

PROGRAMMABLE BUTTON DISPLAY MULTI-INPUT



USER MANUAL

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

OWNER RECORD

Here is an easy-to-locate form to record the Display's serial number. The serial number is located on the back of the enclosure.

From the invoice, record the invoice date, which starts the Display's warranty period.

if the Display ever requires service, please refer to this information when contacting the nearest service center.

PRODUCT	SERIAL NUMBER					INVOICE DATE

INFORMATION DISCLAIMER

WARRANTY

PROGRAMMABLE BUTTON DISPLAY MULTI-INPUT



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WELCOME.

With this acquisition of this Military Grade User Programmable Multi-Input Display, you have chosen a leading edge, high quality and reliability product designed for rugged service. With 20 programmable buttons, this 'smart' display offers ASCII or HEX code protocol for control of external systems and/or internal display features.

Housed in an ultra-thin milled billet aluminum case, the slim-profile display is light weight and watertight, with fully sealed IP67 connectors. Engineered to operate on low power consumption, the display manages multiple incoming signals: DVI, RS170 and VGA, and is auto-sensing on NTSC/PAL. The Source Select button allows the user to quickly move between video inputs.

Incorporated into the display is the latest in optical engineering to achieve optimal viewability in all lighting conditions. This bright sunlight-readable flat panel LED LCD Display is engineered to thrive wherever it is put to work. This Display is specifically designed for rugged mobile computing and handles a wide-range of severe environments, making it the go-to selection of many industries for their mobile applications.

The display offers the productivity-oriented option of Analog Resistive Touch Screen.

GENERAL SAFETY

SAFETY ICONS

Safety icons are displayed throughout the User manual to draw attention to specific User caution and warning instructions.



WARNING!

WARNING! SHOCK HAZARDS

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



CAUTION!

CAUTION! INSTRUCTIONAL

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

GENERAL SAFETY INSTRUCTIONS

- Before operating the 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 the User Manual's operating instructions; improper adjustment of other controls voids the Display's warranty and may result in Display damage, and
- Adhere to local installation codes.

GENERAL UNIT 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 personnel.



WARNING!

GENERAL SAFETY PRECAUTIONS

- Power cable must be connected to a properly wired and grounded power source
- Any equipment 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 display screen should be shattered. Aside from obvious glass shards, the fluids in the LCD are a known skin irritant.



CAUTION!

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



CAUTION!

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 computer 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
- 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.



WARNING!

POWER CONSUMPTION

Display power consumption is listed at 30 Watts maximum.

PRODUCT CARE

PRODUCT CARE

This Display has been designed to provide optimum performance and service without any required scheduled maintenance other than occasional cleaning.



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 a soft clean cloth lightly dampened with a general purpose 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 Qualified Service personnel should perform all other maintenance except for cleaning and power cable replacement as described.



WARNING!

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 - FACTORY

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 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.

SYSTEM SETUP

SYSTEM REQUIREMENTS

The display accepts Composite and DVI video signals.

SHIPPING BOX CONTENTS

The display 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 Service Center. Shipping box contents are:

- Display, cables and optional mounting hardware.

INSTALLATION

The display is installed with: panel mount (M4); VESA mount (75mm / M4) or RAM mount (M4). Follow known-good practices during installation.

DISPLAY CONNECTORS

CABLES

Cables can be provided with the unit, or supplied by the User.



Use caution when coupling or uncoupling cables and connectors.

CONNECTORS

Connectors are located on the rear of the chassis. From left to right, see Figure 1, Table 1 for connector assignments.

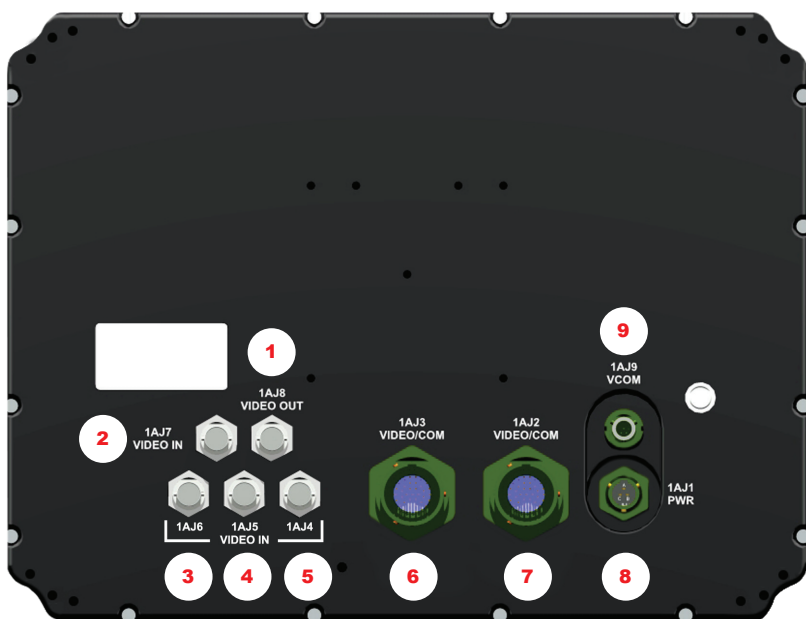


FIGURE 1

POSITION	CONNECTOR	CALL - OUT
1	VIDEO OUT	A1J8
2	VIDEO IN	A1J7
3	VIDEO IN	A1J6
4	VIDEO IN	A1J5
5	VIDEO IN	A1J4
6	DVI	A1J3
7	DVI	A1J2
8	POWER	A1J1
9	VCOM	A1J9

TABLE 1

DISPLAY CONNECTORS (CONTINUED)

POWER CONNECTOR (A1J1)

The military grade sealed power Connector is A1J1. See Table 2, right.

- Align up with A1J1 connector; See Figure 1, #8
- Add a twist to lock

POWER CONNECTOR	
A1J1 PWR	
PIN	SIGNAL
A	28 VOLT DC
B	28 VOLT RTN
C	CHASSIS GROUND
AMPH	71-533721-33P
MATE	PT06E-833SSR

TABLE 2

DVI RECEPTACLES (A1J2, A1J3)

See Table 3, below.

- Align with A1J2 or A1J3 connector; See Figure 1, #7, 6
- Add a twist to lock

DVI RECEPTACLE			
A1J2, A1J3 DVI			
PIN	SIGNAL	PIN	SIGNAL
1	DVI Rx 2-	21	DVI AN BLUE
2	DVI Rx 2+	22	DVI HSYNC
3	DVI Rx 2 g ND	23	ANALOG GND
4	DVI DDC SCL	24	DIGITAL GND
5	DVI DDC SDA	25	USB- TOUCH
6	DVI v SYNC	26	USB+ TOUCH
7	DVI RX1-	27	DIGITAL GND
8	DVI RX1+	28	RS232 TXD TOUCH
9	DVI RX1 GND	29	RS232 RXD TOUCH
10	DVI +5v	30	DIGITAL GND
11	DVI DDC GND	31	RS232 TXD COM
12	DVI HPD	32	RS232 RXD COM
13	DVI RX0-	33	DIGITAL GND
14	DVI RX0+	34	RS422 Tx + COM
15	DVI RX0 GND	35	RS422 Tx - COM
16	DVI RXC+	36	RS422 Rx + COM
17	DVI RXC-	37	RS422 Rx - COM
18	DVI RXC GND	AMPH	MS27468T15B35P
19	DVI AN RED	MATE	MS27467E15B35S
20	DVI AN GREEN	STRAIN	M85049/49-2-14W

TABLE 3

DISPLAY CONNECTORS (CONTINUED)

COMPOSITE - VIDEO IN (A1J4 - A1J7)

The center pin BNC Connectors - VIDEO IN (A1J4-A1J7) allow input of auxiliary composite video signals. See Table 4.

- Align with A1J4-A1J7 - IN connector; See Figure 1; #5, 4, 3, 2
- Add a twist to lock
- BNC receptacle is sealed

BNC CONNECTOR - IN	
A1J4 - A1J7	
PIN	SIGNAL
1	VID_IN
2	GROUND

TABLE 4

COMPOSITE - VIDEO OUT (A1J8)

The center pin BNC Connector - VIDEO OUT (A1J8) provides pass-through of composite video signal. See Table 5.

- Align with A1J8 - OUT connector; See Figure 1, #1
- Add a twist to lock
- BNC receptacle is sealed

BNC CONNECTOR - OUT	
A1J8	
PIN	SIGNAL
CENTER	VID_OUT
SHELL	GROUND

TABLE 5

VCOM (A1J9)

The VCOM (A1J9) connector allows for camera installation, and communicates only with BNC connector A1J4 (programmable buttons). See Table 6.

- Align with A1J9 - VCOM connector; See Figure 1, #9

VCOM	
A1J9	
PIN	SIGNAL
1	RS422 TX+ COM
2	RS232 TXD COM
3	RS232 RXD COM
4	Digi TAL GND
5	RS422 RX+ COM
6	RS422 TX- COM
7	RS422 RX- COM
AMPH	803-015-07ZN6-7PN
MATE	803-001-06ZN6-7SN

TABLE 6

MAIN MENU

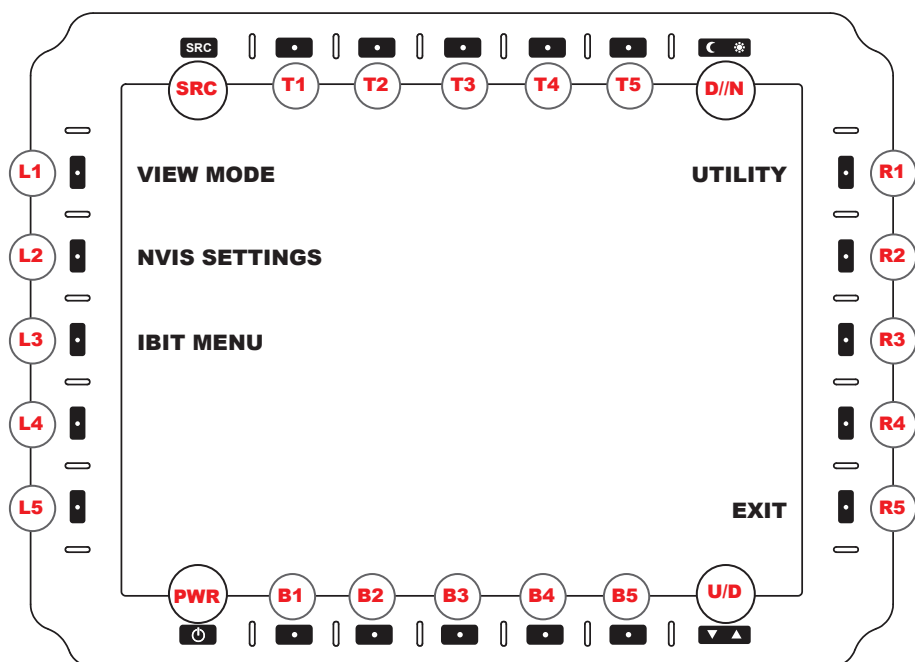


FIGURE 3

MAIN MENU ACCESS

Several user menus are factory-set in the display. To access the main menu (Figure 3) which allows access to display's submenus, hold down the SOURCE button for three (3) seconds (top row, far left).

SRC

The SOURCE button (SRC) is located on the top row of softkeys, the first button on the left, as indicated in Figure 3. Other softkey are explained in following user manual sections.



USER TIP

Hold SOURCE (SRC) button for three (3) seconds to enter Main Menu Screen.

MAIN MENU

The MAIN MENU is the user's entry portal to submenus. From this top level, the following submenus are accessed, which opens additional tiers of extended submenus. To access the MAIN MENU, hold down the SOURCE button for three (3) seconds.

- VIEW MODE: Manage VIEW settings for each communication port
- NVIS SETTINGS (OPTIONAL): Set NVIS to Green or Red master color
- IBIT: Initiate Built-in-Test (IBIT) checks system functionality, and
- UTILITY: Start-up Options; Programmable Button Set-up; Factory Reset.

VIEW MODE MENU

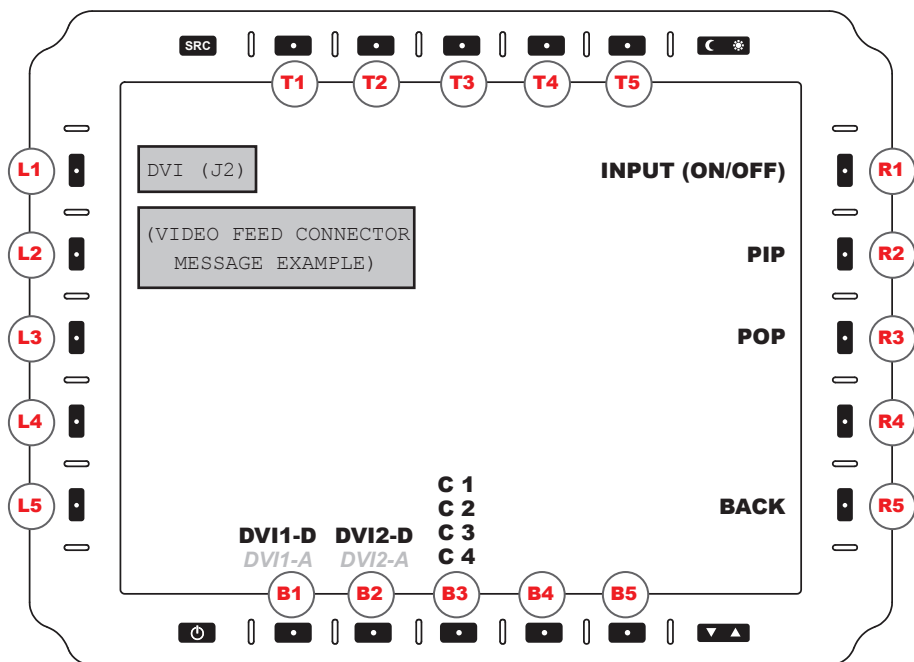


FIGURE 4

VIDEO STATUS MESSAGE

In the upper left corner of the screen a popup information window indicates the VIDEO STATUS when feed is changed from one input to another. (See Figure 4).

This message will list the physical port and resolution detected, or if no feed, physical port and 'no video'. The video detected information will display for approximately five (5) seconds. If there is no video feed, message will state 'no video' until video is detected.

VIEW MODE MENU

To enter the VIEW MODE MENU (Figure 4), select L1 from the MAIN MENU (Figure 3). VIEW MODE MENU is dedicated to selecting specific video settings for each physical port. Note: View settings of individual video feeds are independent of each other.

Across the lower edge of the front bezel are the 'B' (bottom) softkeys buttons. Select one of the bottom softkeys to modify that specific physical port: B1: DVI1-D (Digital) and *DVI1-A (Analog; available in a future release)*, B2: DVI2-D; *DVI2-A (Analog; available in a future release)*; B3: C1/C2/C3/C4. The button and corresponding port will be highlighted when selected. Any changes made to video mode settings will only affect the highlighted port.

On the right side of the bezel are the 'R' (Rig HT) softkeys. Softkey R1 allows the user to turn ON or OFF specific physical ports. Keys (R2 - R3) are used for selecting dual video feeds, and how they display on the screen.

VIDEO MODE MENU (CONTINUED)



Video Feed Settings are configured independently of each other.

VIDEO SCALING OPTIONS

There are VIDEO SCALING OPTiONS available to customize the video feed view on the display screen. These control softkeys are located on the front bezel, right.

INPUT (ON/OFF) (Source) (R1). Selects button R1, INPUT, to choose the input source to ENABLE (ON) or DISABLE (OFF) input from the source selection.

PIP (R2). Selects pip (R2) to enter into picture-in-picture (PIP) layout menu. This feature is reviewed in a following menu section.

POP (R3). Selects POP (R3) to enter into Picture-Over-Picture (POP) layout menu. This feature is reviewed in a following menu section.

BACK (R5). Returns to MAIN MENU (Figure 3).

PICTURE-IN-PICTURE (PIP) OPTIONS MENU

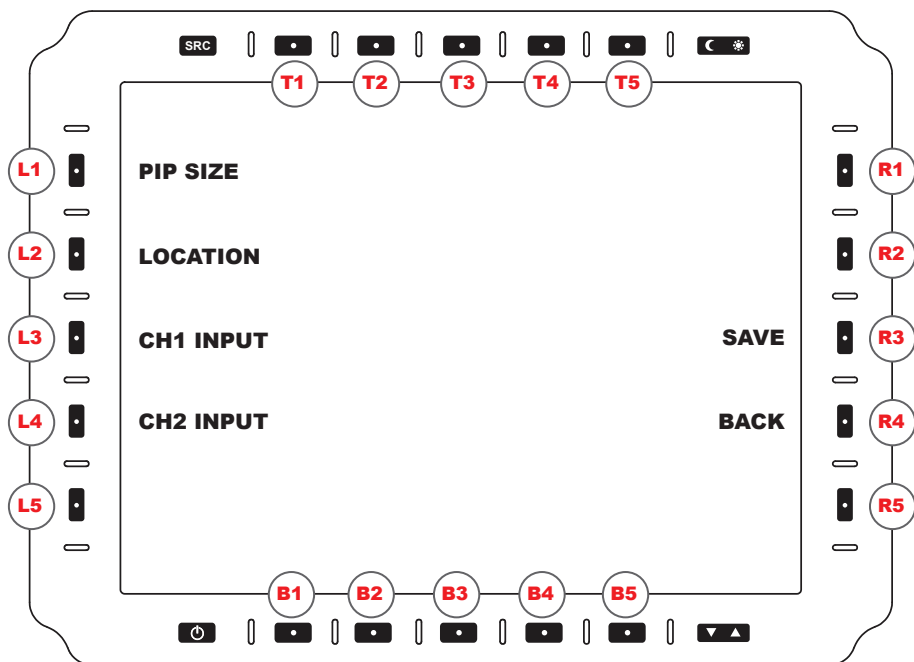


FIGURE 5

PICTURE-IN-PICTURE (PIP) OPTIONS MENU

To enter the PIP (PICTURE-IN-PICTURE) OPTIONS MENU, select PIP (R2) from VIEW MODE MENU (Figure 4). User will determine feeds assigned to a dual-view PIP setting.

PIP SIZE (L1). Cycles through three (3) PIP SiZES: Small; medium; Large. Each press increases the size to next, then returns PIP to default (Small).

LOCATION (L2). Cycles through five (5) possible screen locations:

Top Left; Bottom Left; Top Right; Bottom Right; and Center.

Ch 1 INPUT (L3). Cycles CH1 input sources for configuration in PIP view.

Ch 2 INPUT (L4). Cycles CH2 input sources for configuration in PIP view.

SAVE (R4). Opens SAVE VIEW MENU (See Section Save View Menu for Instructions).

BACK (R5). Returns to SAVE VIEW MENU (Figure 7).

PICTURE-OVER-PICTURE (POP) OPTIONS MENU

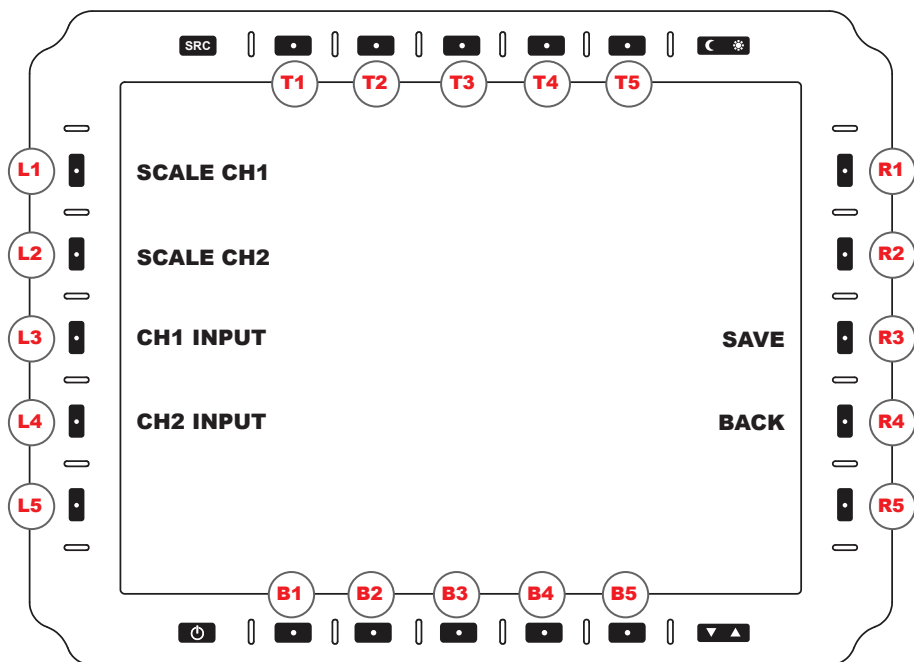


FIGURE 6

PICTURE-OVER-PICTURE (POP) OPTIONS MENU

To enter the POP (PICTURE-OVER-PICTURE) OPTIONS MENU, select POP (R3) from VIEW MODE MENU (Figure 4). User will determine input feeds assigned to a dual-view POP setting.

POP settings are Stretched or Cropped. Cropped scaling displays the middle 50% of video and crops the top and bottom by 25%.

SCALE Ch1 (L1). Cycles Top Window options: Stretched; Cropped; Fit; 1:1.

SCALE Ch2 (L2). Cycles Bottom Window options: Stretched; Cropped; Fit; 1:1.

Ch1 INPUT (L3). Cycles through CH1 input sources.

Ch2 INPUT (L4). Cycles through CH2 input sources.

SAVE (R4). Opens SAVE VIEW MENU (See Section SAVE VIEW MENU for instructions).

BACK (R5). Returns to VIEW MODE MENU (Figure 4).

SAVE VIEW MENU

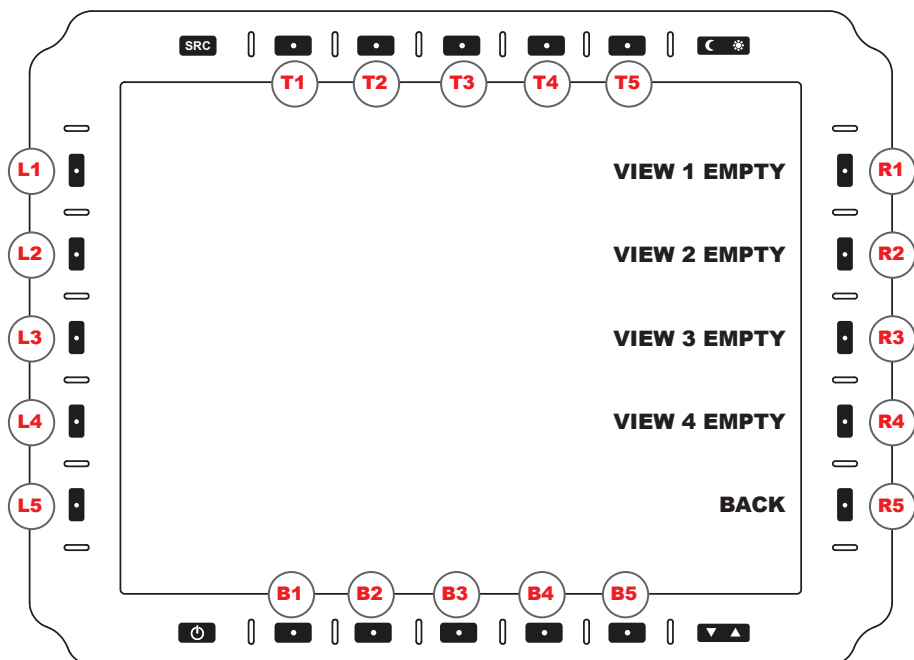


FIGURE 7

SAVE VIEW MENU

Use the SAVE VIEW MENU to save PIP (Figure 5) or POP (Figure 6) configurations. Select entry using R (Right) softkey buttons. Go to section NAME ENTRY MENU (Figure 8) to name views.

VIEW 1 (R1). Saves to PIP/POP VIEW 1 entry. NAME ENTRY MENU opens.

VIEW 2 (R2). Saves to PIP/POP VIEW 2 entry. NAME ENTRY MENU opens.

VIEW 3 (R3). Saves to PIP/POP VIEW 3 entry. NAME ENTRY MENU opens.

VIEW 4 (R4). Saves to PIP/POP VIEW 4 entry. NAME ENTRY MENU opens.

BACK (R5). Returns to PIP or POP MENU (Figure 5 or 6).

NAME ENTRY MENU

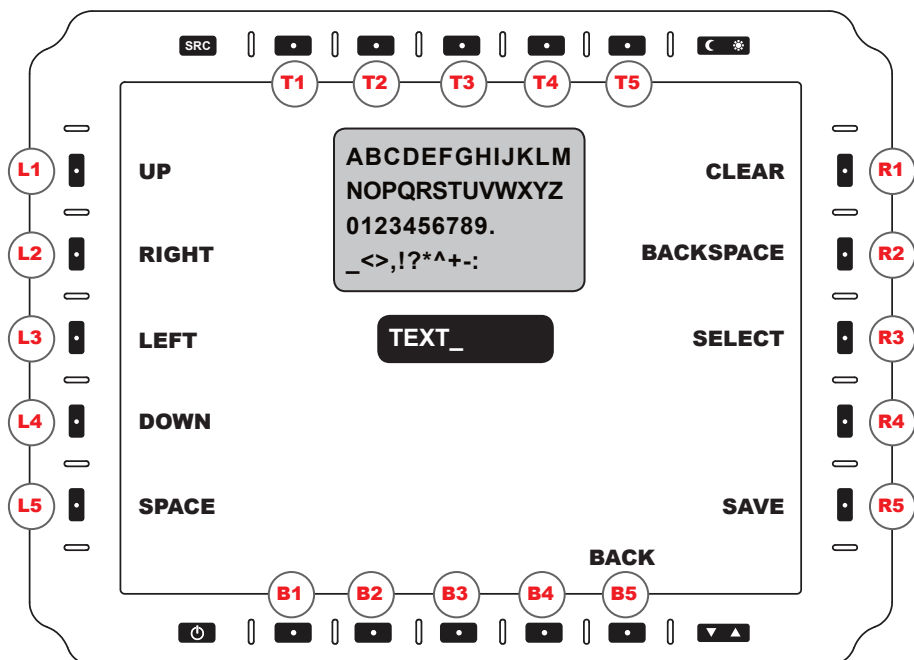


FIGURE 8

NAME ENTRY MENU

The NAME ENTRY MENU is where the user can name the VIEW MODE previously created. (Figure 7). Use the Left and Right softkeys to navigate. Text assigned will appear in the TEXT field on the screen.

LEFT (L3). Navigates Selection Cursor LEFT.

RIGHT (L2). Navigates Selection Cursor RIGHT.

UP (L1). Navigates Selection Cursor UP.

DOWN (L4). Navigates Selection Cursor DOWN.

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

SELECT (R3). Enters Character.

BACKSPACE (R2). Deletes Last Character.

SAVE (R5). Exits menu while saving changes.

BACK (B5). Returns to SAVE VIEW MENU (Figure 7).

OPTIONAL NVIS SETTINGS MENU

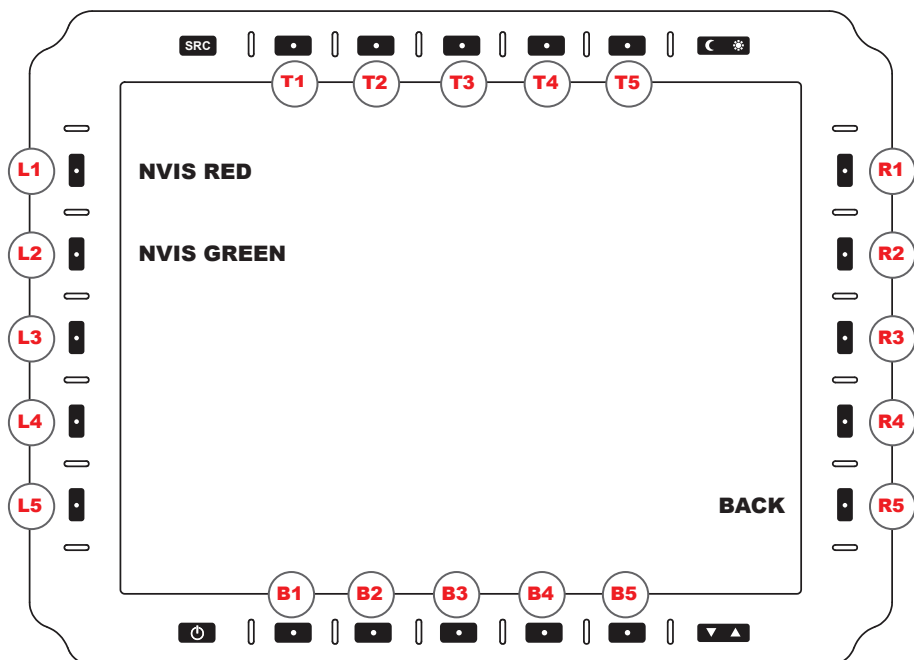


FIGURE 9

NVIS SETTINGS MENU (OPTIONAL)

THE OPTIONAL NVIS RED / GREEN OPTION ALLOWS INTERFACING WITH NIGHT VISION DEVICES WITHOUT ADVERSE EFFECTS. The NVIS SETTINGS MENU is accessed through L2 from the MAiN MENU (Figure 3), and allows the user to make NVIS viewing color selections.

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

NVIS GREEN (L2). Selects the NVIS GREEN view color. Default is GREEN.

BACK (R5). Returns to MAIN MENU (Figure 3).

IBIT MENU

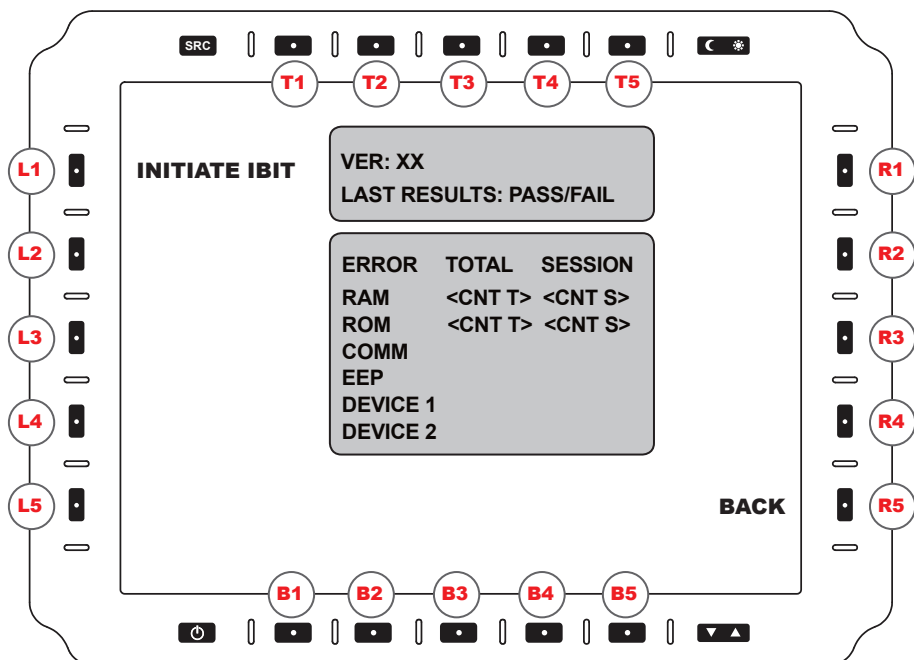


FIGURE 12

IBIT (INITIATE BIT) MENU

The display supports a Built-In-Test (BIT) component, Initiate BIT. This process detects and isolates faults to help the user identify the operational readiness, or where necessary, identify degraded or failed system conditions. Results of BIT failures are stored in memory.

INITIATE IBIT (L1). Running the INITIATE BIT (IBIT) allows the 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 to start the process.

TEST LOG BOX FIELDS. See Figure 12 for example. The Test Log Box Fields indicate the following:

- Version of the 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, Table 10).

ERROR CODES. If there are conflicts within the display, they may be indicated by the following ERROR CODES (see TABLE 10 on following page).

BACK (R5). Returns to MAIN MENU (Figure 3).

IBIT MENU (CONTINUED)

ERROR CODES	ERROR CODE EXPLANATION
RAM	Internal RAM Failure
ROM	ROM Checksum Failure
COMM	Serial Communication Error
EEP	EEP File Error
DEVICE (1)	Communication Video Decoder
DEVICE (2)	Communication with Keys/Buttons Circuit

TABLE 10

This section is intentionally left blank.

UTILITY MENU

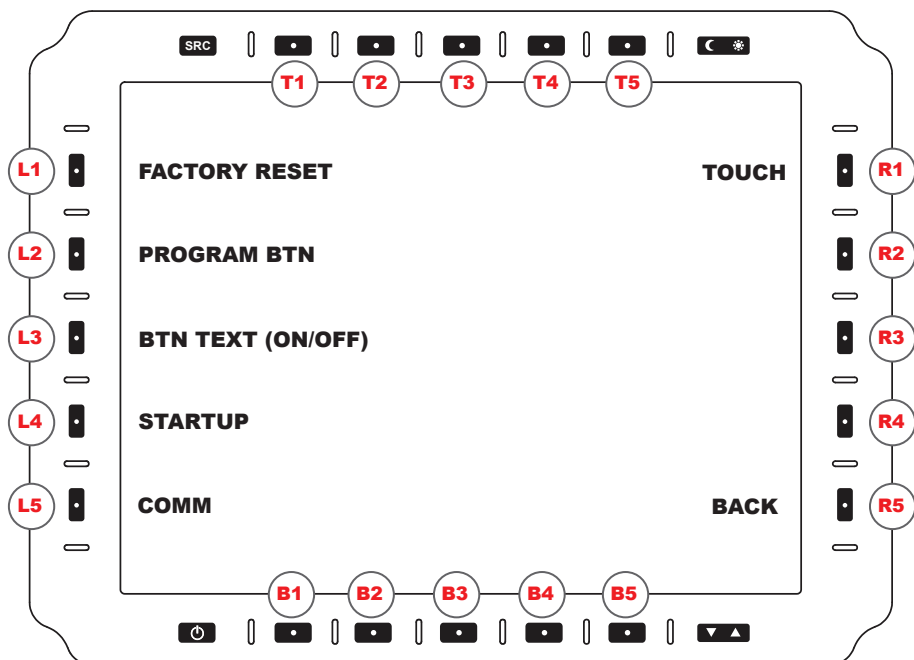


FIGURE 13

UTILITY MENU

From the MAIN MENU (Figure 3), the UTILITY MENU is accessed through R1.

FACTORY RESET (L1). Select FACTORY RESET to reset monitor to factory defaults:

- VIDEO SOURCES: All ENABLED; DVI (1 and 2), Digital (*Analog; available in a future release*); Composites (4)
- SERIAL COMMUNICATIONS PORTS: Sets to RS232
- NVIS COLOR (if Applicable): Sets to GREEN
- CONTRAST: Resets to a predetermined factory setting, and
- KEY DOWN/KEY UP: Restores to Text List (See Section Communication protocol > Factory Default Key Down and Key Up Transmit Text).

PROGRAM BTN (L2). Initiates Programmable Button Setup (Figure 18).

BTN TEXT (ON/OFF) (L3). Shows/Hides button Label Text.

STARTUP (L4). Opens STARTUP MENU (Figure 14).

COMM (L5). Opens SERIAL COMMUNICATIONS OPTIONS menu.

TOUCH (R1). Opens TOUCHSCREEN OPTIONS menu.

BACK (R5). Returns to MAIN MENU (Figure 3).

STARTUP MENU

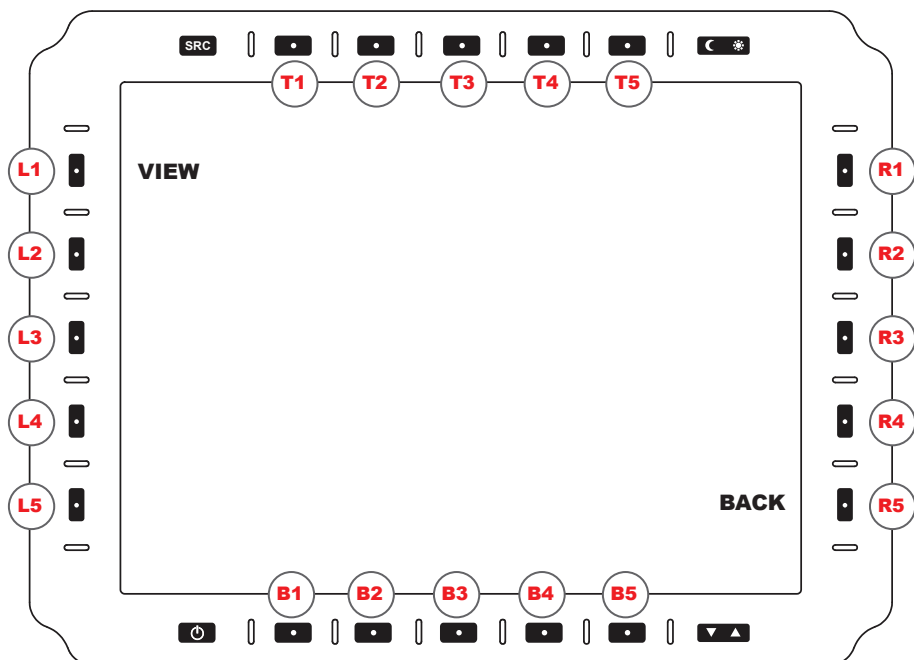


FIGURE 14

STARTUP MENU

From the UTILITY MENU (Figure 13), the STARTUP MENU is accessed through softkey button L4.

VIEW (L1). Enters VIEW STARTUP MENU (Figure 17).

BACK (R5). Returns to UTILITY MENU (Figure 13).

This section is intentionally left blank.

VIEW STARTUP MENU

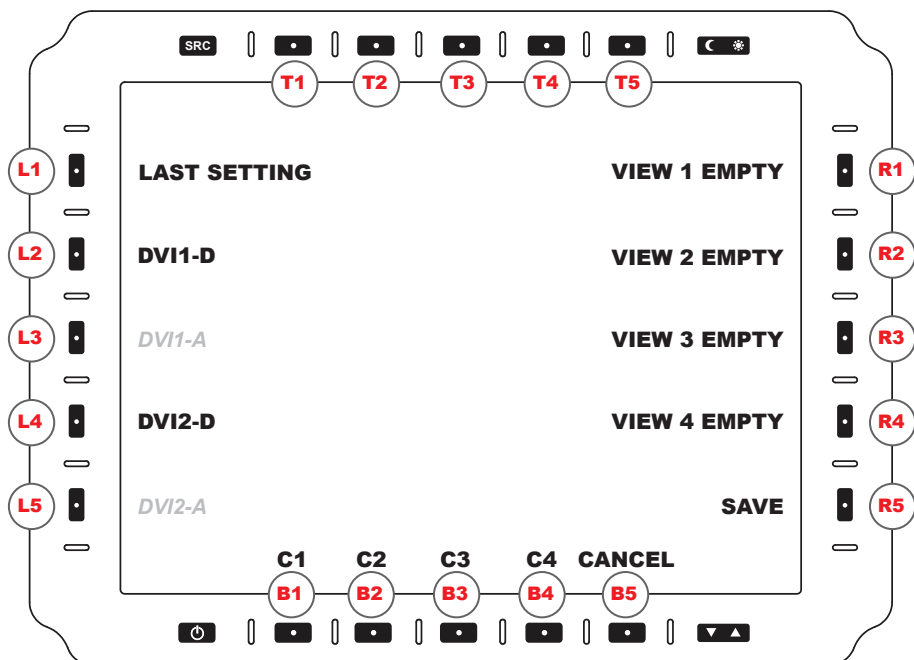


FIGURE 17

VIEW STARTUP MENU

From STARTUP MENU (Figure 14), VIEW STARTUP MENU (Figure 17) is accessed through softkey button L2.

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

DVI1-D (L2). Starts with Dvi 1-D (Digital) fullscreen.

DVI1-A (L3). *Analog: available in a future release.*

DVI2-D (L4). Starts with Dvi 2-D (Digital) fullscreen.

DVI2-A (L5). *Analog: available in a future release.*

C1 (B1). Starts with Composite 1 fullscreen.

C2 (B2). Starts with Composite 2 fullscreen.

C3 (B3). Starts with Composite 3 fullscreen.

C4 (B4). Starts with Composite 4 fullscreen.

VIEW 1 (R1). Starts with PIP/POP view 1.

VIEW 2 (R2). Starts with PIP/POP view 2.

VIEW 3 (R3). Starts with PIP/POP view 3.

VIEW 4 (R4). Starts with PIP/POP view 4.

SAVE (R5). Saves Selection for Power ON view. Auto-returns to STARTUP MENU.

CANCEL (B5). Cancels entry. Returns to STARTUP MENU (Figure 14).

SERIAL COMMUNICATIONS OPTIONS MENU

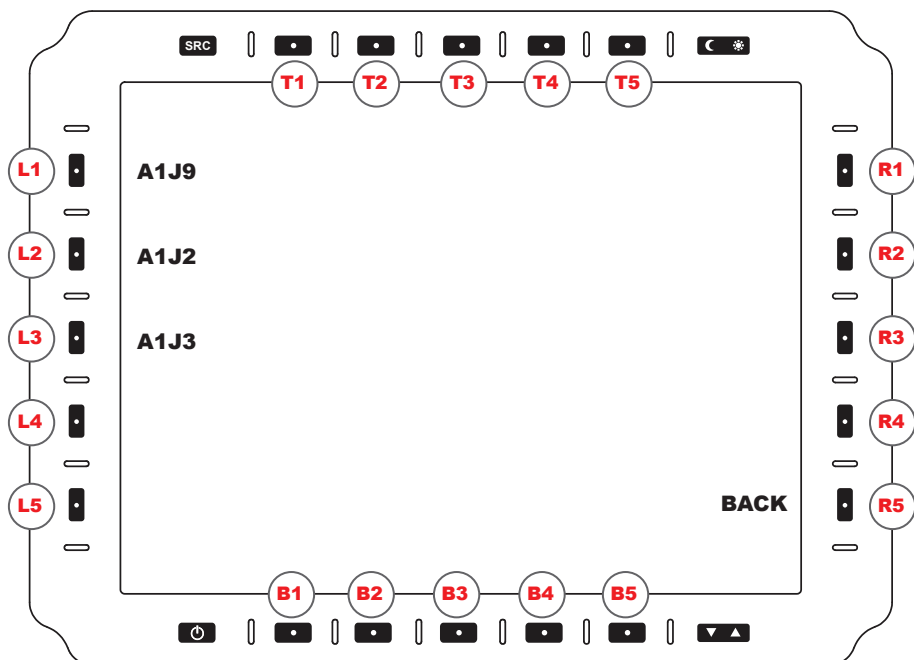


FIGURE 15

SERIAL COMMUNICATIONS OPTIONS MENU

From the STARTUP MENU (Figure 14), the SERIAL COMMUNICATIONS MENU is accessed through softkey button L5, COMM.

A1J9 (L1). Select RS232 or RS422 for A1J9 port.

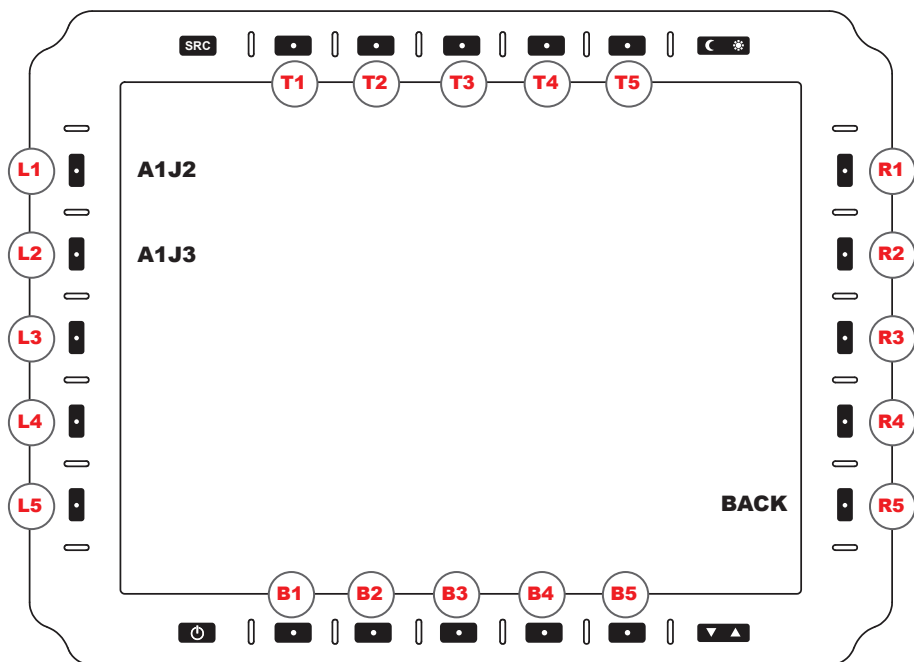
A1J2 (L2). Select RS232 or RS422 for A1J2 port (DVI1).

A1J3 (L3). Select RS232 or RS422 for A1J3 port (DVI2).

BACK (R5). Returns to STARTUP MENU (Figure 14).

This section is intentionally left blank.

OPTIONAL TOUCHSCREEN OPTIONS MENU



OPTIONAL TOUCHSCREEN OPTIONS MENU

From the STARTUP MENU (Figure 14), the TOUCHSCREEN OPTIONS MENU is accessed through softkey button R1, TOUCH.

A1J2 (L1). Select USB (default) or RS232 Touch interface for A1J2 port.

A1J3 (L2). Select USB (default) or RS232 Touch interface for A1J3 port.

BACK (R5). Returns to STARTUP MENU (Figure 14).

This section is intentionally left blank.

PROGRAMMABLE BUTTON MENU (SELECT BUTTON)

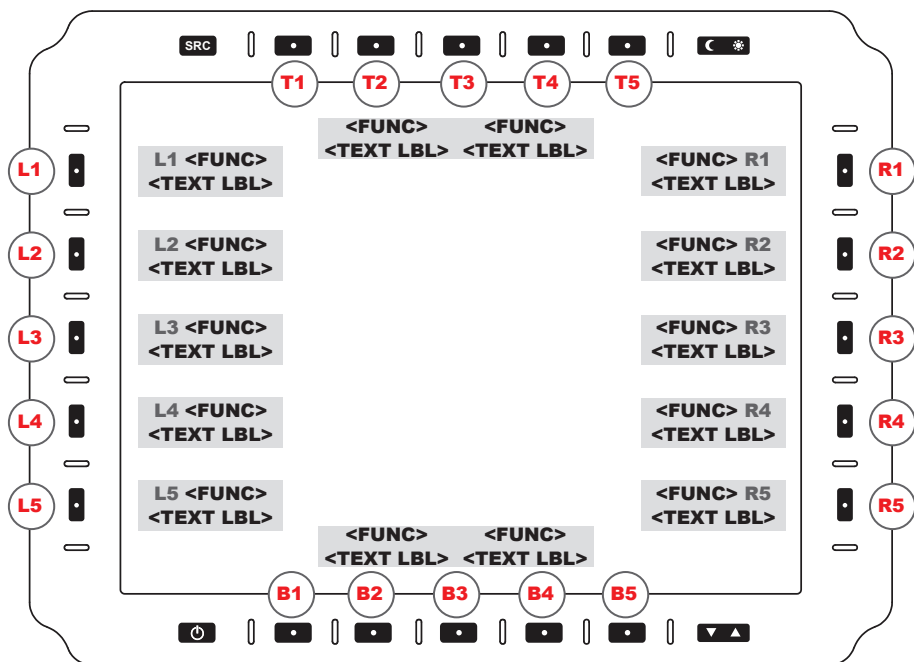


FIGURE 18

PROGRAMMABLE BUTTON ASSIGNMENT MENU (SELECT BUTTON)

There are twenty (20) soft keys with illuminated center dots on the front bezel, in a layout of five buttons on the left (L1-5), right (R1-5), along the bottom (B1-5) and top, (T1-5) (Figure 18). These buttons are used to select on-screen menu options. User will press the button corresponding to the on-screen menu feature preferred.

The softkey buttons are illuminated in Day or Night mode and off in Off mode. Night luminance is subdued to match existing platform night lighting.

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

MULTIPLE KEY PRESSES

The Multiple Key Press feature enables the user to select parallel keys, which if programmed, will support additional choices to the top level 20 softkey buttons.

For example, L1-down (hold) followed by L2-down brings up an additional feature.

ALTERNATE PROGRAMMING SOFTWARE

Alternate Programming Software allows for customizing the OSD labels, button functions, and Key Down/Up messages. Contact factory for the instructions document.

PROGRAMMABLE BUTTON MENU (SET FUNCTION)

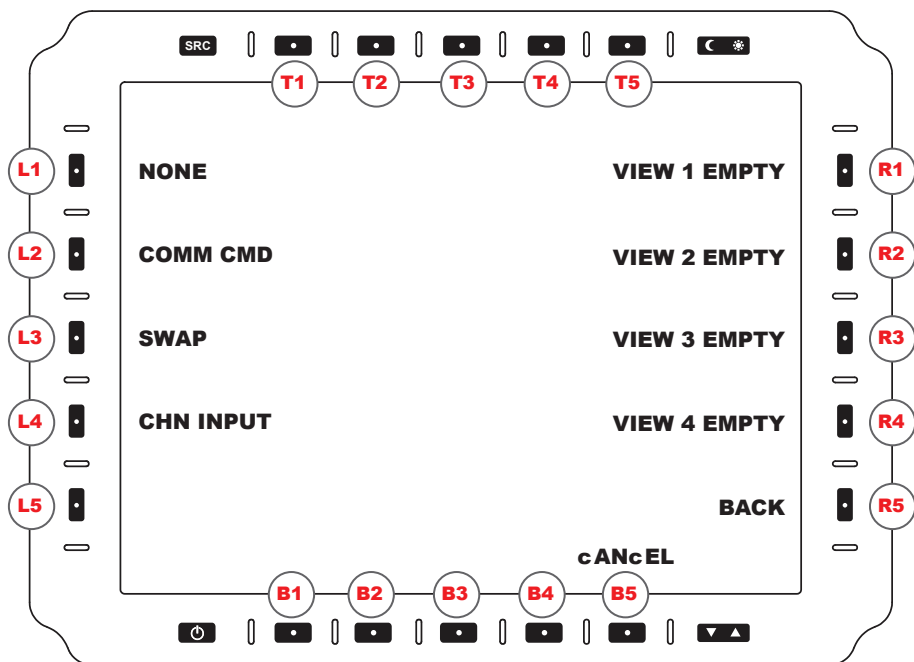


FIGURE 19

PROGRAMMABLE BUTTON MENU (SET FUNCTION)

Wait for user to select buttons function. Button Functions. Note: Selecting any button function opens a virtual keyboard to input the name the button will display.

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

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

SWAP (L3). CH1 and CH2 swap inputs.

CHN INPUT (L5). Opens input Function menu.

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

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

VIEW 3 (R3). User-configured layout entry 3 toggles ON and OFF. 'Empty' displays or the saved PIP/POP 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 BUTTON MENU, (Figure 18).

CANCEL (B5). Cancels entry. Returns to UTILITY MENU (Figure 13).

PROGRAMMABLE BUTTON (SET INPUT FUNCTION)

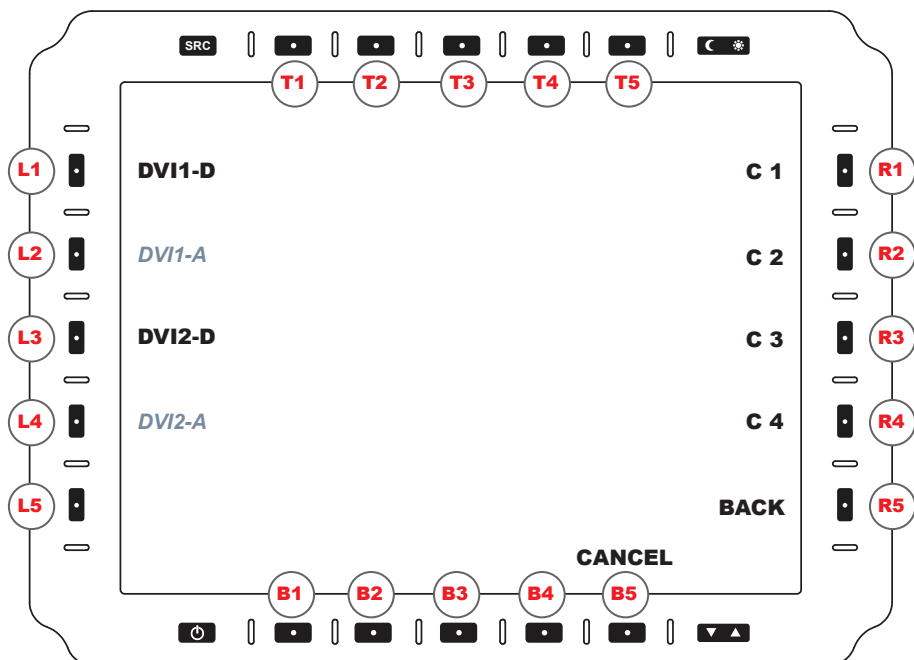


FIGURE 21

PROGRAMMABLE BUTTON MENU (SET INPUT FUNCTION)

Wait for user to select button functions.

DVI1-D (L1). CH1 displays the DVI1-D (Digital) input.

DVI1-A (L2). *Analog: available in a future release.*

DVI2-D (L3). CH1 displays the DVI2-D (Digital) input.

DVI2-A (L4). *Analog: available in a future release.*

C1 (R1). CH1 displays the Composite 1 input.

C2 (R2). CH1 displays the Composite 2 input.

C3 (R3). CH1 displays the Composite 3 input.

C4 (R4). CH1 displays the Composite 4 input.

BACK (R5). Returns to SET FUNCTION (Figure 20).

CANCEL (B5). Cancels entry; returns to UTILITY MENU (Figure 13).

PROGRAMMABLE BUTTON MENU (ENTER NAME)

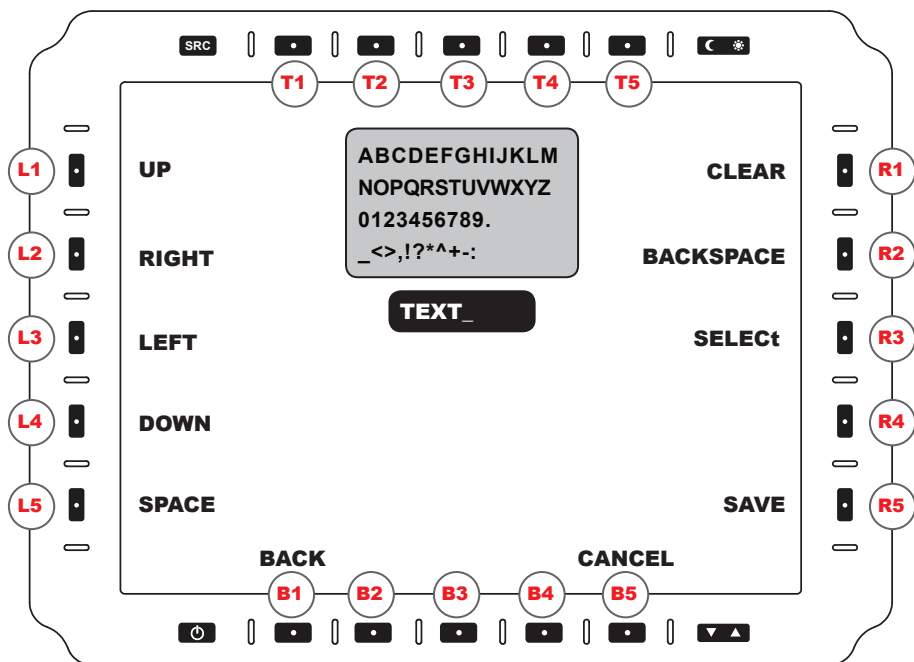


FIGURE 20

PROGRAMMABLE BUTTON MENU (ENTER NAME)

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.

SAVE (R5). Exits menu and Saves Changes.

BACK (B1). Returns to SET FUNCTION MENU (Figure 19).

CANCEL (B5). Cancels entry; returns to UTILITY MENU (Figure 13).

ALTERNATE PROGRAMMING SOFTWARE

Alternate programming Software allows for customizing the OSD labels, button functions, and Key Down/Up messages. Contact factory for the instructions document.

COMMUNICATION PROTOCOL

COMMUNICATION PROTOCOL

The display 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 display upon receiving a message. It will either be the specific response for the command, a general DSACK response, or a DSNACK response if the command is not recognized or the packet is invalid.

PHYSICAL AND DATA LINK LAYER

The display communicates via RS232 or RS422 interface using the following port settings (Table 11).

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

TABLE 11

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 12.

LENGTH	VALUE	DESCRIPTION
1	'\$'	Packet Message Start Byte
5	DSGID	Message Identifier; first two characters represents the manufacturer (DS); last three are Command Code
n	Comma De-limited Fields	Field 0, Field 1, Field n
1	'*'	Checksum Delimiter Byte
2	Checksum	Checksum is two ASCII 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 (0xD) and Line Feed (0xA) combination terminates the message

TABLE 12

COMMUNICATION PROTOCOL (CONTINUED)

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 display supports (Table 13). (Table continues on the next page.)

COMMAND	DIRECTION	RESPONSE	DESCRIPTION
DSKDN	From Display	N/A	Key pressed
DSKUP	From Display	N/A	Key released (from press)
DSCDV	To Display	DSACK/DSNAK	Change Display video
DSIBT	To Display	DSBTR/DSNAK	Initiates IBIT System Test (Display)
DSBTQ	To Display	DSBTR/DSNAK	Requests last IBIT System Test results
DSBTR	From Display	N/A	IBIT System Test Response
DSFWQ	To Display	DSFWR/DSNAK	Request Firmware Version
DSFWR	From Display	N/A	Firmware Version Response
DSPKM	To Display	DSACK/DSNAK	Program Key mode
DSPKD	To Display	DSACK/DSNAK	Program Key Down Text Msg
DSPKU	To Display	DSACK/DSNAK	Program Key Up Text Msg

TABLE 13

COMMUNICATION PROTOCOL (CONTINUED)

COMMANDS

Continued from last page.

COMMAND	DIRECTION	RESPONSE	DESCRIPTION
DSPKF	To Display	DSACK/DSNAK	Program Key Function
DSPKT	To Display	DSACK/DSNAK	Program Key OSD Label Text
DSKDq	To Display	DSKDR/DSNAK	Request Program Key Down TX msg
DSKUQ	To Display	DSKUR/DSNAK	Request Program Key Up TX msg
DSKFQ	To Display	DSKFR/DSNAK	Request Program Key Function
DSKTQ	To Display	DSKTR/DSNAK	Request Program Key OSD Label Text
DSKDR	To Display	N/A	DSKDQ Response
DSKUR	To Display	N/A	DSKUQ Response
DSKFR	To Display	N/A	DSKFQ Response
DSKTR	To Display	N/A	DSKTQ Response
DSACK	From Display	N/A	Acknowledge Response; Used if Display acknowledges command.
DSNAK	From Display	N/A	Not Acknowledged Response; Used if command was not recognized by Display or the command contained errors.

TABLE 13

The following codes are to be implemented in a future release.

COMMAND	DIRECTION	RESPONSE	DESCRIPTION
DSBLS	To Display	DSACK/DSNAK	Set Backlight
DSKUP	To Display	DSBLR/DSNAK	Request Backlight
DSCDV	From Display	N/A	Backlight Response
DSIBT	To Display	DSACK/DSNAK	Set Date
DSBTQ	To Display	DSDTR/DSNAK	Request Date
DSBTR	From Display	N/A	Data Response
DSFWQ	To Display	DSACK/DSNAK	Set Time
DSFWR	To Display	DSTMR/DSNAK	Request Time
DSPKM	From Display	N/A	Time Reponse

COMMUNICATION PROTOCOL (CONTINUED)

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 button (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 button (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 Input Video source.

FIELD	NAME	DATA
0	Source	DVI1-D, <i>DVI1-A</i> , DVI2-D, <i>DVI2-A</i> , C1, C2, C3, C4

Example: \$DSCDV,DVI1D*44[CR][LF]

Video changed to DVI1-D input.

Response: DSACK or DSNACK

DSIBT “INITIATE IBIT” COMMAND

The DSIBT initiate IBIT command starts the IBIT System Test. immediately upon receiving DSIBT, the Display responds with DSBTR (Request IBIT Results), indicating the IBIT test set is incomplete. When IBIT completes, the DSBTR is transmitted with IBIT results. The Display 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. DSNACK: command not recognized or contained errors.

DSBTQ “REQUEST IBIT RESULTS” COMMAND

The DSBTQ Request IBIT Results command requests the Display 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 Display

Response: DSBTR or DSNACK

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 Display immediately transmits an IBIT response with status flags bit 7 set low. upon completion, the Display transmits a second response message with status flags bit 7 set high, with test results.

COMMUNICATION PROTOCOL (CONTINUED)

FIELD	NAME	DATA
0	BIT Status Flags	bit 7: 1 IBIT complete / 0 IBIT incomplete bit 6: 1 IBIT success / 0 IBIT fail bit 5: reserved bit 4: reserved bit 3: reserved bit 2: reserved bit 1: reserved bit 0: reserved
1	BIT Status Flags	Byte order follows big endian format 1 = pass / 0 = fail bit 15: reserved bit 14: reserved bit 13: reserved bit 12: reserved bit 11: reserved bit 10: reserved bit 9: reserved bit 8: reserved bit 7: reserved bit 6: reserved bit 5: reserved bit 4: reserved bit 3: reserved bit 2: reserved bit 1: reserved bit 0: reserved

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 Display.

FIELD	NAME	DATA
0	Placeholder	00

COMMUNICATION PROTOCOL (CONTINUED)

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

Response: DSFWR or DSNACK

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]
Display 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. 01 – Suspend Drawing 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 DSNACK

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 button is pressed.

COMMUNICATION PROTOCOL (CONTINUED)

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 button (L1) set to transmit "L1D\r\n" when pressed. '\r' and '\n' are escape sequences for carriage return and newline characters.

Response: DSACK or DSNACK

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 button 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 button (L1) set to transmit "L1U\r\n" when pressed. '\r' and '\n' are escape sequences for carriage return and newline characters.

Note: Maximum key up transmit text is 20 bytes.

Response: DSACK or DSNACK

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, DVI1D, <i>DVI1A</i> , DVI2D, <i>DVI2A</i> , C1, C2, C3, C4

Example: \$DSPKF, L1, COMM*3B

Top left button (L1) set to cycle the video input

Response: DSACK or DSNACK

COMMUNICATION PROTOCOL (CONTINUED)

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 ASCII 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 button (L1) set to display the text “SRC”

Response: DSACK or DSNACK

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: \$DSKDQ,L1*09[CR][LF]

Response: DSKDR or DSNACK

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: \$DSKUQ,L1*18[CR][LF]

Response: DSKUR or DSNACK

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 DSNACK

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

COMMUNICATION PROTOCOL (CONTINUED)

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

Response: DSKTR or DSNACK

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 button (L1) set to transmit “L1D\r\n” when pressed. ‘r’ and ‘n’ are escape sequences for carriage return and newline characters.

Response: DSACK or DSNACK

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 button (L1) set to transmit “L1U\r\n” when pressed. ‘r’ and ‘n’ are escape sequences for carriage return and newline characters.

Note: Maximum key up transmit text is 20 bytes.

Response: DSACK or DSNACK

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, DVI1D, <i>DVI1A</i> , DVI2D, <i>DVI2A</i> , C1, C2, C3, C4

COMMUNICATION PROTOCOL (CONTINUED)

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

Response: DSACK or DSNACK

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 button (L1) text is “SRC”

Response: DSACK or DSNACK

DSACK “ACKNOWLEDGE RESPONSE” COMMAND

The DSACK Acknowledge Response command is Display’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 DSNACK Not Acknowledge Response command is the display’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

COMMUNICATION PROTOCOL (CONTINUED)

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: They will be reset to these values if a Factory Reset is performed from the Main Menu > Utility Menu > Factory Reset (Figure 13).

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,R6*11[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]		u p	\$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]		u p	\$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]		u p	\$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]		u p	\$DSKUP,T5*14[CR][LF]

This section is intentionally left blank.

OPTIONAL TOUCH SCREEN

TOUCH SCREEN INSTALLATION

Touch Screen installation instructions are available from the Disk enclosed with the Display.

Contact Factory if you encounter any questions.

TSHARC TOUCH CONTROLLER DRIVER/WINDOWS OPERATING SYSTEMS

The display touch screen function requires the download of a TSHARC Touch Controller Driver application installed on the device to which the display is connected. To download the latest compatible drivers, contact Factory.

Operating Systems compatible with TSHARC Touch Controller Driver are: Microsoft® 7 (32 and 64-bit) and XP; with RS232 and USB options. If other MS O/S are installed, contact factory for assistance.

NOTE: TSHARC TOUCH CONTROLLER DRIVER IS NOT COMPATIBLE WITH MICROSOFT® VISTA .



CAUTION!

TSHARC Touch Screen Controller Driver is not compatible with MS Vista.

PREVIOUS VERSIONS OF TOUCH SCREEN CONTROLLER DRIVERS

Previous versions of ANY Touch Screen Controller Driver must be removed before installing the latest version of the TSHARC™ Touch Screen Controller Driver.

If a different T/S Controller Driver (not TSHARC) is on the device it must be removed before installing the TSHARC drivers. Note: A typical driver uninstall program utility of Microsoft's® does not remove all traces of a T/S Driver installation. **Contact manufacturer of previously installed driver program to learn how to uninstall their product. These instructions may be available from the manufacturer's web site.**

NEW DISPLAY INSTALLATION WITH EXISTING DEVICE

Whenever the display is installed to an existing device (equipped with the TSHARC driver), Touch Screen calibration is always required. The Touch Screen driver resides on the computer device, not the display.



CAUTION!

ALWAYS CALIBRATE! When adding the display to a new or different device, always calibrate to that device; Calibration settings reside on the device, NOT the display.

NEW OPERATING SYSTEM INSTALLATION

If installing a new operating system (O/S), do not install Touch Screen Controller Driver until O/S is installed and computer's video display settings have been verified. Touch Screen Controller Driver uses computer's O/S display driver settings to accurately configure T/S Controller Driver files.

APPENDIX A

MECHANICAL DRAWINGS

Mount diagrams and dimensions may assist with installation. Overview drawings can be found on the corresponding product download page of the manufacturer.

OPTIONAL MOUNTS

Diagrams of Flush, panel or Rack mounts and dimensions may assist with installation of Display. Consult Factory.

APPENDIX B

NEMA and IP Industry Standards

Two major electrical manufacturing organizations Displaying product enclosures and/or their degree of protection; each organization publishes technical manufacturing standards. The National Electrical Manufacturers Association (NEMA) Standard No. 250 – 2003 addresses non-hazardous locations, enclosure design and environmental performance requirements. These are referred to as NEMA Types. (www.nema.org)

The International Electrotechnical Commission (IEC) 60529 Standard addresses Ingress Protection (IP); this describes the degree of enclosure protection provided, not the enclosure itself. The first digit of IP Code designation describes degree of protection against ingress of solids; second digit designates degree of protection against ingress of liquids. IP Codes support NEMA Type designations. (www.iec.ch)

This product has been designed and tested to meet or exceed the Standards of NEMA 6 and IP67, incorporating a range of environmentally-sealed connectors engineered to provide a safe and secure dust and waterproof environment in rugged conditions.

Summary of NEMA 6/IP 67: Enclosures constructed for indoor or outdoor use; to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during occasional temporary submersion at a limited depth (6" to 3 feet or 15cm to 1m); and that will be undamaged by external formation of ice on the enclosure. Sealed from dust and water.

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