BUF

TECHNOLOGY

Sport-AR

Multi Angle Replay Controller

INSTRUCTION MANUAL

VERSION: 110331

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INTRODUCTION

FCC RADIO FREQUENCY INTERFERENCE STATEMENT

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by BUF Technology could void the user's authority to operate this equipment. Shielded cables must be used with this equipment to maintain compliance with FCC regulations.

WARRANTY STATEMENT

BUF Technology warrants that the equipment it manufactures is free from defects in materials and workmanship. Equipment that has been operated within its ratings and has not been subjected to mechanical or other abuse or modification and has failed because of such defects, will, at the option of BUF Technology, be repaired or replaced if it is returned, freight pre-paid, to BUF Technology within two years from the date of shipment. Equipment that fails under conditions other than described herein will be repaired at the price of parts and labor in effect at the time of repair.

This warranty is in lieu of all other warranties, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. BUF Technology is not liable for any consequential damages.

OVERVIEW

The Sport-AR Multi Angle Replay Controller is designed exclusively for control of the *Mira* series of video/audio production servers manufactured by *Abekas* Incorporated. The controller takes maximum advantage of the servers' unique capabilities, simplifying and streamlining multi camera instant replay operations. A single operator easily controls the replay of up to six camera angles, including the creation of highlights packages that are ready to roll at any time. The Sport-AR panel intentionally uses small displays to keep user functions simple and fast. Clip, playlist, and other Information can be viewed in more detail using the server's computer displays and by using the optional SPORTclips software available from BUF Technology (see our web site at *www.buftek.com*).

Operation of Sport-AR is nearly identical to the single channel standard definition *Sport* replay system, assuring a similarly short learning curve. Differences include the ability to select multiple camera angles and, even while outputting replays and highlights playlists, the Sport-AR system is *Always Recording*.

The Sport-AR controller includes memory for up to 1000 cue points and 1000 clips allowing instant cueing of prerecorded and in-record clips. Multiple camera angle clips are supported that allow changing of angles on-the-fly, even during slow motion playback. Each cue point recalls its stored camera angle, which can be changed to other angles at any time. Ten playlists of up to 100 cue points each can be programmed and played with seamless cut edits. Playlist events also contain camera angles, allowing the playback of successive angles of a given cue point. Cue points or entire playlists can be looped indefinitely.

This manual includes instructions related to the Sport-AR Replay Controller, please refer to the *Abekas Mira* instructions for information related to the production server. All BUF Technology manuals are available on our web site: *www.buftek.com* - hit the MANUALS button.

COLD BOOT

If the Sport-AR controller ever acts strangely or does not communicate with the server, normal operation may be restored by performing a COLD BOOT. See COLD BOOT near the end of this manual for directions.

SPORT-AR CONTROL PANEL

QUICK REFERENCE

To best learn Sport-AR, feed server record channels with test sources. Don't use static pictures for testing, the more motion the better. Load a clip: hit SETUP, PLAY & use the knob to browse clips, then hit ENTER, HOME. Start by getting a basic understanding of the displays, F1-F3 (angles), REC, MARK, CUE, PLAY, SLOW, KNOB, SCAN (◄◄ , ►►). Play with it until you are comfortable, then move on to PLAYLIST, LOOP, BUMP I/O.

F4*-F9 can also be set to do other things, like "Bump I/O", which sandwiches the loaded cue between bumper clips. To change one, hit SETUP, then the F-key, the MENU display shows icons to guide you.

To play a playlist, hit PLAYLIST then CUE. Hit 0-9 then PLAYLIST to select one of ten playlists. Hold 0-9 and hit PLAYLIST to add the current cue to the end of any playlist. Hit SETUP, 0-9, PLAYLIST to setup a playlist. Follow the icons.

F4*-F6 are "quick cue keys". Hold ENTER and hit an F-key to set the current cue point into it. Push it to cue to that cue point. * F-keys shown will be higher if more angles in clip.

F1-F3* select camera angle. Green are angles in the current clip. Red is current angle.

Flashing Green means the TBar must be moved UP to take control. Flashing Red means move it DOWN.

Sets things up. Hit SETUP then another button to setup things related to that button.

Shows current cue point. Change by hitting number keys, ENTER. Also for menu navigation.

Loaded (playing) cue point and remaining time to play (duration). Also shows playback status

Hold to scan at 6X play speed. Release to jog. Hit both for "clip scan" mode .

Slow motion preset buttons (Can be changed - see other F-keys) 1/4 1/2 3/4

Takes you "HOME" in the menus.
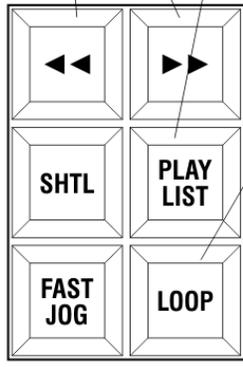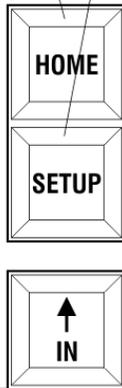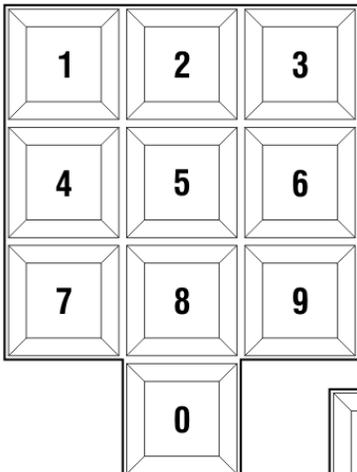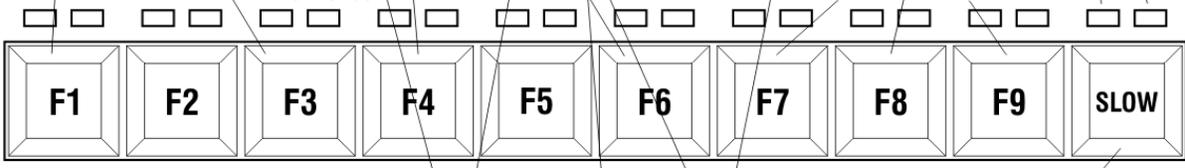
Loops the loaded cue or playlist.

Slow motion at TBar speed. Hold for reverse playback.

Turn to jog when at still. Picture moves only while turning.

Hit CUE to load current cue for playback. Loads cue's clip & angle. PREROLL cues to 2 seconds earlier. Hold OUT and hit CUE or PREROLL to cue to OUT point.
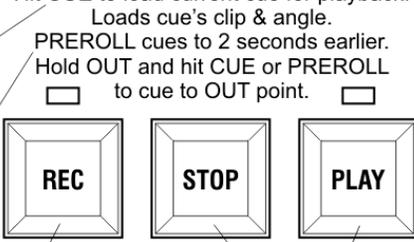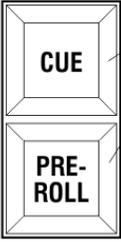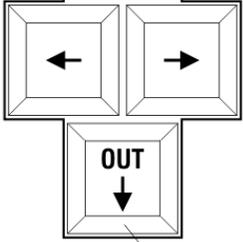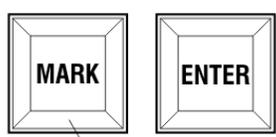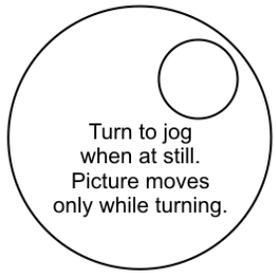
Makes a new cue point at current location. Stores loaded clip & angle. Hold ENTER and hit MARK to trim (change) the current cue point's IN (start) and angle. Hold OUT and hit MARK to trim its OUT point (end).

Hold OUT to show TC instead of duration/remaining. When held, MARK, CUE, PREROLL, etc. affect OUT instead of IN.

Goes "live" if recording. Hold in for "catch-up" -- plays faster than normal until caught up to live.

PLAY plays at normal speed. STOP goes to still. Move TBar or turn Knob to change speed.

INSTALLATION

The *Abekas Mira* servers feature unique capabilities, including the ability to record special multi camera angle clips. The Sport-AR control system controls only one playback channel and allows the selection of any camera during playback or record. A "go live" feature causes playback to follow recording by only a short delay (hit the REC key). The last channel (D for 4 channel servers, H for 8 channel servers) is used for replay, and is the replay program output. If transitions (dissolves) are to be used, the next previous channel (C or G) must be left unused - the server uses this channel for transitions. Because of the *near live* playback and camera selection capabilities, the output can be fed directly to display equipment if a production switcher is not available, but this is not recommended.

The following steps outline the basic installation and prepare the system for replay operations.

1. Install the *Abekas Mira* production server per its instruction manual (install all disks, keyboard and mouse, monitors, etc.). Make video, and optionally audio, connections to all record channels (channels A-C for 4 channel server, channels A-F for 8 channel server). Replay of all camera angles will be done on the last channel (D for 4 channel server, G for 8 channel server).
2. Connect the Sport-AR control cabling to the replay (last) channel using the adapters provided.
    DO NOT CONNECT THE RJ45 CONTROLLER CONNECTOR DIRECTLY TO THE SERVER.
    Connect the Sport-AR main panel to the TBar AUX connector using a short *unmarked* flat RJ45 cable. Using another short *unmarked* flat RJ45 cable, connect the TBar AUX-E connector to the VTA-2001 adapter. Connect the PSA-12-1000 power supply to the VTA-2001 power pigtail and apply AC power. The Sport-AR panel should light up - if not, disconnect power and check cables.
    Note: Like telephone cables, all *unmarked* BUF Technology RJ45 cables have the conductor order reversed: 1-8 to 8-1, so standard CAT5 type cables will not work. This is NOT the same as a CAT5 *crossover* cable.
3. Connect the VTA-2001 adapter DB09F (9-pin) connector to the *Abekas* DB09F adapter using a straight through M-M 9-pin cable. The 9-pin connectors on these adapters can be connected directly together by removing the DB09F-F "Gender Bender" from the VTA-2001. Connect the *Abekas* adapter to the server CH-D (or CH-H for 8 channel servers) using the round CAT5 cable provided by *Abekas* or any straight through CAT5 type cable. The CAT5 and 9-pin cables can either or both be long cables, with a maximum total length of 1000 meters. The TBar to VTA-2001 cable cannot exceed 10 meters in length to limit power supply voltage drop.
4. Power up the *Abekas Mira* production server as detailed in its manual. Once booted, the Sport-AR STATUS display should show timecode and status, indicating that it is communicating with the server.
5. To check operation, on the Sport-AR panel, hit SETUP, PLAY and turn the knob to browse alphabetically through the clips stored in the server. It may take some time for all clip names to be read from the server. Hit ENTER to load a clip. Hold ENTER and turn the knob to browse the first frame of successive clips. Hit HOME when done. Hit PLAY, move the TBar up and down, and check other playback operations. The clip should play as expected. Note that only clips that match the server's video resolution and frame rate settings will load.
6. Using the server's Engineering utility (*EngSetup.exe*), set for ISO recording of the desired number of record channels (*Channels* tab - *ISO3* for 4 channel server, *ISO6* for 8 channel server). This causes recordings to occur on all record channels in special multi camera angle clips. Set the server to the same video standard as the cameras (*Video* tab). Set the server for external *Video Reference Source* (not *Free Run*). Video reference must be supplied to the server and to all cameras or a vertical offset in picture position will occur. If the video or reference settings are changed, a server restart may be required.
7. To use transitions (dissolves), hit SETUP, F1 and enable the desired transitions - a transition duration of 10 frames works well. The second to last channel must remain unused and *ISO2* must be used for 4 channel servers (allowing only two cameras).
8. Because multiple camera angles are recorded, the available disk space will be consumed by a multiple of real time (record duration times the number of cameras). For example, a 4 hour game being recorded on 3 cameras will use 12 hours of record time. Always make sure there is enough *Disk Space Free*, displayed near the top of the *Mira Explorer* utility. Delete unimportant clips to maintain adequate free space.
9. To start the recording process for instant replay, use the server's *Mira Explorer* utility:
    On CH-A, hit the REC button (button with a circle icon). The *Clip Record Setup* dialog appears. Enter a *Clip Name* and *Clip ID* of up to 7 characters (use the same name for both and do not exceed 7 characters). In *Auto Name*, select *Numeric Append*, this allows subsequent recordings to be made quickly if necessary. Select *Striped* for *Timecode* (or apply timecode). *Starting At* can be zeros or you may want to use time of day (set the time of day a few seconds in the future).
    Hit OK, this dialog goes away and the REC button flashes. Hit REC again to begin recording.
    The correct video should display for all cameras in CH-A, CH-B, etc., and should all appear normal. Once recording is started, the Sport-AR panel is used for all remaining operations including replay and highlights.

BASIC OPERATION

1. The Sport-AR controls only the replay channel, the last channel on the server, and can playback all camera angles. Green LEDs above F-keys indicate the angles available at any given time (in the loaded clip). A red LED indicates the angle being played, press another F-key to select a different angle.

2. To load a clip for playback, hit SETUP, PLAY and turn the knob to browse alphabetically through the *Clip ID*s stored in the server. Hit ENTER to load a clip. Hold ENTER and turn the knob to browse the first frame of successive clips. Hit HOME when done. Hit both scan keys (◀◀ & ▶▶) to scan the clip with the TBar. It takes some time for all *Clip ID*s to be read from the server, and a new record clip may take a while to show up.

3. To begin instant replay, load the *Clip ID* being recorded (to begin recording, see the above INSTALLATION section, step 8). To determine the record *Clip ID* to load, check CH-A on the server's *Mira Explorer* utility for the *Clip Name*, find the *Clip Name* in the *Clip Library* section and read the *Clip ID* from that column.

4. To "go live", hit REC. The replay channel outputs almost live video, delayed only slightly from real time. If the SLOW LED is flashing green, move the TBar up to the PLAY position (to match the current speed). To slow down, simply move the TBar lever down. At still, turn the knob to jog. Move the TBar back up for slow motion. Hit STOP to pause playback. If the SLOW LED is flashing red, move the TBar down to the still position (to match the still speed). Move the TBar back up for slow motion. To catch back up to live without missing any action, press and hold the REC key, playback will roll faster than play until live is reached or REC is released.

5. To change the camera angle, hit F1-F3 (any F-key with a green LED). Playback changes to the selected camera angle and the red LED lights above its F-key.

6. Press PLAY to playback at normal speed or press F7, F8, or F9 for slow motion at ¼, ½, or ¾ normal. No button pushes are needed to change between play, slo-mo, and jog modes. TBar at top is play mode, bottom is still, in between is slow motion. At still, just turn the knob to jog. TBar back up to return to slo-mo.

7. To play in reverse at the current speed, hold SLOW while in play or slo-mo. To change playback direction smoothly, move the TBar down to still, hold or release the SLOW button, then move the TBar back up to the desired speed. Repeat this process as needed to show a segment multiple times in both directions.

8. To shuttle quickly through material, press the SHTL key and use the TBar. Near the middle is still, and the knob will jog. The FAST JOG key selects fast jog mode which operates like jog but moves faster. Scan keys (◀◀ & ▶▶) shuttle at six times play speed when held, still when released. Both pressed together enter clip scan. As the TBar is moved, playback continually cues to the point proportional to the TBar position. Any transport function ends the clip scan mode (examples: turn the knob to jog or hit PLAY to play).

9. At any time, press MARK to create a new cue point. The current timecode, clip, and angle are stored.

10. Press CUE to cue playback to the location that MARK was hit, or press PREROLL to cue 2 seconds earlier. The cue point's clip is automatically loaded. The angle stored with the cue point is automatically selected.

11. To select any cue point, BUT NOT cue playback, enter the cue number on the keypad and press ENTER. To select any cue point, AND instantly cue playback, enter the cue number on the keypad and press CUE.

12. Hold ENTER and hit F4-F6 to store the a quick cue. Quick cue keys instantly cue the stored cue point.

13. To change the *current* cue's out point (end), hold OUT and press MARK. Normal or slo-mo playback will pause exactly at the last used cue's out point. To resume playback, press PLAY, press a slo-mo preset key (F7-F9), or move the TBar down then up. Playback will again stop at the end of the clip (if not live). To cue to the out point, hold OUT and press CUE. Hold OUT and press PREROLL to cue 2 seconds before the out point.

14. To change the in point (beginning) of a cue and/or its camera angle, hold IN or ENTER and press MARK.

15. The STATUS display shows the time remaining before the out point. Slo-mo speed is taken into account so the time shown is the actual time it will take to finish playing. The MENU display shows the cue point duration. While holding OUT, the STATUS display shows timecode and MENU shows the out timecode.

16. Hold ENTER and press PLAY LIST to add the *current* cue and angle to the end of the current playlist. To edit a playlist, press SETUP, PLAYLIST. Use the arrow and number keys to insert cues into the playlist, to delete cues, or to insert pauses (STL). Press HOME when done.

17. To play a playlist, press PLAYLIST, CUE, then PLAY (or a slo-mo key). As playback reaches the out point of each cue in the list, a clean cut is made to the in point of the next cue. Camera angles are stored separately in playlist steps, so the same cue point can be entered more than once with different angles to play subsequent camera angles of the same action. While playing a playlist, the STATUS display shows the time remaining in the entire list (or until the next pause), and is adjusted for slo-mo speed. A pause (STL) stops playback and shows a still frame at the out point of the cue preceding the pause, press PLAY to still frame at the in point of the next cue. Then resume playback as usual.

18. There are ten playlists. To select a different playlist for setup or playback, press a keypad number (0-9) immediately before the PLAYLIST key. To add the *current* cue to the end of *any* playlist, hold its keypad number (0-9) and press PLAYLIST. Each playlist holds up to 100 cues.

OPERATION

LOADING CLIPS

To load a clip for playback, hit SETUP, PLAY and turn the knob to browse through the *Clip ID*s stored in the server. Hit ENTER to load a clip. Hold ENTER and turn the knob to browse the first frame of successive clips. Hit HOME when done. The loaded clip's start and end are automatically set into the special cue point zero. After exiting this menu, hit both scan keys together (◄◄ & ►►) to browse the clip with the TBar (see CLIP SCAN).

Clips are shown in alphabetical order without regard to case, although clips are case sensitive, so identical *Clip ID*s can exist that differ only by case. All *Clip ID*s in the server are constantly being read at approximately one per second. When in the clip menu, they are read faster. It takes some time for all *Clip IDs* to be read from the server, and a new record clip may take a while to show up after a recording is begun.

When a cue point is marked (see CUE POINTS), the loaded clip from which the cue point is made is stored with it. When the cue point is used, its clip is automatically loaded, so this menu need be used only once per clip required for a particular session, then cue points can be made and used to quickly load the clips during the session.

RECORDING

Recording must be done at the server, using the *Mira Explorer* utility. Camera feeds must be of the same video standard, resolution, and frame rate, and must be genlocked so that they are vertically in time. If the cameras cannot be genlocked, frame synchronizers are required between the cameras and the server.

Before recording is started, certain settings must be made on the server. Using the server's Engineering utility (*EngSetup.exe*), set for ISO recording of the desired number of record channels (*Channels* tab - *ISO3* for 4 channel server, *ISO6* for 8 channel server). This causes recordings to occur on all record channels in special multi camera angle clips. Set the server to the same video standard as the cameras (*Video* tab). Set the server for external *Video Reference Source* (not *Free Run*). Video reference must be supplied to the server and to all cameras or a vertical offset in picture position will occur. If the video or reference settings are changed, a server restart may be required.

Because multiple camera angles are recorded, the available disk space will be consumed by a multiple of real time (record duration times the number of cameras). For example, a 4 hour game being recorded on 3 cameras will use 12 hours of record time. Always make sure there is enough *Disk Space Free*, displayed near the top of the *Mira Explorer* utility. Delete unimportant clips to maintain adequate free space.

To start the recording process for instant replay, use the server's *Mira Explorer* utility:
On CH-A, hit the REC button (button with a circle icon). The *Clip Record Setup* dialog appears. Enter a *Clip Name* and *Clip ID* of up to 7 characters (use the same name for both and do not exceed 7 characters). In *Auto Name*, select *Numeric Append*, this allows subsequent recordings to be made quickly if necessary. Select *Striped* for *Timecode* (or apply a timecode signal to the server). *Starting At* can be zeros or you may want to use time of day (set the time of day a few seconds in the future).
Hit OK, this dialog goes away and the REC button flashes. Hit REC again to begin recording.

The correct video should display for all cameras in CH-A, CH-B, etc., and should all appear normal. Once recording is started, the Sport-AR panel is used for all remaining operations including replay and highlights.

To begin instant replay, load the *Clip ID* being recorded (see LOADING CLIPS). To determine the exact record *Clip ID* to load (which will be the one set above, plus a *Numeric Append* digit) check CH-A on the server's *Mira Explorer* utility for the *Clip Name*, find the *Clip Name* in the *Clip Library* section and read the *Clip ID* from that column.

CAMERA ANGLES

The *Abekas Mira* production server records special multi camera angle clips that allow camera selection during playback. If a multi camera angle type clip is loaded for playback, green LEDs light above the F-keys corresponding to the available camera angles. A red LED indicates the currently selected (playing) camera angle. Hit an F-key with a green LED to select a new camera angle.

Camera angle F-keys also provide a re-cue function which cues and immediately replays the last used cue point. By holding HOME and hitting an F-key with a green LED, the cue point is re-cued and replayed using the selected angle (which can be a different angle or the same one). Re-cue can be set as the default action of these F-keys (not holding HOME), in which case a simple camera angle selection requires holding HOME instead. See the OPERATIONAL PREFERENCES, RECUE ON ANGLE CHANGE menu item.

DISSOLVE TRANSITIONS

The Sport-AR replay system is capable of performing dissolve transitions in place of cuts for certain operations. The Abekas Mira server uses a second playback channel to aid in transitions, so a 4 channel Mira can only record 2 camera angles if transitions are used (6 camera angles for 8 channel Mira). To enable dissolve transitions, hit SETUP, F1 and enable the desired conditions. See TRANSITIONS (DISSOLVES).

GOING LIVE

To "go live", hit the REC key (do not hold it for over one second). The replay channel outputs normal speed almost live video, or *near live*, delayed only slightly from real time. The video is actually playing out of the in-record clip, allowing it to be slowed or stopped at any time. If a production switcher is not available, the replay output can be used as a program output and *near live* cameras can be "switched" like a switcher by selecting angles using the angle select F-keys (see CAMERA ANGLES).

The Sport-AR features a *catch-up* mode, which brings delayed playback forward to the *near live* point gradually, by speeding up playback to faster than normal speed. Hold REC to begin *catch-up* playback, and continue holding it until *near live* is reached, at which time playback slows to normal speed. If REC is released before the *near live* point is reached, normal playback speed is resumed early. The speed used for *catch-up* mode defaults to 200% normal speed and can be changed by hitting SETUP, REC and entering a different value.

PLAYBACK

Press PLAY to playback material at normal speed, or use F7 to play at ¼, F8 to play at ½, or F9 to play at ¾ normal speed (see SLO-MO SPEED PRESET KEYS). Move the TBar to vary playback speed between zero and 100% normal speed. So that speed changes are always smooth and don't change suddenly, the TBar does not affect playback until moved to the position corresponding to the current speed (this assumes the speed was set by keystroke such as PLAY or an F-key). When the TBar needs to be moved to take control, a LED above the SLOW key flashes: green if the TBar needs to be moved up, red if it needs to be moved down. Press the SLOW key to force playback to the TBar speed.

It is not necessary to press any keys to change between variable play (slow motion) and jog modes. When playback is at still, simply turn the knob to jog or raise the TBar from the bottom to begin playing in slow motion. In jog, playback moves relative to the amount the knob is turned and stops when the knob is stopped. The FAST JOG key enters the fast jog mode which is identical to jog, but picture movement is much faster (the knob operates with much greater sensitivity), allowing you to quickly move through more material.

REVERSE PLAYBACK

To playback in reverse at the current TBar speed, press and hold the SLOW key. Release the SLOW key to play forward. Speed can be changed while in reverse by moving the TBar. If the TBar is at the top, reverse play will be at normal speed but in reverse. To smoothly reverse speed, move the TBar to the bottom (still), then press and hold the SLOW key, move the TBar up - speed increases in reverse. Then move the TBar back to the bottom before releasing the SLOW key, move the TBar up. Only hold or release the SLOW key when the TBar is down at still. In this way, you can repeatedly play through a segment forward and reverse with smooth speed control.

CUE POINTS

A cue point is a memory location that remembers a particular playback location. For speed reasons, cue points are referenced numerically, from zero to 999. When deleted, cue points are marked deleted with a 'd' after the number, but not renumbered. This is in case a list of cue points is being used elsewhere that references these numbers. If it is safe to renumber deleted cue points so the numbers can be reused, a renumber menu is provided. See ERASE CUE RANGE and RENUMBER CUE POINTS.

When a cue point is created, it stores the currently playing timecode, called the IN point. Also stored are the clip from which the cue point is being made and the current camera angle. When a cue point is used, it automatically loads the clip and selects its angle.

The cue point also optionally contains another timecode number called the OUT point. The *duration* of the cue point (how long it will play) is found by subtracting the OUT point from the IN point. The OUT point is important if the cue point is looped or used in a playlist. It is also handy to pause playback at a certain point, and is frame accurate.

When playing at normal or slow motion speeds, playback goes to still when the OUT point is reached.

Playback is resumed up to the end of the clip by pressing PLAY or entering slow motion when at the OUT point.

The duration of a cue point is shown on the MENU display because it is useful information. The OUT point can be observed by holding the OUT key.

CREATING AND TRIMMING CUE POINTS

A new cue point is created by pressing the MARK key. Cue points are created sequentially from 000 to 999.

To change, or *trim*, a cue point's IN point to the current position and angle, hold ENTER and hit MARK.

Often, the IN isn't exactly where you want it, so hit CUE and turn the knob to jog to the perfect point, then hold ENTER and hit MARK. You can even do this after adding the cue point to the playlist and the trimmed cue point is automatically fixed in the playlist too. Holding ENTER and hitting MARK also changes the cue point's angle, so to change the angle of a cue point, hit CUE, the new angle F-key, hold ENTER and hit MARK.

To set or change a cue point's OUT point to the current position, hold OUT and hit MARK.

MARK BACKTIMING

A unique feature of the Sport-AR controller is called *variable backtime*. This feature allows the operator to effortlessly and quickly compensate for the amount of time taken to hit the MARK key after "replay worthy" action was observed and evaluated. Events that are worthy of replay are not apparent until after they occur. Also, it is common to want a variable amount of action prior to the event to be included in the replay. Variable backtiming is a powerful tool that allows the operator to perfectly mark a cue point, or at least get very close to the optimum IN point the first try, eliminating or reducing the need to trim the IN point. Backtiming subtracts the time that the MARK key is held down from the point at which it is first hit to create the mark point. The idea is: Think about how long ago the beginning of action that should be included in the replay occurred, and hold the MARK key down about that length of time. The IN point sort of runs backwards during this time, the amount of which can be viewed on the STATUS display following the 'M' indicator. When released, the action of the MARK key takes effect, which would be a new cue point, or could also be the trimming of IN or OUT points. Speed is taken into account, so if MARK is held during slow motion or shuttle, backtiming works as expected.

VIEWING AND USING CUE POINTS

The cue point shown on the MENU display is called the *current* cue point.

The CUE key cues playback to the *current* cue point.

The PREROLL key cues playback to 2 seconds before the cue point (or the beginning of the clip).

Hold OUT and hit CUE to cue to the *current* cue's OUT point.

Hold OUT and hit PREROLL to cue 2 seconds before the OUT point.

To make a cue point *current* without affecting playback, enter its number on the keypad and hit ENTER.

To make a cue point *current* and cue playback, enter its number on the keypad and hit CUE.

The RIGHT/LEFT arrow keys change the *current* cue to the next/previous cue point.

Hold IN and hit the RIGHT/LEFT arrow keys to also cue playback to the new *current* cue.

CUE POINT ZERO

Cue point zero is special. Whenever the LOADING CLIPS menu is used, the loaded clip is automatically stored in cue point zero. The duration of cue point zero is set to the clip's duration when it was loaded (if it is growing due to being in record, the actual duration will be longer). To scan through the clip, cue to zero (0, CUE) and hit the scan keys (◄◄ & ►►) together (see CLIP SCAN).

PREROLL

PREROLL cues to the location 2 seconds before the IN point, or to the beginning of the clip if the IN point is within the first 2 seconds. The preroll time can be changed by pressing SETUP, PREROLL and entering a different time.

FUNCTION KEYS (F-KEYS)

Each of the function keys that are not used to select camera angles serve any of three purposes: Slo-mo Speed Preset, Quick Cue, or Bump I/O. A Slo-mo Speed Preset key plays in slow motion at a preset speed (then the

TBar can be used to vary the speed). A Quick Cue key cues playback instantly to any cue point. A Bump I/O key sandwiches the *current* cue point between pre-designated IN and OUT bumper clips. By default, F4-F6 are Quick Cue keys and F7-F9 are slow motion speed preset keys. To change a key's function, press SETUP, the key, then the UP/DOWN arrow keys.

SLO-MO SPEED PRESET KEYS

To change the speed of a Slo-mo Speed Preset key, press SETUP, the Slo-mo Speed Preset key, the speed in percent of normal, then ENTER. Press HOME when done.

QUICK CUE KEYS

The *current* cue point (the one showing on the MENU display) can be assigned to a Quick Cue key at any time by holding ENTER while pressing the Quick Cue key. Alternately, press SETUP, the Quick Cue key, the cue point number on the keypad, then press ENTER. Press HOME when done.

BUMP I/O

To set the bumper clips, press SETUP, the Bump I/O key, the IN bumper cue point number on the keypad, then press ENTER, then the OUT bumper cue point, then ENTER (ENTER toggles between the IN and OUT bumpers). Press HOME when done.

Any cue points can be set as the IN and OUT bumper clips. A Bump I/O key automatically cues the IN bumper clip then plays it at normal speed, then cuts to the currently selected cue point and plays it at the speed set on the TBar, then at its OUT point, playback cuts to the OUT bumper, which again plays at normal speed. Speed can be changed with the TBar while the clip is being played. Bumper clips might be "swoop" animations that take you into and out of replays with a sponsor's graphic or any other desired clip. Bumper clips must be at least two seconds in length.

If you want to press PLAY manually after the IN bumper is cued (instead of it playing automatically), see the BUMP AUTO START item in the OPERATIONAL PREFERENCES menu.

SCAN

The reverse scan (◄◄) and forward scan (►►) keys scan playback while being held, and pause the picture when released. While paused, turning the knob allows fine adjustment of picture position (jog), or lifting the TBar from the bottom to begins slow motion playback. The default scan speeds are 6 times normal speed. To change the scan speed, press SETUP, the scan key to change, turn the knob until the desired speed is shown, then press ENTER.

CLIP SCAN

"Clip Scan" is entered by tapping both scan keys (◄◄ & ►►) together. While in clip scan mode, playback continually cues to the point in the last cued clip relative to the TBar position. This allows clips of any length to be scanned quickly from heads (bottom = IN point) to tails (top = OUT point). Any other transport key (STOP, PLAY, SHTL, etc.) exits the clip scan mode. Also, turning the knob exits the clip scan mode and enters jog (still).

SHUTTLE

To shuttle quickly through material, press the SHTL key and use the TBar. Near the middle is still, up from middle shuttles forward, down from middle shuttles in reverse. Speed response uses a logarithmic scale providing a natural feel for both fast and slow speeds. While in the still range, the knob can be used to jog without leaving the shuttle mode.

PLAYLISTS

Sport has memory for up to ten playlists each containing up to 100 steps which can be assigned cue points or stills. When played, as the OUT point of each step's cue point is reached, a seamless cut is made to the cue point of the following step while motion continues. Cue points must have a duration of at least 1 second for playlists to operate properly. While playlist mode is enabled (PLAYLIST LED lit), the MENU display shows the current playlist number, the current step and cue point, and the next step and cue point. The STATUS display shows the actual time, adjusted for slo-mo speed, that it will take for the playlist to finish playing to the next still (STL) or end. If looping is enabled while playing a playlist, the entire playlist is looped.

PLAYLIST SETUP MENU

To create a playlist, press SETUP, the number of the playlist (0-9), then PLAYLIST. If you skip the number key, the last *setup* playlist is used. The MENU display shows (from left to right):

TOP LINE SHOWS HEADING	BOTTOM LINE SHOWS VALUE
# (Playlist number being setup)	0-9
STP (Current step number)	00-99 with LEFT/RIGHT arrows meaning use arrows to change step. To change by ten, hold arrow and hit zero.
CUE (Cue point assigned to step)	000-999 or END (end of playlist) or STL (still step - pauses video)
CA (Camera Angle)	0-3 (or 0-6 for 8 channel servers) - step's camera angle. This defaults to the cue point's angle, but can be changed by hitting an angle select F-key, allowing multiple angles of the same cue.
UP arrow DEL This is a heading letting you know that UP arrow deletes the step.	DOWN arrow STL This is a heading letting you know that DOWN arrow inserts a still step.

To insert a cue point into the list, use the LEFT and RIGHT arrows until you see the step where you want it, then enter its number on the keypad and press ENTER. The step that was shown before the entry and any higher ones are rippled up one. If you use the RIGHT arrow instead of ENTER, the cue point is inserted and the next step is shown. This is how you enter a list of cue points - use RIGHT arrow instead of ENTER for each number.

To move faster through the list (to get to a step more than a few away), hold the RIGHT or LEFT arrow key and hit zero. This moves ten at a time to get you close, then zero in with the arrow keys.

Press the DOWN arrow to insert a still (STL) at the current step. When encountered, a still step pauses playback of the playlist at the last frame of the previous step's cue point (OUT point). Playback is resumed by hitting PLAY to still on the following step's cue point, then PLAY again to start playing.

To delete the current step and ripple all higher steps down, press the UP arrow key.

QUICK PLAYLIST CREATION

The quick entry method allows cue points to be added effortlessly into playlists during replay operations.
To add the *current* cue point (the one on the MENU display) to the end of a playlist, hold the keypad number of the playlist and hit the PLAYLIST key. The displayed cue point can quickly be added to multiple playlists.
This allows separate playlists to be created for different purposes, such as special playlists for key athletes or types of plays. To add the cue point to the current *setup* playlist (the last one you used with the PLAYLIST SETUP MENU), hold ENTER and hit PLAYLIST.

PLAYLIST PLAYBACK

To play a playlist, press the number of the playlist (0-9), PLAYLIST, CUE. The cue point assigned to the first playlist step is immediately cued and the playlist is ready for playback. If the number is omitted, the last cued playlist is used. The PLAYLIST LED lights when in playlists mode and the MENU display shows the current and next steps. Turn the playlist mode off by again pressing PLAYLIST.

When a still (STL) step is reached, the OUT point of the preceding step's cue point is shown at still.
To show a still frame of the next step's cue point, hit PLAY. Hit PLAY again to resume playback. Alternately, slow motion preset keys or the TBar can be used to play in slow motion.

Playback speed can be varied while a playlist is playing. The STATUS display is continually updated to show the actual amount of time it will take to finish playing the playlist at the speed currently in effect (if a still is programmed, it shows the time until the next STL). Sometimes you don't have time to finish playing a playlist and want to hurry it up. To shave seconds, the RIGHT arrow key switches to the next step early, as though the OUT point was reached.

PLAYLIST BROWSING

While at still, the current step can be changed using the RIGHT and LEFT arrow keys or by entering a step number and pressing ENTER. CUE will always cue to the first step, but the displayed step can be cued instead by holding IN while pressing CUE. The step's OUT point can be cued by holding OUT and pressing CUE. Hold

OUT and press PREROLL to cue 2 seconds before the OUT point of the current step. The first or last frame of successive steps can be cued by holding IN or OUT and using the RIGHT and LEFT arrow keys.

LOOPING

Looping is enabled by pressing the LOOP key so that the LOOP LED lights. When on, playback will continuously loop between the last used cue point's IN and OUT points. If the playlist mode is enabled, the entire playlist will loop forever. Cue points must have a duration of at least 1 second for looping to operate properly.

STATUS DISPLAY

The STATUS display always shows the current status of the video server regardless of what is being done in the menu system. Also, all transport keys (PLAY, STOP, CUE, SLO-MO, etc.) are always active. The bottom line of the STATUS display shows the playback status. When in slow motion mode, the speed reads out in percent of normal speed, when in scan or shuttle, the display reads in multiples of normal speed. The beginning of the top line shows the cue point that was last cued with CUE or PREROLL or reached in a playlist.

REMAINING TIME DISPLAY

The top line of the STATUS display shows the time remaining in the current cue point (time until OUT point), or if playlist mode is enabled, the time remaining until the end of the playlist or the next still step. The format of the remaining time is -HH:MM:SS:FF, where the - sign indicates playback is before the OUT point (or playlist STL or END), HH is hours, MM is minutes, SS is seconds, and FF is frames. If playback is after the OUT point, the time after is shown preceded by a + sign.

REMAINING TIME IN SLO-MO

If playback is in slow motion and not stopped, the approximate remaining time is shown scaled for the current playback speed. As speed is changed, the remaining time is adjusted on the fly to represent the actual time that playback will continue at that speed. If more than one hour of material remains, the speed calculation is not used. When the remaining time is scaled for speed, it is preceded by a 'v' to indicate that variable play speed is taken into account.

TIMECODE POSITION DISPLAY

The actual timecode being played is displayed in lieu of remaining time when the OUT key is held down.

MENU DISPLAY

The MENU display is used for various purposes depending on the panel's mode. Press HOME and turn PLAYLIST off to return to normal display mode.

HOME DISPLAY

The MENU display normally shows the *current* cue point number and IN point timecode on the top line and its duration on the bottom line. The OUT point timecode can be viewed instead of duration by holding the OUT key. To change to a different cue point, simply enter the cue point number on the keypad and press ENTER. If you press CUE or PREROLL instead of ENTER, it has the same effect as pressing ENTER, then CUE or PREROLL (playback immediately cues to the newly entered cue point). The RIGHT and LEFT arrow keys change to the next or previous cue point. If IN or OUT is held while the RIGHT or LEFT arrow is used, playback cues to each cue point. This allows quick browsing of successive cue points.

PLAYLIST DISPLAY

The PLAYLIST button toggles the playlist mode on and off. If a number key (0-9) is pressed before PLAYLIST, that playlist (of ten) is selected for playback. While playlist mode is enabled (PLAYLIST LED lit), the MENU display shows the playlist number and the current and next steps and cue points. To see the IN point and duration for the current step's cue point, press and turn off PLAYLIST. Note that turning PLAYLIST off before reaching the end of a playlist step will cause playback to pause at the OUT point of the current step.

MENUS

The MENU display is also used for navigating SETUP menus. Setup menus are entered by pressing SETUP followed by another key. Press HOME when done with a setup menu.

The setup menus are:

KEY PRESSED AFTER SETUP	MENU	MENU ITEMS
MARK	PERSONALITY MENU ITEMS	SAVE PERSONALITY RECALL PERSONALITY REGISTER RECALL DEFAULTS CALC VS. PHONE STYLE NUMERIC KEYPAD
PLAY	CLIP BROWSE & LOAD	LOADING CLIPS
REC	RECORD SETTINGS	TIME OF DAY & DATE ERASE CUE RANGE RENUMBER CUE POINTS ERASE ALL CUES
STOP	OPERATIONAL PREFERENCES	SET CATCH-UP SPEED BUMP AUTO START KNOB SENSITIVITY JOG MAX SPEED JOG SENSITIVITY
SCAN (◄◄ & ►►)	SCANNING SPEEDS	SCANNING SPEEDS
PLAYLIST	PLAYLIST SETUP MENU	PLAYLIST SETUP
CUE	CUE POINTS	KNOB SCROLLS THROUGH CUE POINTS
PREROLL	SET PREROLL	IN FRAMES TO 99 SECONDS
F4-F9	F-KEYS SETUP MENU	FUNCTION KEYS (F-KEYS)
ENTER	MISC MENU ITEMS	VERSION AND TEST LED BRIGHTNESS MENU & STATUS DISPLAY ANGLES INITIALIZE UNIT

CUSTOMIZATION

PERSONALITY MENU ITEMS

All user configuration settings are stored in permanent memory and remain safe even after extended periods without power (at least 10 years). Settings can be stored in any of five personality registers for later recall, allowing different users to personalize the panel to their preferences. Press SETUP, MARK to enter the PERSONALITY MENU ITEMS menu. Use the UP and DOWN arrows to choose a selection and select it with the ENTER key.

SAVE PERSONALITY

After selecting this item, enter a register number on the keypad (0-9), then press ENTER. You can then name the register by turning the knob to change the character and using the RIGHT and LEFT arrow keys to change the character position. Press ENTER when done. The personality remains protected unless the unit is initialized (see MISC MENU ITEMS, INITIALIZE UNIT).

RECALL PERSONALITY REGISTER

To recall a previously stored personality, enter the register number (0-9) on the keypad (names of registers are shown as you press different keypad keys), then press ENTER. The settings that were in effect when the register was saved are recalled.

RECALL DEFAULTS

Recalls the factory default settings. Saved personality registers are not altered.

CALC VS. PHONE STYLE NUMERIC KEYPAD

The numeric keypad is arranged telephone style. The panel can be changed to calculator style by changing this menu item. This setting is stored separately from personality data and can only be changed using this menu. After changing the style, it is necessary to physically swap the keycaps between the 1-2-3 and 7-8-9 keys.

RECORD SETTINGS

Press SETUP, REC to enter the RECORD SETTINGS menu. Use the UP and DOWN arrows to choose a selection and select it with the ENTER key. While in this menu, the time of day is shown on the MENU display top line.

TIME OF DAY & DATE

Sets the current time of day and date. The real time clock does not keep time during power interruptions. Time of day and date are not used by the Sport-AR at this time.

ERASE CUE RANGE

Erases the memory associated with of a range of cue points. Enter the first and last (inclusive) cue points to erase. Marks the specified range of cue points as deleted, but does not free up the cue point numbers used. Deleted cue points are displayed with a 'd' after the number. Cue points higher than the specified range are not deleted so any notes that may exist about them do not become obsolete. To recover the use of the deleted cue point numbers, and ripple higher ones down to fill the deleted ones, use the RENUMBER CUE POINTS menu. This cannot be undone - once cue points are erased, they are gone forever!
Actual recorded clips must be deleted using the server's *Mira Explorer* utility.

RENUMBER CUE POINTS

Removes cue points that are marked as deleted and renumbers the remaining cue points. Cue point numbers that are assigned to playlists and quick cue keys are adjusted or removed as necessary.

ERASE ALL CUES

Erases all cue point and playlist memory. Also erases and reloads all clip names from the server.
This cannot be undone - once cue points and playlists are erased, they are gone forever!

OPERATIONAL PREFERENCES

Press SETUP, STOP to enter the OPERATIONAL PREFERENCES menu. Use the UP and DOWN arrows to choose a selection and select it with the ENTER key.

SET CATCH-UP SPEED

Sets the speed, in percent of normal, used for the *catch-up* mode (see GOING LIVE). Default is 200%.

RECUE ON ANGLE CHANGE

When enabled, an angle select F-key re-cues and plays the current cue point at the selected angle instead of just selecting a new camera angle at the current speed. This can also be done by holding HOME while hitting an F-key. ENABLING this actually inverts the meaning of holding HOME, so simple camera angle selection can still be done, but instead requires holding HOME. Default is DISABLED. See CAMERA ANGLES.

BUMP AUTO START

When enabled, requires manual playing of the IN bumper clip after using a Bump I/O key. For more information see BUMP I/O. Default is ENABLED.

KNOB SENSITIVITY

Reduces the overall sensitivity of the knob by two or four fold. If you feel the knob is too sensitive in all modes, use this item to reduce it's sensitivity.

JOG MAX SPEED

Limits the maximum speed the jog mode uses. Use the knob to set the fastest speed that the picture will travel by turning the knob in the jog mode. The JOG MAX SPEED may be set from zero to 500% normal speed. The default is 500%. This setting does not affect the fast jog mode.

JOG SENSITIVITY

Adjusts the speed the knob must be turned in the jog mode to reach the JOG MAX SPEED. This setting affects the fast jog mode also. Default is 10 units (units are arbitrary).

TRANSITIONS (DISSOLVES)

Dissolve transitions can be used in place of cuts during various conditions. To use transitions, second to last server channel must be left unused; the server uses this channel's hardware to perform the transitions. To enable transitions, hit SETUP, F1 and use the UP/DOWN arrows and ENTER key to ENABLE the TRANSITION MODE. If disabled, no transitions are used. If enabled, the following conditions can be independently enabled or disabled:
LIVE ANGLE - dissolves when manually selecting a new camera angle with the F-keys.
RECUE ANGLE - dissolves when re-cueing (see).
PL(aylist) ANGLE CHANGE - dissolves between different views of the same cue point in a playlist.
PL(aylist) NEW CUE - dissolves between different cue points when playing a playlist.
BETWEEN LOOPS - dissolves from the end of a loop to the beginning of the next loop.
BUMP I/O - dissolves between bumper clips and a replay when using BUMP I/O (see BUMP I/O).
The last setting is TRANSITION DURATION. This is the time, in frames, that transitions take. Default is 10.
See DISSOLVE TRANSITIONS for more information.

SCANNING SPEEDS

By default, the scan keys (◄◄ & ►►) scan playback at 6 times normal speed. To change the speed of either key, press SETUP, the scan key, turn the knob until the desired speed is shown, then press ENTER.

PLAYLIST SETUP MENU

See PLAYLIST SETUP MENU in the OPERATION, PLAYLISTS section.

CUE POINTS

Press SETUP, CUE to enter the CUE POINTS menu. While in this menu, you can scroll through all cue points using the knob.

SET PREROLL

To change the preroll time, press SETUP, PREROLL, seconds and frames using the keypad, ENTER.
Press HOME when done. The PREROLL key operates identically to the CUE key except it cues to a point earlier

than the IN or OUT point being cued. 2 seconds is the default, but the preroll advance can be changed in 1 frame increments to any amount of time up to 99 seconds.

F-KEYS SETUP MENU

See FUNCTION KEYS (F-KEYS) in the OPERATION section.

MISC MENU ITEMS

Press SETUP, ENTER to enter the MISC MENU ITEMS menu. Use the UP and DOWN arrows to choose a selection and select it with the ENTER key.

VERSION AND TEST

Displays the firmware version and performs a self test. All 24 LED indicators light and the keyboard can be tested by checking that keystrokes show on the STATUS display. Move the TBar up and down and observe the TBAR readings from 1 to 4095. Turn the knob to end the keyboard test. If a PROM FAILED! message appears, the program PROM needs replacement. The unused stack space (MEM FREE:) is also displayed and should be a non-zero number, if not, please call the factory.

LED BRIGHTNESS

Adjusts the brightness of the 24 LED indicators. Turn the knob until the desired LED brightness is reached, then press any key.

MENU & STATUS DISPLAY ANGLES

Adjusts display contrasts to optimize for viewing angle.

INITIALIZE UNIT

DO NOT USE THIS MENU ITEM LIGHTLY! This menu item clears all PERSONALITY REGS which is not recommended unless you really mean to clear them. This can be done without erasing personality data by using the COLD BOOT function (see COLD BOOT).

COLD BOOT

In rare instances, especially during heavy ESD (electrostatic discharge) events like lightning storms or dry weather in carpeted environments, panel memory can become corrupted. This can cause random symptoms including garbage (random characters) displayed in menu settings, strange slow motion speeds, other settings that are out of normal range, and/or failure of communication with the server. There are hardware circuits in the panel designed to avoid errant RAM writes whenever power is below a certain voltage level, but there is no way to completely protect against ESD induced problems.

A COLD BOOT restores all system memory to the factory default condition except the personality registers. It also erases all cue points and playlists.

To perform a COLD BOOT: Disconnect the RJ45 cable from the main panel, and hold down the MARK and PLAY keys while reconnecting. Continue holding the keys until you see characters on the displays.
If you had stored a personality register, it can be recalled after the COLD BOOT to bring the panel back to the way you like it. If you save personality after the panel is already corrupted, it may contain corrupted data and still cause problems. If personality data itself is corrupted, a stored register will appear as "default", so if the name you saved appears, you can trust that register (see PERSONALITY MENU ITEMS).