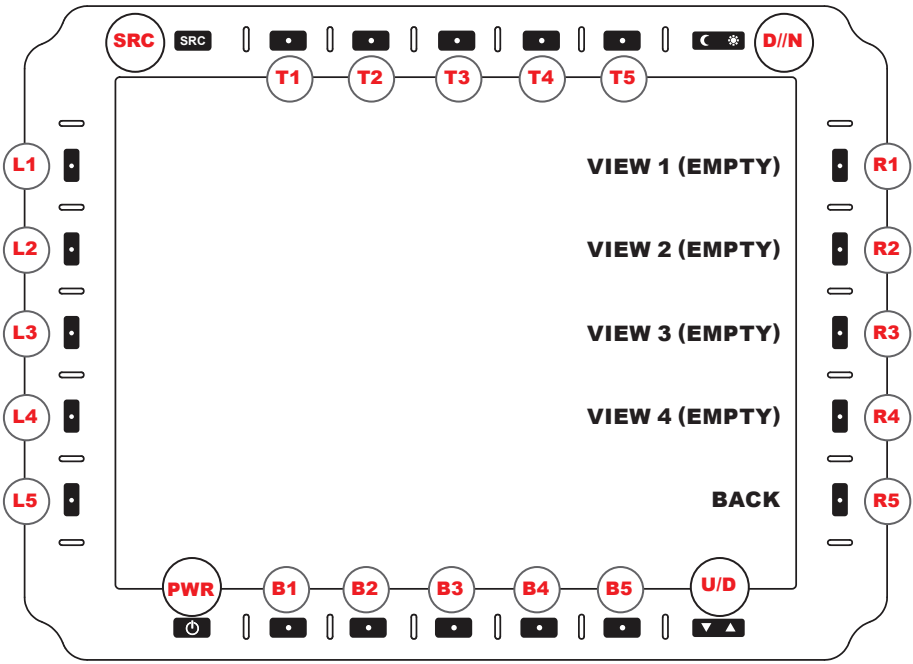



FIGURE 24. SAVE VIEW MENU

## SAVE VIEW MENU

Use the Save View Menu (Figure 24) to save PIP (Figure 21), POP (Figure 22), or QUAD (Figure 23) configurations for various views. Select entry using R (Right) softkeys. User is directed to Name Entry Menu (Figure 25) to name view configurations.

**VIEW 1 (R1).** Saves the assigned PIP/POP/QUAD View 1 entry. Key press opens View Name Entry Menu to name the view (Figure 25); new view name replaces 'Empty'.

**VIEW 2 (R2).** Saves the assigned PIP/POP/QUAD View 2 entry. Key press opens View Name Entry Menu to name the view (Figure 25); new view name replaces 'Empty'.

**VIEW 3 (R3).** Saves the assigned PIP/POP/QUAD View 3 entry. Key press opens View Name Entry Menu to name the view (Figure 25); new view name replaces 'Empty'.

**VIEW 4 (R4).** Saves the assigned PIP/POP/QUAD View 4 entry. Key press opens View Name Entry Menu to name the view (Figure 25); new view name replaces 'Empty'.

**BACK (R5).** Returns to previous menu (PIP, POP or QUAD).

# VIEW NAME ENTRY MENU

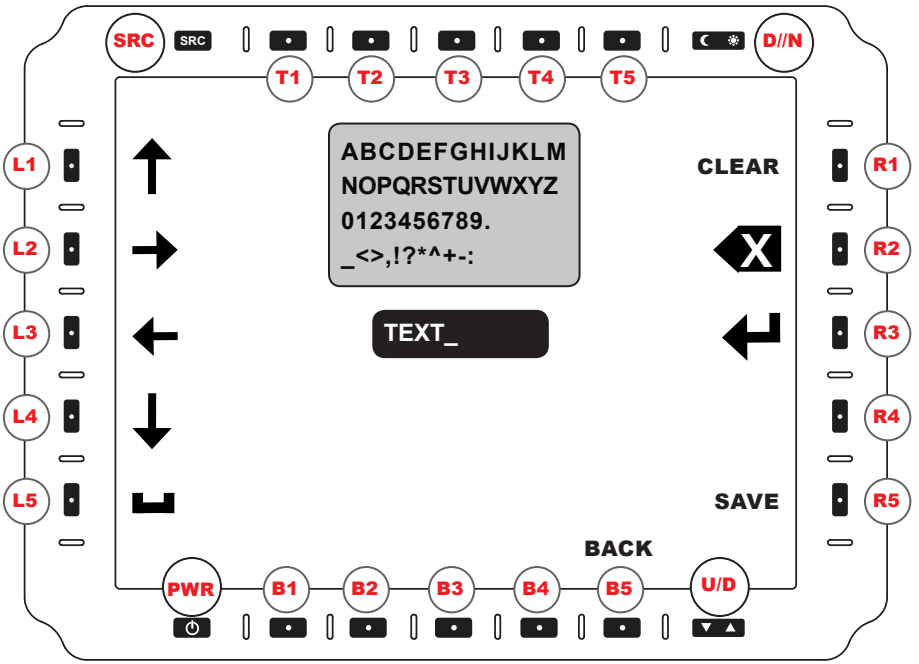



FIGURE 25. VIEW NAME ENTRY MENU

## VIEW NAME ENTRY MENU

In the submenu View Name Entry (Figure 25), User can name the Save View previously created. (Figure 24). Access to this screen is through the Save View Menu. Use the Left and Right softkeys to navigate. Text assigned will appear in the TEXT field (black) shown in the above screen capture.

**UP (L1).** Navigates Selection Cursor UP.

**RIGHT (L2).** Navigates Selection Cursor RIGHT.

**LEFT (L3).** Navigates Selection Cursor LEFT.

**DOWN (L4).** Navigates Selection Cursor DOWN.

**SPACE (L5).** Adds an empty SPACE (as in a spacebar press).

**CLEAR (R1).** Clears Current Characters.

**BACKSPACE (R2).** Deletes Last Character.

**SELECT (R3).** Enters Character.

**SAVE (R5).** Exits Menu while saving changes.

**BACK (B5).** Returns to Save View Menu (Figure 24).

# NVIS SETTINGS MENU (OPTION)

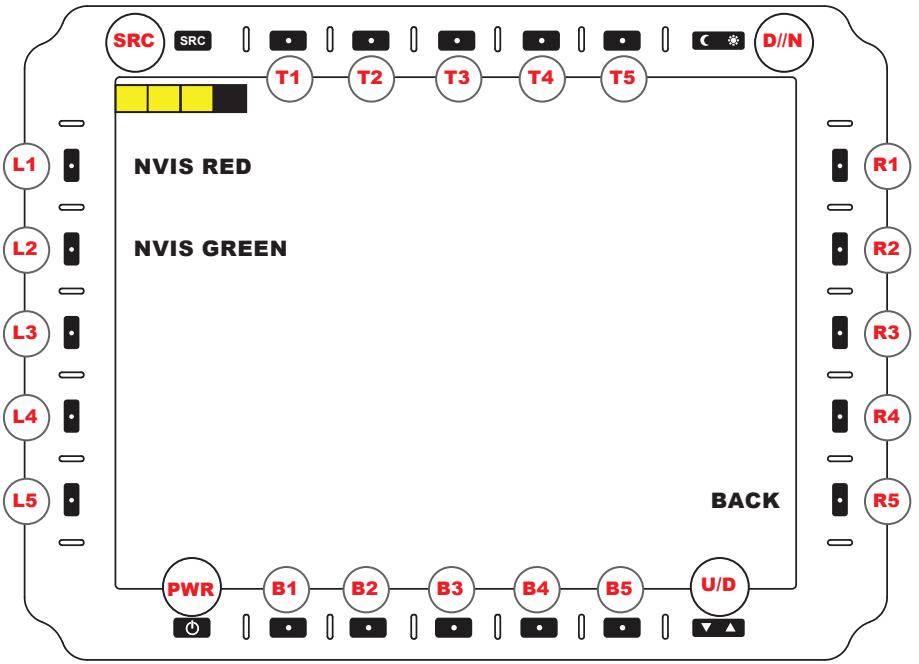



FIGURE 26. NVIS SETTINGS MENU

## NVIS SETTINGS MENU (OPTION)

NVIS Red/Green viewing capability is an option ordered at time of unit production. This feature allows interfacing with Night Vision Devices without adverse effects. The NVIS Setting Menu (Figure 26) is accessed from the Main Menu (Figure 11), and allows the User to select their NVIS viewing color: RED or GREEN.

**NVIS RED (L1).** Selects the NVIS RED view color.

**NVIS GREEN (L2).** Selects the NVIS GREEN view color. Factory default is GREEN.

**BACK (R5).** Returns to Main Menu (Figure 11).

USER TIP

**SRC** From other menu screens, hold down SRC Button for (3) seconds to return to Main Menu.

## BIT SYSTEM TESTS

Utilized to improve the reliability, safety, and security of mission-critical applications, Built-in-test (BIT) applications offer the ability to quickly and easily identify a specific component when a fault is detected. This is the fundamental promise of an effective Built-in-tests (BIT) system. BITs are self-test processes supporting display maintenance in that they monitor the display, as well as detect and isolate faults of the display.

BIT applications also offer tools to identify operational readiness, or where necessary, identify specific degraded or failed conditions relative to the display. The PSM supports three (3) Built-In-Test (BIT) components: Power-UP BIT (P-BIT) Initiated BIT (I-BIT), and Continuous BIT (C-BIT). P-BIT runs at Power ON; I-BIT confirms all systems are functioning, and C-BIT runs in the background.

All BIT results are stored in memory with time and date stamping, and failures are listed in the Test Log Box as shown on the display screen.

## PSM SYSTEM TESTS

BIT system tests present the ability to know that a fault exists. Table 7 provides the PSM BIT System Test Summary with brief definitions of the BIT available for the PSM. Tests are designed to assess the health of the display and to improve diagnostics, minimize maintenance, and reduced debugging time.

Running Initiated BIT (I-BIT) allows the user to confirm specific monitor systems are functioning. I-BIT results are shown in the test log box in the center of the display screen. Table 7 explains System Tests Error Codes, and Table 8 lists System Tests.

Power-UP BIT (P-BIT), is a series of BITs the display initiates at Power ON. P-BIT searches for errors, and provides confirmation that specific systems are functioning at Power ON. Systems tested are: RAM, ROM, EEP, DVR, Key, and PWR (Power).

For the purpose of detecting an external communications error from an incoming signal, Continuous BIT (C-BIT) runs in the background. C-BIT verifies the input connector is operative by verifying data integrity through the external communications port.

All BIT results are stored in memory with time and date stamping, and failures are listed in the Test Log Box as shown on the display screen.

# IBIT MENU

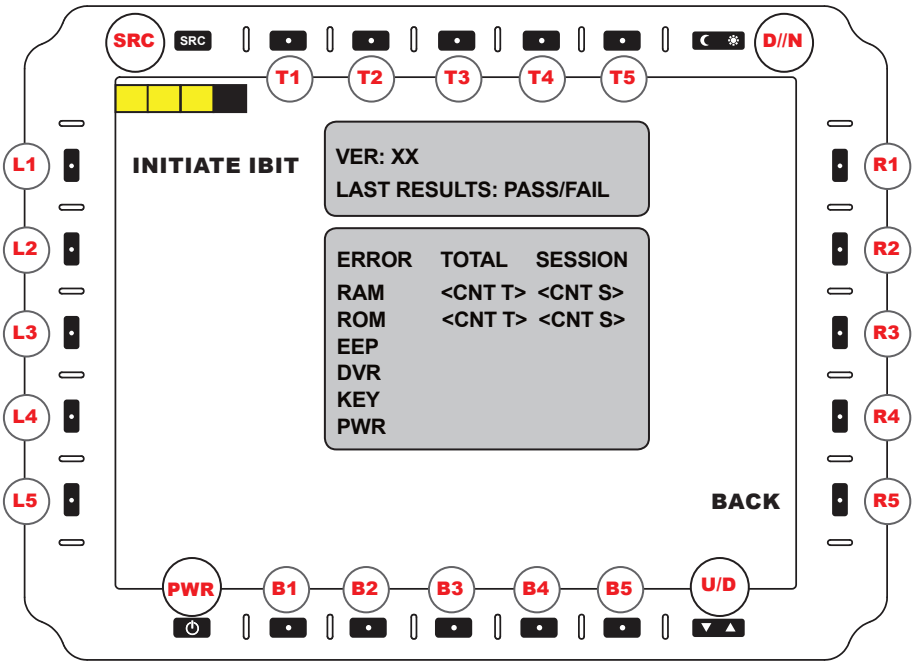



FIGURE 27. IBIT MENU

## INITIATE BIT (IBIT) MENU

The PSM supports a Built-In-Test component, Initiate BIT (IBIT) (Figure 27). This process detects and isolates faults to help User identify the operational readiness, or where necessary, identify degraded or failed system conditions. Results of failures are stored in memory. Access to the IBIT screen is through the Main Menu (Figure 11).

**INITIATE IBIT (L1).** Running Initiate BIT (IBIT) allows User to confirm all systems are functioning. Results are shown as counts per category in the test log box in the center of the display screen. Select INITIATE IBIT (L1) to start the process.

**TEST LOG BOX FIELDS.** The Test Log Box Fields indicate the following:

- Version of IBIT test run
- Lists the overall result of last IBIT test: PASS or FAIL
- TOTAL: Lists the total ERROR count from unit's initial Power ON (manufacture date)
- SESSION: Lists the ERROR count from unit's current Power ON session, and
- Lists an Error Code. (See Error Codes, next page, Table 7)

# IBIT MENU (CONTINUED)

**ERROR CODES**. If there are conflicts within the PSM, they may be indicated by the following ERROR CODES (Table 7). The Error Code is displayed in the on-screen Error Log Message. Example: “ERROR 1 (IF ANY)”.

**BACK (R5).** Returns to MAIN MENU (Figure 11).

| ERROR CODES | ERROR CODE EXPLANATION |
|---|---|
| **RAM ERROR** | A series of bit patterns are written across the RAM. The test fails if the pattern read back at an address does not match the written pattern. |
| **ROM ERROR** | Bootloader firmware or application firmware validation failed. This could be due to a bad checksum, file length or incorrect meta-data. |
| **EEP ERROR** | EEP file header was incorrect or communication with the device failed. |
| **DVR ERROR** | Indicates there is a failed communication with DVR Module Communication Error. |
| **KEY** | Indicates there is a failed communication with the Keys/Buttons Circuit. |
| **PWR** | Indicates there is a failed communication with the Power Module. |

TABLE 7

***This section is intentionally left blank.***

# EVENTS PERFORMED AT BUILT-IN-TEST (BIT)

The System Test can be run at Power ON, when initiated by a BIT serial command, when initiated by the user from the I-BIT menu, or System Test can run continuously. Table 8 shows when each test is run, in various BITs: Power-up (P-BIT); Initiated Serial and Iniatiated Menu (I-BIT), and Continuous (C-BIT).

## Events Performed at P-BIT, I-BIT and C-BIT

| SYSTEM TEST NAME | POWER UP | INITIATED SERIAL | INITIATED MENU | CONTINUOUS |
|---|---|---|---|---|
| RAM ERROR | YES | YES | YES | NO |
| ROM ERROR | YES | YES | YES | NO |
| EEP ERROR | YES | YES | YES | NO |
| DVR ERROR | YES | NO | NO | YES |
| KEY ERROR | YES | YES | YES | NO |
| PWR ERROR | YES | YES | YES | NO |

TABLE 8

***This section is intentionally left blank.***

# UTILITY MENU

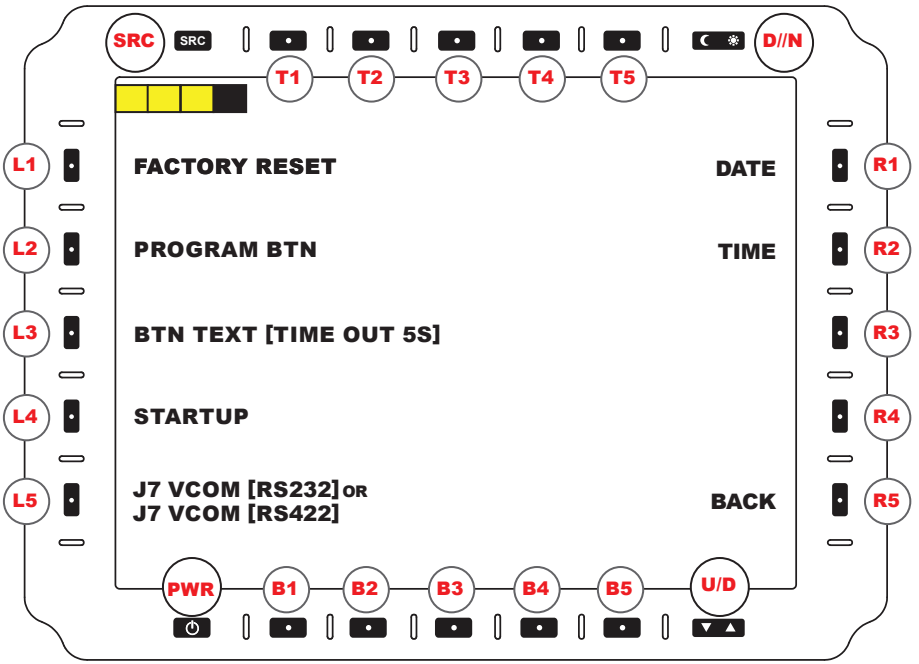



FIGURE 28. UTILITY MENU

## UTILITY MENU

Many options are set in the Utility Menu (Figure 28), accessed through the Main Menu.

**FACTORY RESET (L1).** Dialogue box reads FACTORY RESET WILL OVERWRITE ALL SETTINGS WITH THEIR DEFAULT STATE. PERFORM FACTORY RESET? User selects YES (R4) (Confirm) or NO (R5) (Cancel). During Factory Reset, screen message reads PERFORMING FACTORY RESET. Display resets (30 seconds); defaults are:

- VIDEO LAYOUT: Resets to Single Channel (no PIP/POP/QUAD)
- VIDEO SOURCES: All ENABLED; Composites (4)
- SERIAL COMMUNICATIONS PORTS: Sets to RS232
- CONTRAST: Resets to a predetermined factory setting
- KEY DOWN/KEY UP: Restores to Text List (See Section Communication Protocol)
- BUTTON TEXT: restores to ON, and
- NVIS COLOR (If Option installed): Sets to GREEN.

**PROGRAM BTN (L2).** Initiates Programmable Softkey (Select Key) Menu (Figure 34).

**BTN TEXT (L3).** Adjust Button Label Text as to: Always ON, Hide, Timeout 3S, 5S, or 7S.

**STARTUP (L4).** Opens Startup Menu (Figure 32).

**J7 VCOM (L5).** Opens Comm. Options (Figure 31); toggles between RS232 or RS422.

**DATE (R1).** Opens Date Adjust Menu (Figure 29).

**TIME (R2).** Opens Time Adjust Menu (Figure 30).

**BACK (R5).** Returns to Main Menu (Figure 11).

# DATE ADJUST MENU

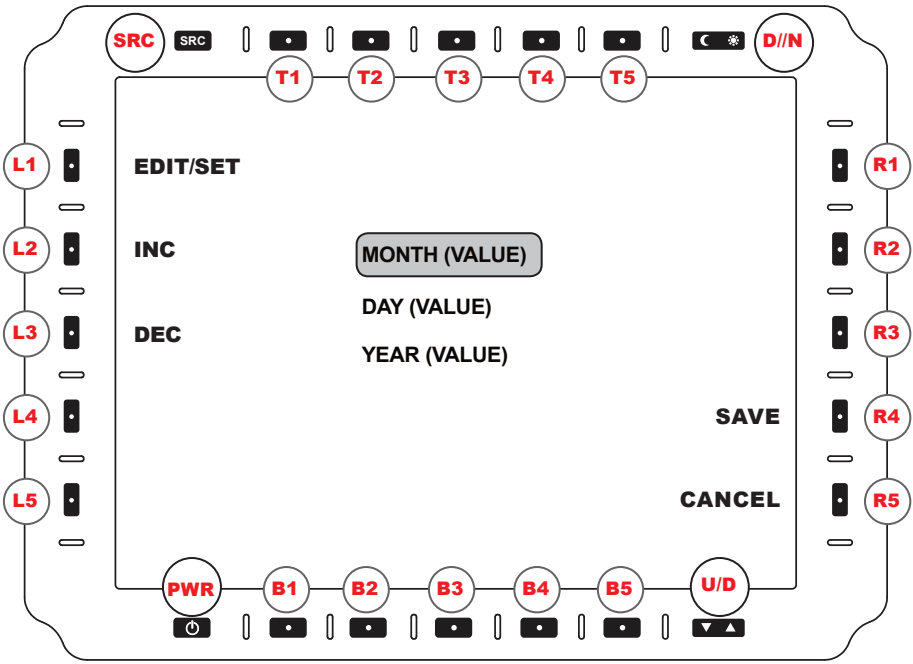



FIGURE 29. DATE ADJUST MENU

## DATE ADJUST MENU

The Date Adjust Menu (Figure 29) is accessed through the Utility Menu. This menu allows User to establish DATE settings. The highlight box indicates the value to be changed.

**EDIT/SET (L1).** Select to begin editing selected value (MONTH, DAY OR YEAR). Set value to selected item (MONTH, DAY OR YEAR).

**INC (L2).** Navigate to next item (MONTH, DAY OR YEAR) or increment selected value if editing.

**DEC (L3).** Navigate to previous item (MONTH, DAY OR YEAR) or decrement selected value if editing.

**CANCEL (R5).** Returns to Utility Menu (Figure 28) without saving changes.

**SAVE (R4).** Saves DATE and returns to Utility Menu (Figure 28).

# TIME ADJUST MENU

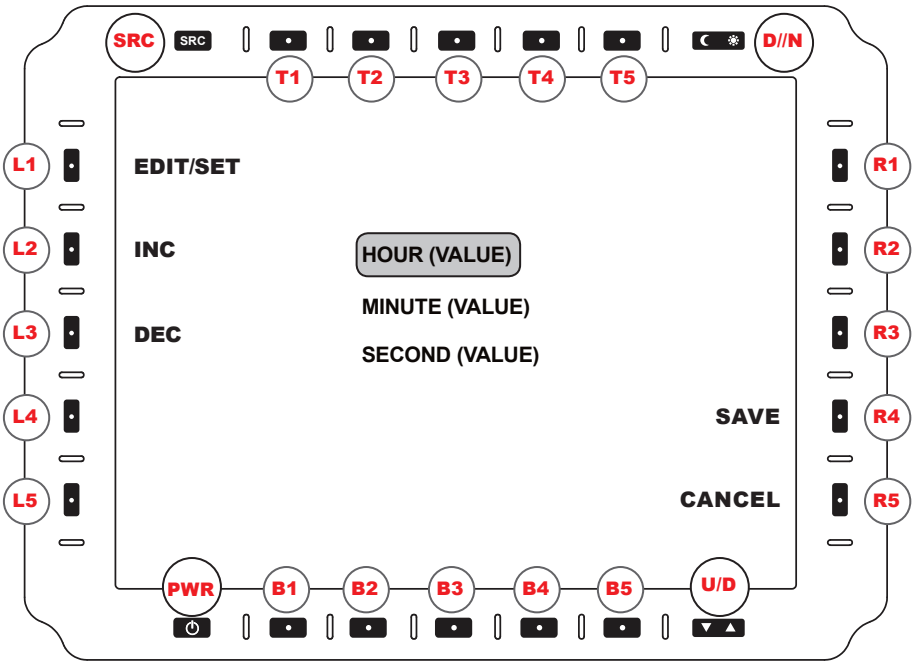



FIGURE 30. TIME ADJUST MENU

## TIME ADJUST MENU

The Time Adjust Menu (Figure 30) is accessed through the Utility Menu. This menu allows User to set TIME settings. The highlight indicates the value to be changed.

**EDIT/SET (L1).** Select to begin editing selected value (HOUR, MINUTE, or SECOND). Set value to selected item (HOUR, MINUTE, or SECOND).

**INC (L2).** Navigate to next item (HOUR, MINUTE, or SECOND) or increment selected value if editing.

**DEC (L3).** Navigate to previous item (HOUR, MINUTE, or SECOND) or decrement selected value if editing.

**CANCEL (R5).** Returns to Utility Menu (Figure 28) without saving changes.

**SAVE (R4).** Saves TIME and returns to Utility Menu (Figure 28).

# COMMUNICATIONS MENU

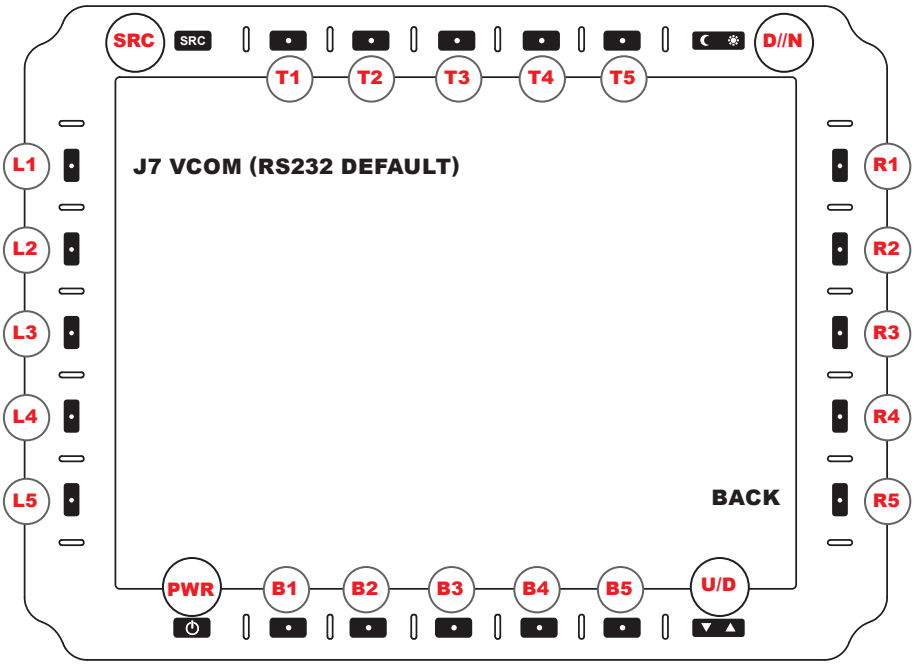



FIGURE 31. J7 VCOM COMMUNICATIONS MENU

## COMMUNICATIONS MENU

The Communications Menu (Figure 31) is where setting options are made for communications port J7 VCOM. Either RS232, RS422 or OFF are selected, dependent on User requirements. This Menu is accessed through the Utility Menu.(Figure 28).

The factory reset default is RS232.

**J7 VCOM (L1).** User selects either RS232 (Default), RS422 or OFF for J7 VCOM port communications setting.

**BACK (R5).** Returns to Utility Menu (Figure 28).

***This section is intentionally left blank.***

# STARTUP MENU

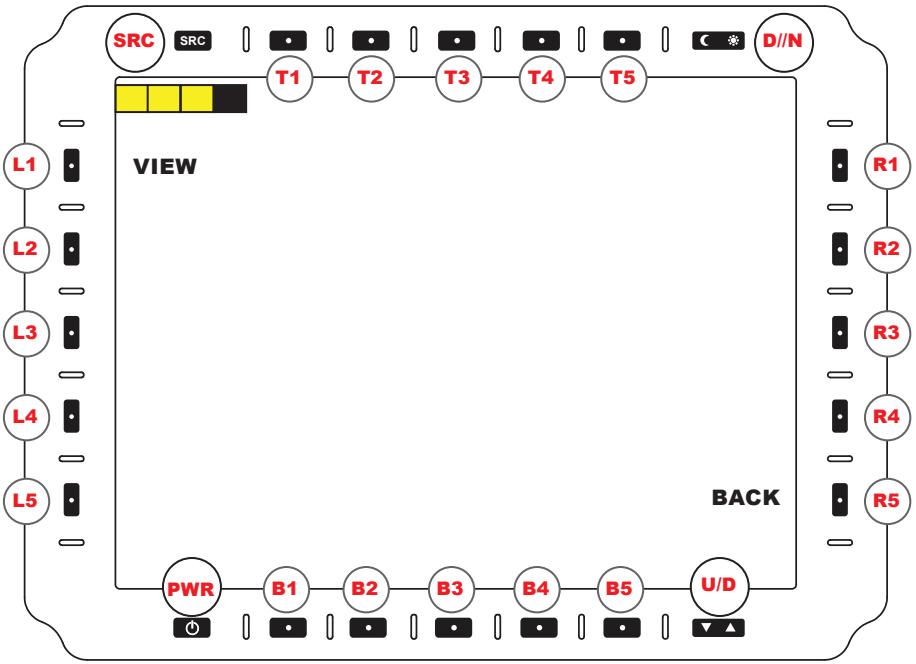



FIGURE 32. STARTUP MENU

## STARTUP MENU

The Startup Menu (Figure 32) is where Startup settings and options are selected through the submenu View Startup (Figure 33). This menu is accessed through the Utility Menu (Figure 28).

**VIEW (L1).** Enters View Startup Menu (Figure 33).

**BACK (R5).** Returns to Utility Menu (Figure 28).

# SOFTKEY BUTTONS

There are (20) softkey buttons; (5) keys on left (L1-5), right (R1-5), bottom (B1-5) and top, (T1-5) (Figure 7). Use keys to select on-screen menu options. Keys are illuminated in Day or Night mode and off in Display OFF mode. Night luminance is subdued to match existing platform night lighting scheme.

USER TIP

SRC From other menu screens, hold down SRC Button for (3) seconds to return to Main Menu.

# VIEW STARTUP MENU

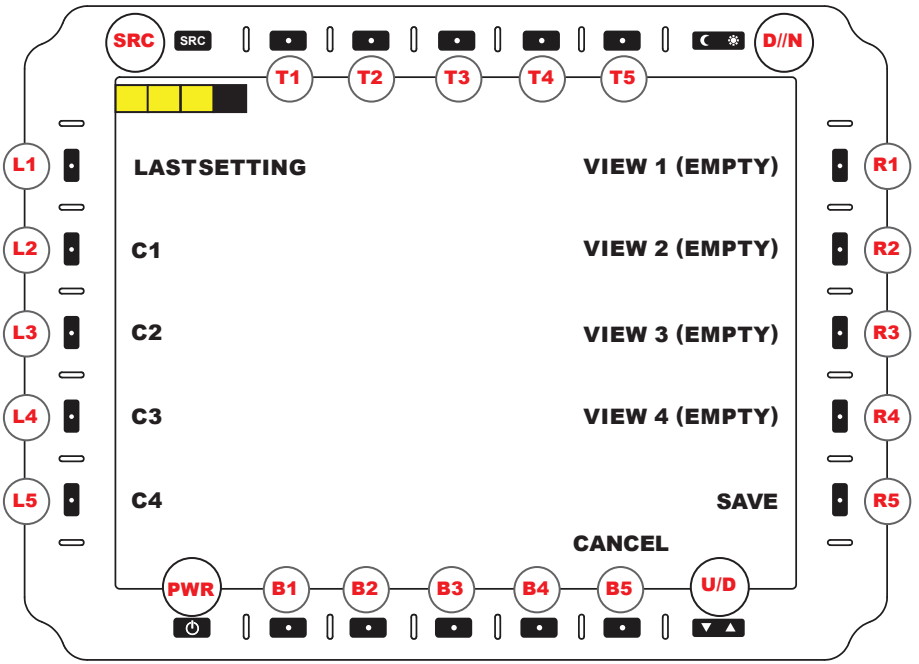



FIGURE 33. VIEW STARTUP MENU

## VIEW STARTUP MENU

The View Startup Menu (Figure 33) is where Startup settings and options are selected; this menu is accessed through the Startup Menu (Figure 32).

**LAST SETTING (L1).** Starts with last used view settings.

**C1 (L1).** Starts with Composite 1, full screen.

**C2 (L2).** Starts with Composite 2, full screen.

**C3 (L3).** Starts with Composite 3, full screen.

**C4 (L4).** Starts with Composite 4, full screen.

**VIEW 1 (R1).** Select from PIP/POP/QUAD View 1. (View name replaces 'Empty')

**VIEW 2 (R2).** Select from PIP/POP/QUAD View 2. (View name replaces 'Empty')

**VIEW 3 (R3).** Select from PIP/POP/QUAD View 3. (View name replaces 'Empty')

**VIEW 4 (R4).** Select from PIP/POP/QUAD View 4. (View name replaces 'Empty')

**SAVE (R5).** Saves View selection for next Power ON view. Auto-returns to Startup Menu (Figure 32).

**CANCEL (B5).** Cancels entry. Returns to Startup Menu (Figure 32).

# PROGRAMMABLE SOFTKEY MENU (SELECT KEY)

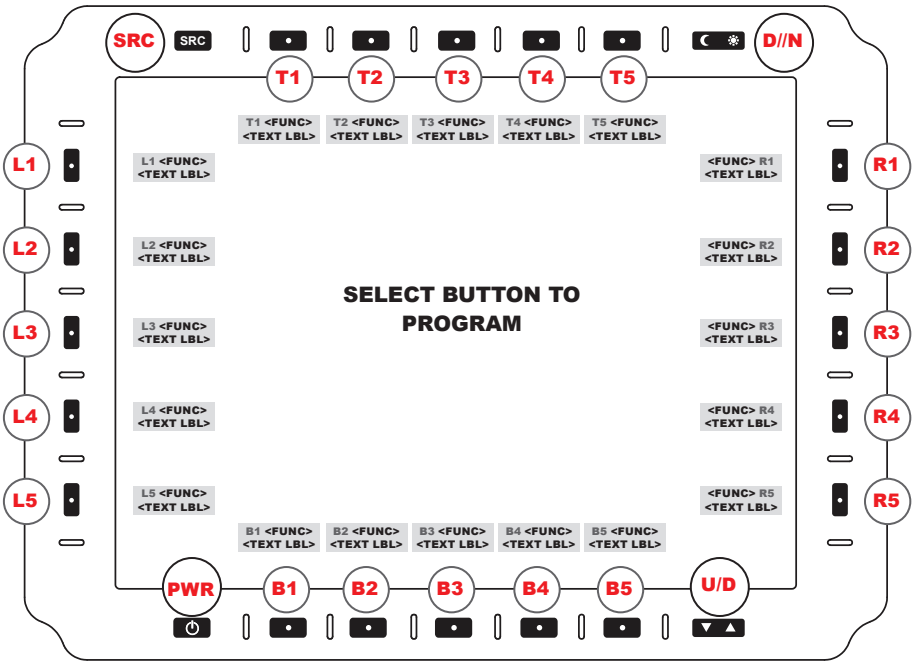



FIGURE 34. PROGRAMMABLE SOFTKEY ASSIGNMENT MENU

## PROGRAMMABLE SOFTKEY ASSIGNMENT MENU (SELECT KEY)

The front bezel twenty (20) softkeys are in a layout of five keys on the left (L1-5), right (R1-5), bottom (B1-5) and top, (T1-5) (Figure 34). Use these keys to select on-screen menu options. The keys are illuminated in Day or Night mode and off in Off mode. Night luminance is subdued to match existing platform night lighting.

Identification of the assigned function should be visible next to the key selected.

***Additional softkey information is communicated over the serial communication link as provided by the Host device.***

### KEY DOWN/KEY UP

When Keys are programmed with the COMM CMD function, they will transmit a Key Down message and Key Up message. Simultaneous Key presses can be detected when multiple Key Down messages are transmitted before Key Up messages are transmitted.

For example, L1-down (hold) followed by L2-down.

### DSE'S ALTERNATE PROGRAMMING SOFTWARE

DSE's Alternate Programming Software allows for customizing the OSD labels, key functions, and Key Down/Up messages. See DSE's website for the instructions document or e-mail: info@digitalsys.com for assistance.

# PROGRAMMABLE SOFTKEY MENU (SET FUNCTION)

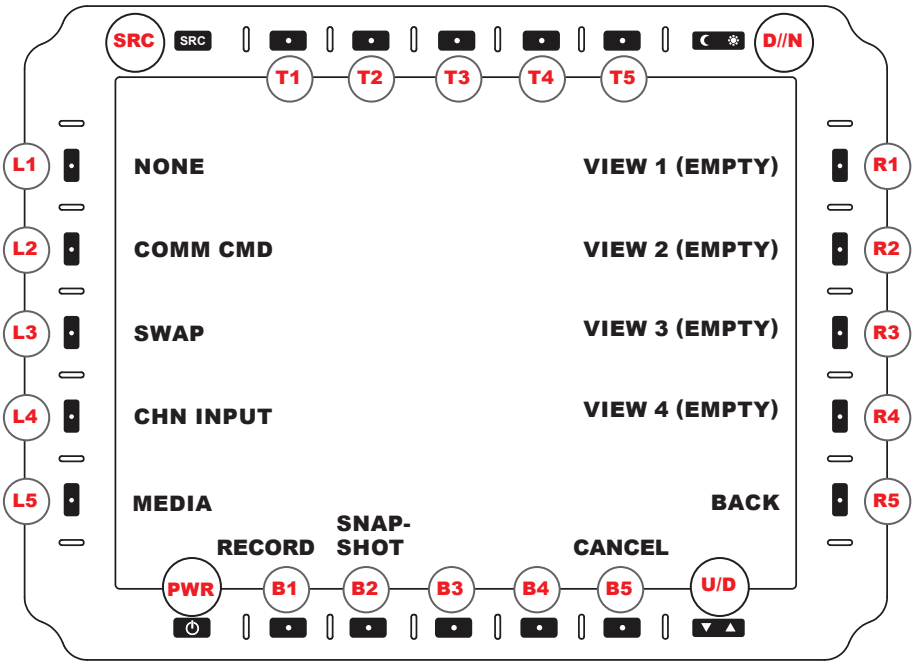



FIGURE 35. PROGRAMMABLE SOFTKEY SET FUNCTION MENU

## PROGRAMMABLE SOFTKEY MENU (SET FUNCTION)

User selects a softkey (Figure 35) to set a specific function into that key. A virtual keyboard appears to input the assigned function's identification.

**NONE (L1).** No action takes place when key is pressed.

**COMM CMD (L2).** Programmed text command transmits when key is pressed.

**SWAP (L3).** CH1 and CH2 swap Video Inputs.

**CHN INPUT (L4).** Opens Programmable Softkey Set Input Function Menu (Figure 36).

**MEDIA (L54).** Opens Media Menu.

**RECORD (B1).** Starts or stops a Recording.

**SNAPSHOT (B2).** Takes a Snapshot (JPG) of Input source in view; saves in Media Gallery.

**VIEW 1 (R1).** User-configured layout entry 1 toggles ON and OFF. 'Empty' displays or the saved PIP/POP/QUAD view name.

**VIEW 2 (R2).** User-configured layout entry 2 toggles ON and OFF. 'Empty' displays or the saved PIP/POP/QUAD view name.

**VIEW 3 (R3).** User-configured layout entry 3 toggles ON and OFF. 'Empty' displays or the saved PIP/POP/QUAD view name.

**VIEW 4 (R4).** User-configured layout entry 4 toggles ON and OFF. 'Empty' displays or the saved PIP/POP view name.

**BACK (R5).** Returns to Select Programmable Softkey Select Key Menu, (Figure 34).

**CANCEL (B5).** Cancels entry. Returns to Utility Menu (Figure 28).

# PROGRAMMABLE SOFTKEY (SET INPUT FUNCTION)

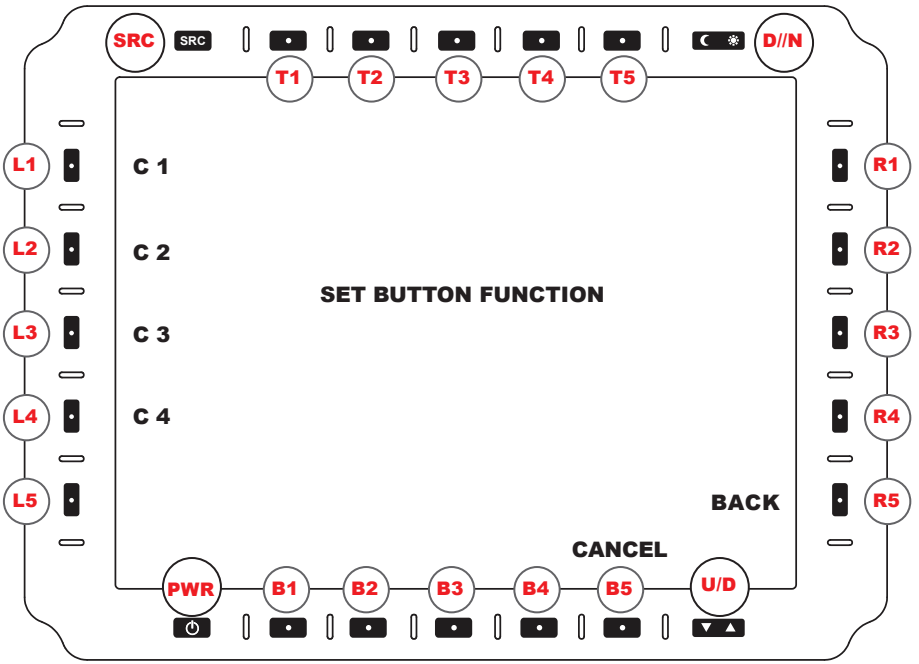



FIGURE 36. PROGRAMMABLE SOFTKEY SET INPUT FUNCTION MENU

## PROGRAMMABLE SOFTKEY MENU (SET INPUT FUNCTION)

In the Programmable Softkey Set Input Function Menu, User selects a specific key (Figure 36) to set the Video Feed input.

**C1 (L1).** CH1 displays the Composite 1 Video Input.

**C2 (L2).** CH1 displays the Composite 2 Video Input.

**C3 (L3).** CH1 displays the Composite 3 Video Input.

**C4 (L4).** CH1 displays the Composite 4 Video Input.

**BACK (R5).** Returns to Programmable Softkey Set Function Menu (Figure 35).

**CANCEL (B5).** Cancels entry; returns to Utility Menu (Figure 28).

# PROGRAMMABLE SOFTKEY MENU (ENTER NAME)

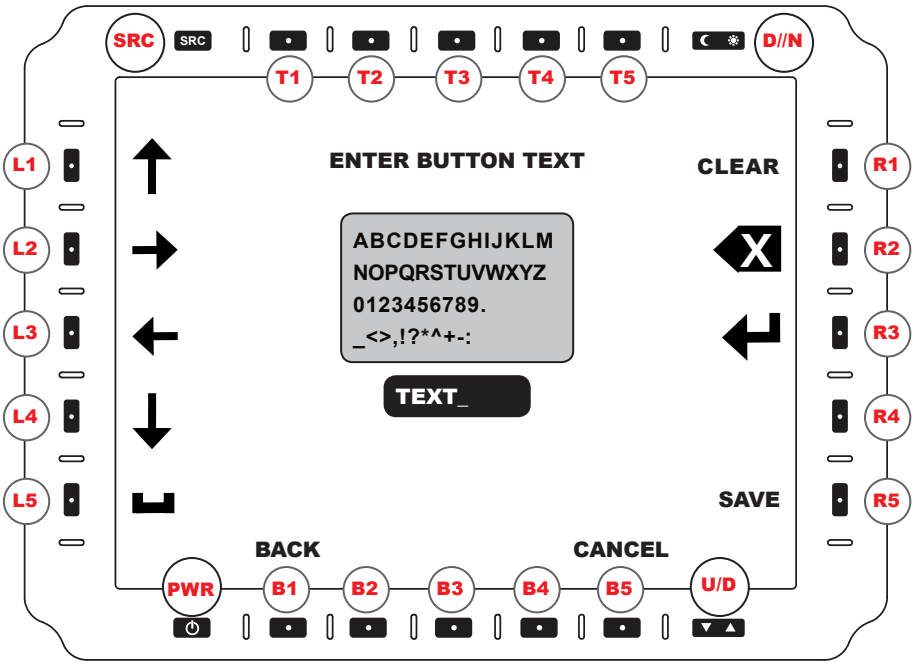



FIGURE 37. PROGRAMMABLE SOFTKEY ENTER NAME MENU

## PROGRAMMABLE SOFTKEY MENU (ENTER NAME)

In the Programmable Softkey Enter Name Menu, User can enter custom text (Figure 37) for the default screen key names. Select key; backspace to clear default test; customize.

**SELECT (R3).** Enters Character.

**BACKSPACE (R2).** Deletes Last Character.

**CLEAR (R1).** Clears the Text Entry.

**UP (L1).** Navigates Selection Cursor UP.

**RIGHT (L2).** Navigates Selection Cursor RIGHT.

**LEFT (L3).** Navigates Selection Cursor LEFT.

**DOWN (L4).** Navigates Selection Cursor DOWN.

**SPACE (L5).** Adds an empty SPACE (as in a spacebar press).

**SAVE (R5).** Exits Menu and Saves Changes.

**BACK (B1).** Returns to Programmable Softkey Set Function Menu (Figure 35).

**CANCEL (B5).** Cancels entry; returns to Utility Menu (Figure 28).

## COMMUNICATION PROTOCOL

The PSM protocol uses packets based on the NMEA message format. This consists of an ID, comma delimited fields, a checksum field and a two-character checksum. A response message is transmitted from the PSM upon receiving a message. It will either be the specific response for the command, a general DSACK response, or a DSNAK response if the command is not recognized or the packet is invalid.

The System Test can be run at Power ON, when initiated by a BIT serial command, when initiated by the user from the I-BIT menu, or System Test can run continuously. Table 11 shows when each test is run, in various BITs: Power-up (P-BIT); Initiated Serial and Initiated Menu (I-BIT), and Continuous (C-BIT). This Table is a repeat of page 38, Events Performed at Built-In-Test (BIT).

### Events Performed at P-BIT, I-BIT and C-BIT

| SYSTEM TEST NAME | POWER UP | INITIATED SERIAL | INITIATED MENU | CONTINUOUS |
|---|---|---|---|---|
| RAM ERROR | YES | YES | YES | NO |
| ROM ERROR | YES | YES | YES | NO |
| EEP ERROR | YES | YES | YES | NO |
| DVR ERROR | YES | NO | NO | YES |
| KEY ERROR | YES | YES | YES | NO |
| PWR ERROR | YES | YES | YES | NO |

TABLE 8

## PHYSICAL AND DATA LINK LAYER

The PSM communicates via RS232 or RS422 interface using the following port settings (Table 9).

| | |
|---|---|
| BAUD RATE | 19200 bps |
| DATA BITS | 8 |
| PARITY | NONE |
| START BITS | 1 |
| STOP BITS | 1 |
| FLOW CONTROL | NONE |

TABLE 9. RS232/RS422 PORT SETTINGS

# COMMUNICATION PROTOCOL (CONTINUED)

## PACKAGE MESSAGE FORMAT

The NMEA (standard protocol) message format is an ASCII string that consists of a message ID, comma delimited data fields and a checksum field. The message format is described in Table 10.

| LENGTH | VALUE | DESCRIPTION |
|---|---|---|
| 1 | '$' | Packet Message Start Byte |
| 5 | MSGID | Message Identifier; first two characters represents the manufacturer (DS); last three are Command Code |
| n | Comma Delimited Fields | Field 0, Field 1, Field n |
| 1 | '*' | Checksum Delimiter Byte |
| 2 | Checksum | Checksum is two ASCI characters representing a hexadecimal byte 00 to FF. Value is the exclusive OR (XOR) of all bytes between, but not including characters '$' and '*' |
| 2 | [CR][LF] | Carriage Return Character (OxD) and Line Feed (OxA) combination terminates the message |

TABLE 10. NMEA MESSAGE FORMAT

## CHECKSUM CALCULATION

```
unsigned char ComputeChecksum(string text)
{
        unsigned char startInx, endInx, result;

        startInx = Pos('$', text) + 1;    //start at character after '$' in string
        endInx = Pos('*', text) - 1;      //end at character before '*' in string
        result = 0;

        for(int n = startInx; n < = endInx; n++)
        {
                result = result ^ text[n];
        }

        return result;
}
```

## COMMANDS

The following table references the commands the PSM supports (Table 11).

| COMMAND | DIRECTION | RESPONSE | DESCRIPTION |
|---|---|---|---|
| DSKDN | From PSM | N/A | Key pressed |
| DSKUP | From PSM | N/A | Key released (from press) |
| DSCDV | To PSM | DSACK/DSNAK | Change Display Video |
| DSIBT | To PSM | DSBTR/DSNAK | initiates IBIT System Test (PSM) |
| DSBTQ | To PSM | DSBTR/DSNAK | Requests last IBIT System Test results |
| DSBTR | From PSM | N/A | IBIT System Test Response |
| DSFWQ | To PSM | DSACK/DSNAK | Request Firmware Version |
| DSFWR | From PSM | N/A | Firmware Version Response |
| DSPKM | To PSM | DSACK/DSNAK | Program Key Mode |
| DSPKD | To PSM | DSACK/DSNAK | Program Key Down Text Message |
| DSPKU | To PSM | DSACK/DSNAK | Program Key Up Text Message |
| DSPKF | To PSM | DSACK/DSNAK | Program Key Function |
| DSPKT | To PSM | DSACK/DSNAK | Program Key OSD Label Text |
| DSKDQ | To PSM | DSKDR/DSNAK | Request Program Key Down TX Message |
| DSKUQ | To PSM | DSKUR/DSNAK | Request Program Key Up TX Message |
| DSKFQ | To PSM | DSKFR/DSNAK | Request Program Key Function |
| DSKTQ | To PSM | DSKTR/DSNAK | Request Program Key OSD Label Text |
| DSKDR | From PSM | N/A | DSKDQ Response |
| DSKUR | From PSM | N/A | DSKUQ Response |
| DSKFR | From PSM | N/A | DSKFQ Response |
| DSKTR | From PSM | N/A | DSKTQ Response |
| DSACK | From PSM | N/A | Acknowledge Response; Used if PSM acknowledges command |
| DSNAK | From PSM | N/A | Not Acknowledged Response; Used if command was not recognized by PSM or the command contained errors |

TABLE 11. COMMANDS

# PROTOCOL MESSAGE COMMANDS

## DSKDN "KEY DOWN" COMMAND

The DSKDN Key Down command will transmit a message after a key has been pressed. The message transmitted can be programmed using the DSPKD (Program Key Down) command. Each key can transmit up to 20 bytes. If a custom message has not been programmed, a factory default message for the key will transmit.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKDN,L1*07[CR][LF]
***Factory default*** transmit message for top left key (L1) on Press Down.

L1D[CR][LF]
Message "$DSPKD,L1,4C31440D0C*47[CR][LF]" used to program key L1 to transmit "L1D" on Press Down. (Custom message)

0x01 0x02 0x03
Message "$DSPKD,L1,010203*32[CR][LF]" used to program key L1 to transmit the three bytes 0x01, 0x02, and 0x03 on Press Down. (Custom message)

Response: N/A

***Warning: A factory reset will revert the key down message to factory default (see "Factory Default Key Down and Key Up Transmit Text" section).***

## DSKUP "KEY UP" COMMAND

The DSKUP Key Up command transmits a message after a key has been released from Key (press) Down. The message transmitted can be programmed using DSPKU (Program Key Up) command. Each key can transmit up to 20 bytes. If a custom message has not been programmed, a factory default message for the key will transmit.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKUP,L1*08[CR][LF]
***Factory default*** transmit message for top left key (L1) when released (from Press Down).

Response: N/A

***Warning: A factory reset will revert the key down message to factory default (see "Factory Default Key Down and Key Up Transmit Text" section).***

# COMMUNICATION PROTOCOL (CONTINUED)

## DSCDV "CHANGE DISPLAYED VIDEO" COMMAND

The DSCDV Change Displayed Video command is used to change the Video Input Source.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Source | C1, C2, C3, C4 |

Example: $DSCDV,C1*18[CR][LF]
Video changed to Composite 1 input.

Response: DSACK or DSNAK

## DSIBT "INITIATE IBIT" COMMAND

The DSIBT Initiate IBIT command starts the IBIT System Test. Immediately upon receiving DSIBT, the PSM responds with DSBTR (Request IBIT Results), indicating the IBIT test set is incomplete. When IBIT completes, the DSBTR is transmitted with IBIT results. The PSM is unable to process any commands until the IBIT test has completed.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Placeholder | 00 |

Example: $DSIBT,00*64[CR][LF] (Command runs.)

Response: DSBTR: transmitted after IBIT test with IBIT not completed, then again after IBIT completes, with test set results. DSNAK: command not recognized or contained errors.

## DSBTQ "REQUEST IBIT RESULTS" COMMAND

The DSBTQ Request IBIT Results command requests the PSM to transmit the last IBIT System Test results. Use DSIBT (Initiate IBIT) command if a test needs to be run.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Placeholder | 00 |

Example: $DSBTQ,00*7C[CR][LF]
Requests an IBIT response from PSM.

Response: DSBTR or DSNAK

## DSBTR "IBIT RESPONSE" COMMAND

The DSBTR IBIT Response command contains status information and results from running IBIT System Test. When DSIBT (initiate IBIT) is received, the PSM immediately transmits an IBIT response with status flags bit 7 set low. Upon completion, the PSM transmits a second response message with status flags bit 7 set high, with test results.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BIT Status Flags | bit 7: 1 IBIT complete / 0 IBIT incomplete<br>bit 6: 1 IBIT success / 0 IBIT fail<br>bit 5: reserved<br>bit 4: reserved<br>bit 3: reserved<br>bit 2: reserved<br>bit 1: reserved<br>bit 0: reserved |
| 1 | BIT Status Flags | Byte order follows big endian format<br>1 = pass / 0 = fail<br><br>bit 15: reserved<br>bit 14: reserved<br>bit 13: reserved<br>bit 12: reserved<br>bit 11: reserved<br>bit 10: reserved<br>bit 9: reserved<br>bit 8: reserved<br>bit 7: reserved<br>bit 6: reserved<br>bit 5: PWR<br>bit 4: KEY<br>bit 3: DVR<br>bit 2: EEP<br>bit 1: ROM<br>bit 0: RAM |

Example: $DSBTR,00,0000*53[CR][LF]
IBIT incomplete response message

Example: $DSBTR,80,0000*5B[CR][LF]
IBIT complete and failed response message

Example: $DSBTR,C0,0000*20[CR][LF]
IBIT complete and successful response message

Response: N/A

## DSFWQ "REQUEST FIRMWARE VERSION" COMMAND

The DSFWQ Request Firmware Version command requests DSFWR (Firmware Version Response) from the PSM.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Placeholder | 00 |

Example: $DSFWQ,00*7B[CR][LF] *(Command runs.)*

Response: DSFWR or DSNAK

## DSFWR "REQUEST FIRMWARE RESPONSE" COMMAND

The DSFWR Request Firmware Response command answers the DSFWA (Request Firmware Version) command. The data contains the year, month, and day of month the firmware was compiled.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Year 20xx | 00-99 |
| 1 | Month | 01-12 |
| 2 | Day of Month | 01-31 |

Example: $DSFWR,13,07,08*75[CR][LF]
*PSM reported Firmware version is July 08 2013*

Response: N/A

## DSPKM "PROGRAM KEY MODE" COMMAND

The DSPKM command can be used to set the DSPKD, DSPKU, DSPKF and DSPKT operating mode. This is useful for disabling drawing until all keys are programmed and for disabling saving key setting to non-volatile storage.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Mode | 00 – Resume Normal Operation (Enable Drawing and Save Values). OSD is redrawn if mode was suspending drawing.<br>01 – Suspend Drawing<br>02 – Suspend Drawing and do not save |

Example: $DSPKM,01*6C[CR][LF] //Suspend drawing
… program key info
$DSPKM,00*6D[CR][LF] //Resume drawing and force scene to repaint

Response: DSACK or DSNAK

## DSPKD "PROGRAM KEY DOWN TRANSMIT MESSAGE" COMMAND

The DSPKD Program Key Down Transmit Message command is used to program the message a key will transmit when pressed. The data in Field 1 is encoded in a series of ASCII character pairs representing hex bytes. For example, the ASCII characters "0102" represent the two hex bytes 0x01 and 0x02; these two hex bytes transmit when the key is pressed.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Key Down Message | Hex bytes encoded as an ASCII Hex Character Sequence. Maximum data length is 40 bytes, which will represent up to the 20 hex bytes a key can transmit. |

Example: $DSPKD,L1,4C31440D0C*47[CR][LF]
*Top left key (L1) set to transmit "L1D\r\n" when pressed. '\r' and '\n' are escape sequences for carriage return and new line characters.*

Response: DSACK or DSNAK

## DSPKU "PROGRAM KEY UP TRANSMIT MESSAGE" COMMAND

The DSPKU Program Key Up Transmit Message command is used to program the message a key will transmit when released (from Press). The data in Field 1 is encoded in a series of ASCII character pairs representing hex bytes. For example, the ASCII characters "0102" represent the two hex bytes 0x01 and 0x02; these two hex bytes transmit when the key is released.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Key Up Message | Hex bytes encoded as an ASCII Hex Character Sequence. Maximum data length is 40 bytes, which will represent up to the 20 hex bytes a key can transmit. |

Example: $DSPKU,L1,4C31550D0C*56[CR][LF]
*Top left key (L1) set to transmit "L1U\r\n" when pressed. '\r 'and '\n' are escape sequences for carriage return and new line characters.*

***Note: Maximum key up transmit text is 20 bytes.***

Response: DSACK or DSNAK

## DSPKF "PROGRAM KEY FUNCTION" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Function | NONE, COMM, SWAP, VIEW1, VIEW2, VIEW3, VIEW4, C1, C2, C3, C4 |

Example: $DSPKF, L1, COMM*3B
*Top left key (L1) set to cycle the video input*

Response: DSACK or DSNAK

## DSPKT "PROGRAM OSD KEY TEXT" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Hex ACII Text | Hex bytes encoded as an ASCII Hex character Sequence. The hex string must be less than or equal to 12 bytes representing up to 6 characters. |

Example: $DSPFT, L1, 535243*2E
*Top left key (L1) set to display the text "SRC"*

Response: DSACK or DSNAK

## DSKDQ "REQUEST KEY DOWN TRANSMIT MESSAGE" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKUQ,L1*09[CR][LF]

Response: DSKDR or DSNAK

## DSKUQ "REQUEST PROGRAM KEY UP TRANSMIT MESSAGE" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKDQ,L1*18[CR][LF]

Response: DSKUR or DSNAK

## DSKFQ "REQUEST PROGRAM KEY FUNCTION TRANSMIT MESSAGE" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKFQ,L1*1A[CR][LF]

Response: DSKFR or DSNAK

## DSKTQ "REQUEST PROGRAM KEY TEXT TRANSMIT MESSAGE" COMMAND

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKTQ,L1*08[CR][LF]

Response: DSKTR or DSNAK

## DSKDR "KEY DOWN TRANSMIT MESSAGE RESPONSE" COMMAND

The DSKDR is a response message to a DSKDQ and contains the transmit message used when the key is pressed.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |

Example: $DSKDR,L1,4C31440D0C*45[CR][LF]
*Top left key (L1) set to transmit "L1D\r\n" when pressed. '\r' and '\n' are escape sequences for carriage return and new line characters.*

Response: DSACK or DSNAK

## DSKUR "KEY UP TRANSMIT MESSAGE RESPONSE" COMMAND

The DSKUR is a response message to a DSKDQ and contains the transmit message used when the key is released (from being pressed).

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Key Up Message | Hex bytes encoded as an ASCII Hex character Sequence. Maximum data length is 40 bytes, which will represent up to 20 hex bytes a key can transmit. |

Example: $DSKUR,L1,4C31550D0C*54[CR][LF]
*Top left key (L1) set to transmit "L1U\r\n" when pressed. '\r 'and '\n' are escape sequences for carriage return and new line characters.*

***Note: Maximum key up transmit text is 20 bytes.***

Response: DSACK or DSNAK

## DSKFR "KEY FUNCTION RESPONSE" COMMAND

The DSKFR is a response message to the DSKFQ command. The response message contains the function assigned to the key.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Function | NONE, COMM, SWAP, VIEW1, VIEW2, VIEW3, VIEW4, C1, C2, C3, C4 |

Example: $DSKFR, L1, COMM*39 [CR][LF]
*Top left key (L1) is set to cycle the video input*

Response: DSACK or DSNAK

## DSKTR "OSD KEY TEXT RESPONSE" COMMAND

The DSKTR is the response message to a DSKTQ command. The message contains the OSD text assigned to the key.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | BTNID | L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, B1, B2, B3, B4, B5, T1, T2, T3, T4, T5 |
| 1 | Hex ACII Text | Hex bytes encoded as an ASCII Hex character Sequence. The hex string must be less than or equal to 12 bytes representing up to 6 characters. |

Example: $DSKTR, L1, 535243*21[CR][LF]
*Top left key (L1) text is "SRC"*

Response: DSACK or DSNAK

## DSACK "ACKNOWLEDGE RESPONSE" COMMAND

The DSACK Acknowledge Response command is PSM's response to valid commands.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Placeholder | 00 |

Example: $DSACK,00*72[CR][LF] (Command runs.)

Response: N/A

## DSNAK "NOT ACKNOWLEDGE RESPONSE" COMMAND

The DSNAK Not Acknowledge Response command is the PSM's response when it receives a command it does not recognize or the received command has errors such as the checksum failed.

| FIELD | NAME | DATA |
|---|---|---|
| 0 | Placeholder | 00 |

Example:$DSNAK,00*7F[CR][LF] (Command runs.)

Response: N/A

## FACTORY DEFAULT KEY DOWN AND KEY UP TRANSMIT TEXT

These Factory Default Key Down and Key Up softkeys (below) are factory-programmed to transmit the following text messages.

**Note: Softkeys will be reset to these values if a Factory Reset is performed from the Main Menu > Utility Menu > Factory Reset (Figure 27).**

| BTN | Event | Text | BTN | Event | Text |
|---|---|---|---|---|---|
| **L1** | Down | $DSKDN,L1*07[CR][LF] | **R1** | Down | $DSKDN,R1*19[CR][LF] |
| | Up | $DSKUP,L1*08[CR][LF] | | Up | $DSKUP,R1*16[CR][LF] |
| **L2** | Down | $DSKDN,L2*04[CR][LF] | **R2** | Down | $DSKDN,R2*1A[CR][LF] |
| | Up | $DSKUP,L2*0B[CR][LF] | | Up | $DSKUP,R2*15[CR][LF] |
| **L3** | Down | $DSKDN,L3*05[CR][LF] | **R3** | Down | $DSKDN,R3*1B[CR][LF] |
| | Up | $DSKUP,L3*0A[CR][LF] | | Up | $DSKUP,R3*14[CR][LF] |
| **L4** | Down | $DSKDN,L4*02[CR][LF] | **R4** | Down | $DSKDN,R4*1C[CR][LF] |
| | Up | $DSKUP,L4*0D[CR][LF] | | Up | $DSKUP,R4*13[CR][LF] |
| **L5** | Down | $DSKDN,L5*03[CR][LF] | **R5** | Down | $DSKDN,R5*1D[CR][LF] |
| | Up | $DSKUP,L5*0C[CR][LF] | | Up | $DSKUP,R5*12[CR][LF] |
| | | | | | |
| **B1** | Down | $DSKDN,B1*09[CR][LF] | **T1** | Down | $DSKDN,T1*1F[CR][LF] |
| | Up | $DSKUP,B1*06[CR][LF] | | Up | $DSKUP,T1*10[CR][LF] |
| **B2** | Down | $DSKDN,B2*0A[CR][LF] | **T2** | Down | $DSKDN,T2*1C[CR][LF] |
| | Up | $DSKUP,B2*05[CR][LF] | | Up | $DSKUP,T2*13[CR][LF] |
| **B3** | Down | $DSKDN,B3*0B[CR][LF] | **T3** | Down | $DSKDN,T3*1D[CR][LF] |
| | Up | $DSKUP,B3*04[CR][LF] | | Up | $DSKUP,T3*12[CR][LF] |
| **B4** | Down | $DSKDN,B4*0C[CR][LF] | **T4** | Down | $DSKDN,T4*1A[CR][LF] |
| | Up | $DSKUP,B4*03[CR][LF] | | Up | $DSKUP,T4*15[CR][LF] |
| **B5** | Down | $DSKDN,B5*0D[CR][LF] | **T5** | Down | $DSKDN,T5*1B[CR][LF] |
| | Up | $DSKUP,B5*02[CR][LF] | | Up | $DSKUP,T5*14[CR][LF] |

***This section is intentionally left blank.***

# INTERNAL HEATER

## INTERNAL HEATER

The Internal Heater automatically brings the Display up to standard operating temperature if the Display is below that temperature when powered on.

## OPERATIONS

- The flashing blue LED behind the Power Button indicates the Display is in heating mode, bringing the Display up to operational temperature
- Once the Display is up to operational temperature, the flashing LED becomes a constant blue illumination and the Display automatically powers on
- Maximum time for the Display to reach operational temperature is approximately 12 minutes (15 minutes for 15”), and
- There are no user adjustments for the Internal Heater function.

# APPENDIX A

## MECHANICAL DRAWINGS

Mount diagrams and dimensions may be of assistance in installation. Overview drawings may be found on the corresponding product page on the DSE website (www.digitalsys.com). When on the product page, scroll down and select the Download tab and follow instructions.

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# NOTES

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**DIGITAL SYSTEMS ENGINEERING, INC. (DSE)**
17491 NORTH 93RD STREET | SCOTTSDALE, AZ 85255
**DSE SERVICE CENTER: 480-515-1110**
**SERVICE@DIGITALSYS.COM | WWW.DIGITALSYS.COM**