

FOCUSBUG TECHNOLOGIES NEWSLETTER - No.1

cine/RT

ULTRASONIC RANGER/TRACKER

CINE RT SPRING CHECK UP

cine/RT
ULTRASONIC RANGER/TRACKER

Hello! Greetings and salutations from LAIRD and JON. Spring is here again and with it the continued challenges of pulling focus. We wanted to offer you some info in the hopes of enhancing your experience with the Cine RT System to get the job done.

Before we dive in, we would like to thank you again for your interest in, and/or ordering of, a Cine RT. We trust you are, or will soon be, enjoying the benefits of your System Package. We encourage you to contact us with any questions and hope you have an opportunity to check out the latest version of our manual at <http://www.focusbug.com/downloads>.

The manual offers a detailed table of contents, hyperlinks, appendices and FAQs to help you find to what you want to know about your Cine RT. We hope to soon augment the experience with the addition of informational videos! That said, let's touch on some functions and features which, right out of the box, may present some mysteries for the uninitiated...

POWERING UP!

When you first unpack your Cine RT System you will notice stickers covering the Lemo inputs. They are there to warn you that, the while BASE UNIT accepts both 12/24V, the HANDSET and HIGH-BRIGHT DISPLAY are 12V components.



Vitals Menu Button

Your components contain internal lithium polymer batteries which require an initial deep cycle charge of approx. 6 hours before first use. Subsequent charge times will differ per component and will be affected by their selectable CHARGE RATES. The components ship with FAST CHARGE engaged. At the REGULAR CHARGE RATE all components require a full 6 hours to trickle charge to 100%.

Your components have different sized batteries with different operating times. The life of each battery is determined by operation mode, screen brightness, external operating temperatures, etc.

To determine your system's internal battery power levels each component has is equipped with the means to tell you when they need some juice...

VOLTAGE RESTRICTIONS

BASE UNIT: 9-30 VDC
HANDSET CONTROL UNIT: 7-20 VDC
HIGH_BRIGHT DISPLAY: 7-20 VDC
BUG TRANSMITTER: 5V USB

HANDSET BATTERY INDICATOR

YOUR HANDSET POWER IS INDICATED GRAPHICALLY ON THE VITALS TOUCH KEY AND AS A PERCENTAGE IN THE VITALS MENU.

Please note: The HANDSET draws most power when operating in TAPE MODE.

FAST CHARGE GUIDELINES

For each battery to reach 95%*, please charge for:

HANDSET: 2 HOURS
HIGH-BRIGHT DISPLAY: 1.5 HOURS
BUG TRANSMITTER: 2 HOURS

HIGH-BRIGHT BATTERY INDICATOR

YOUR HIGH-BRIGHT DISPLAY POWER IS DETERMINED BY MOMENTARILY PRESSING THE POWER BUTTON UNTIL YOU SEE:

4 DOTS: 100% / 3 DOTS: 75% / 2 DOTS: 50% / 1 DOT: 25%

Please note: A pulsing dot indicates the component needs to be charged.

APPROX. BATTERY LIFE

HANDSET: 6 HOURS
HIGH-BRIGHT DISPLAY:
10 HOURS @ MINIMUM BRIGHTNESS
4 HOURS @ MAXIMUM BRIGHTNESS
BUG TX:
2 HOURS WHILE TRANSMITTING
8 HOURS IN STANDBY MODE

BUG BATTERY INDICATOR

YOUR BUG'S POWER LEVEL IS INDICATED IN THE 2ND ORANGE STATUS LED FLASH SERIES DURING IT'S START UP SEQUENCE:

4 FLASHES: 100% / 3 FLASHES: 75% / 2 FLASHES: 50% / 1 FLASH: 25%

PLEASE DO NOT PLUG 24 VOLTS INTO THE HANDSET OR HIGH-BRIGHT!

CINE RT COMMUNICATIONS 101

In order to assist the set up and/or troubleshooting of your Cine RT, we will illustrate how the system components relate to one another by discussing three important “conversations” that make everything work...



Source Touch Key

CONVERSATION ONE: ULTRASONIC SENSORS

The first conversation takes place between your system’s ultrasonic sensors. Each Cine RT component, except the HIGH-BRIGHT DISPLAY, contains these sensors. In RANGER MODE the sensors in the BASE UNIT take reflective readings and in BUG and TAPE MODES, the HANDSET and BUG sensors communicate directly to the BASE UNIT.

The sensors send and listen in the form of 40 khz ultrasonic pulses at a rate of 11.76 pulses per second. These ultrasonic conversations are processed in the BASE UNIT and the resulting data is relayed in “packets” to the other system components via 2.4 Ghz RF transmissions.

Your BUG engages uniquely in a simple form of this sensor conversation... That is, your BUG’s sensor sends pulses to your BASE UNIT and receives RF commands from your HANDSET. The BUG is different from the other components in that it does not transmit RF and therefore cannot send data - it simply provides the ultrasonic pulses for the BASE UNIT to hear and track. See **BUG-100 101** section for more details.



ID Touch Key

CONVERSATION TWO: CODES, IDS & CHANNELS

To ensure communication stability between your RF transmitting components your BASE UNIT ships with it’s own hexadecimal PAIRING CODE. With this unique code your HANDSET and HIGH-BRIGHT DISPLAY are each paired to your BASE UNIT. Your PAIRING CODE is the first value displayed when each component powers up and does not typically need to be adjusted.

Your PAIRING CODE ensures that your system components will distinguish each other from those of another Cine RT System; however, for your components to converse together they still must be set to the same PROTOCOL ID and RF CHANNEL.

Your system components ship set to PROTOCOL ID “A” and RF CHANNEL “1”. You have the option to choose from two PROTOCOL IDs (“A” or “B”) and eight RF CHANNELS (“1”-“8”). If you are using your Cine RT System on the same set as another Cine RT System you will want to select PROTOCOL ID and RF CHANNEL settings to allow the two systems to engage in SYNC MODE...



Sync Touch Key

CONVERSATION THREE: “SYNC MODE” & “CINE-TAP”

This conversation relates back to the principals of Conversation One: If two Cine RT Systems are working closely in the same acoustic space (E.g. in the same room) it is possible that an ultrasonic sensor in one Cine RT could mistake a pulse it hears from the other Cine RT’s sensor as it’s own. This crosstalk can result in incorrect data. To avoid crosstalk, Cine RT Systems are able to alternate when they send and listen by each having their own dedicated ultrasonic TIMESLOT.

COMMUNICATIONS CONTINUED...

For SYNC MODE to work, one Cine RT system must be set to PROTOCOL ID "A" and the other to PROTOCOL ID "B". The next step is to set all the components of both systems to the same RF channel. If the systems are on different channels they will not be able to enter SYNC MODE. If the systems are set to the same RF CHANNEL, SYNC MODE in the VITALS MENU can be engaged and the systems will be synced.

Please remember that ONLY TWO CINE RT SYSTEMS CAN ENTER SYNC MODE. If there are more than two Cine RT Systems working together it is best for any additional system to switch to a different RF CHANNEL than those of the systems set up for SYNC MODE. By going to other channels the additional systems will be able to keep their RF transmissions separate. This scenario, however, does not guarantee that ultrasonic sensor crosstalk will not occur and presents the same possible pitfalls as several Cinetapes working together in close proximity.

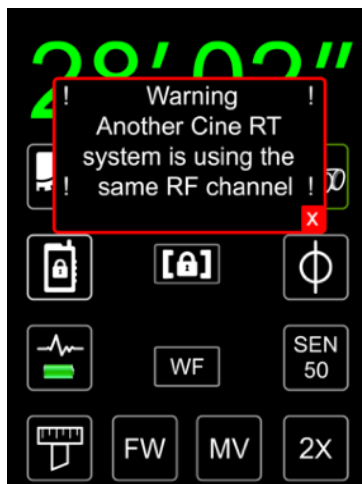
Speaking of Cinetapes, if your Cine RT System is working near a Cinetape you can choose to enter CINE-TAP MODE in the ADVANCED SETTINGS to avoid potential ultrasonic crosstalk. With CINE-TAP engaged, your system's BASE UNIT will listen for the Cinetape's ultrasonic pulses and offset it's own send and listen periods in order to avoid interference. No adjustment to your Cine RT System's PROTOCOL ID or RF CHANNEL is required.

Please note: In CINE-TAP MODE your Cine RT will be restricted to RANGER MODE and not be able to enter BUG MODE.

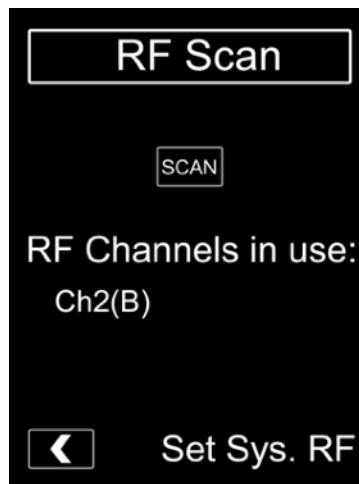
WARNING! UNEXPECTED CONVERSATIONS...

If you receive WARNINGS on your HANDSET that another Cine RT System is working nearby, you should unplug your BASE UNIT and perform a RF channel scan on your HANDSET. You can access the SCAN function through VITALS or SYSTEM SETTINGS.

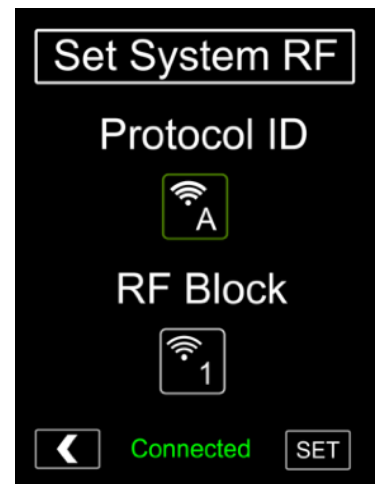
This scan will determine what channel the other Cine RT System is using. You should set your system to a free channel to avoid crosstalk. Because you are not working in the same acoustic space as the other system you do not need to change your "PROTOCOL ID", as SYNC MODE is not required.



Heed the warning! Enter the "VITALS" menu and press "RF Scan" touch key to enter the RF Scan page...



Unplug your Base Unit and press "SCAN"! The scan will take approx. 15 seconds. If another Cine RT is within range it's "Protocol ID" and "RF CHANNEL" will be displayed...



Plug your Base Unit back in, enter the "Set System RF" page and select an unused "Protocol ID" and "RF Block" (channel) combination.

COMMUNICATIONS RECAP

- Your Cine RT transmits on 8 channels in the 2.4 Ghz range to distances of approx. 850' (line of sight).
- Your Cine RT Pairing Code is a security feature to ensure stability within your own Cine RT System.
- All your Cine RT components must be set to the same Protocol ID and RF Channel for them to talk.
- For two Cine RT Systems to work in SYNC MODE one must be set to Protocol "A" and the other to "B" (only two systems can SYNC) and BOTH SYSTEMS NEED TO BE ON THE SAME RF CHANNEL!
- When you receive a WARNING about another Cine RT System in your area unplug your BASE, perform a CHANNEL SCAN to determine the ID/RF of the other system and change your channel to an unused channel. **DO NOT IGNORE THESE WARNINGS!**
- If your Cine RT is in a different space than another system, sync is not an issue and you only need to select separate RF CHANNELS.

ULTRASONIC "VOLUME"

Human hearing range falls roughly between 20 Hz to 20 kHz. Meanwhile, your Cine RT operates exclusively in the 40 kHz range and it's ultrasonic "pings" cannot be detected by the human ear. That said, if you listen really hard in a very quiet environment to your BASE UNIT, "something" is potentially audible...

SCALING THE "PINGS" TO SUBJECT DISTANCE

That "something" you might hear coming from the BASE UNIT are sub-harmonics of the 40kHz pulse frequency. Although most of the sonic energy is contained in the 40kHz (totally inaudible) range, there is some bleed into undertones due to the driver wave and transducer characteristics (basically where the real world takes over from theory). You will likely perceive that energy as "clicks".

In order to get the best long range performance we've introduced "volume scaling" into the Cine RT. In simple terms, when the system is reading long-range targets it "pings" at maximum volume. Conversely, when the target is up close the volume is at it's minimum. This works very well in real-world performance, but it does mean that the "clicks" can be quite loud if you're listening right next to the horns while the unit is searching for a long-distance target.

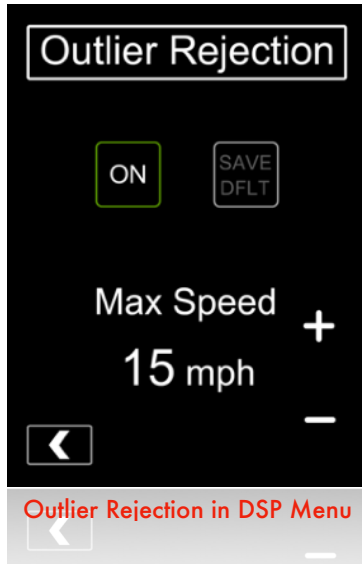
For example, if the rangefinder is pinging off a wall 30' away but you're listening to the horns 6 inches away, the "clicks" will be fairly audible. In our testing and reports back from the field, this hasn't ever caused a problem in a real-world situation. If by some unlikely chance the sound department is noticing noise, we've included a "SONIC-SAVER" feature where the volume of the pings is reduced at longer ranges (as well as the BUG's pings). Engage it by pressing the "Sound Recordist" icon SONIC SAVER TOUCH KEY on the VITALS page. It will reduce the range of the system, so only turn it on if necessary (besides, why would you want the sound guy to be happy).



Sonic Saver Touch Key Icons

DIGITAL SIGNAL PROCESSING 101

Your Cine RT System's BASE UNIT contains a microprocessor which handles sampling rates of a million times per second. This incredibly fast computing harnesses the incoming raw ultrasonic data and enables functions and tools like LIMITS, FOCUS WHISPER and MARKS VIEW. Certain types of processing ensure greater baseline stability and OUTLIER REJECTION is one such Digital Signal Processing or DSP.



“OUTLIER REJECTION” DEMYSTIFIED...

Your Cine RT ships with OUTLIER REJECTION enabled by default. In RANGER MODE, OUTLIER REJECTION helps to ignore momentary false reflections in order to maintain solid readings on your primary subject; particularly when your subject is at long range.

When another subject suddenly enters your rangefinder field of view, you may notice a small delay before that subject's distance appears on the readout. For example, when a slate enters the shot, it appears to take a second for your Cine RT to read the slate. Because OUTLIER REJECTION is enabled, your Cine RT stays “sticky” to the first subject until it determines that the new subject (slate) is a real target and not a false reflection. Behind the scenes, the slate's distance has been immediately calculated, but your Cine RT holds off displaying the new distance until it's sure that it is reading a real subject and not a false reflection.

As an example, imagine a scenario with an actor at 20' and a slate entering suddenly at 5'. As far as your Cine RT is concerned, the “subject” travelled 15' (from 20' to 5') in 1/12 of a second (the BASE UNIT's sample rate). That translates to a perceived speed of 122 mph; obviously unrealistic for a human target. Because the perceived speed is faster than the speed limit for OUTLIER REJECTION, the new reading is rejected for a second or so until your unit is confident that the new target is valid, at which point readings continue as normal. Because the slate remains in the shot it will now be read as the dominant target.

Obviously this isn't desirable if you have a shot where a new subject abruptly enters the frame and you need to know their position immediately. In this case, disable OUTLIER REJECTION to be able to read that new subject as fast as possible. However, if this is not an issue, leaving OUTLIER REJECTION on will help stabilize your distance readings in RANGER MODE.

The MAX SPEED setting on the OUTLIER REJECTION page represents the maximum target speed before OUTLIER REJECTION engages. The default will work for most uses, but for fast moving subjects, ensure that this value is 30-40% higher than the maximum expected speed of your target. For very fast moving subjects, OUTLIER REJECTION might have to be temporarily disabled for best performance.

OUTLIER REJECTION RECAP

- OUTLIER REJECTION helps the stability of dominant target distance readings and rejects fleeting false reflections...
- THERE IS NO LATENCY IN YOUR SUBJECT'S DISTANCE READINGS WHEN OUTLIER REJECTION IS ENGAGED!
- If you have a target that moves exceptionally fast or a target which appears suddenly in your frame (like a target stepping into the foreground of your shot that you wish to immediately throw to) turn off OUTLIER REJECTION in the DSP menu of the SYSTEM SETTINGS in the HANDSET.

BUG-100 101

COUNTING BUGS & STACKING THE DECK

All your BUG TRANSMITTERS ship set to CHANNEL 1, BUG ID 1. Your system, however, can monitor up to four active BUGS at once. If you wish to monitor more than one BUG you will need enter SET BUG ID in SYSTEM SETTINGS and assign your additional BUGS new ID numbers (2,3 or 4). You will not need to change the BUG's RF channel unless you are changing your system's RF channel and BUGS do not possess PROTOCOL ID settings, as they are designed to be tracked by multiple Cine RT Systems.

To set your BUG's ID (or RF Channel) the BUG must be on and within 25' of your BASE UNIT and HANDSET. When setting these parameters please ENSURE THAT ONLY THE BUG YOU WISH TO SET IS POWERED OTHERWISE ALL POWERED BUGS IN RANGE WILL RECEIVE THE SAME PARAMETERS.

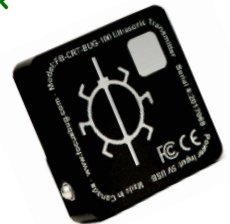
If you planning to monitor more than one BUG please ensure you choose the appropriate number of BUG source options from the NUMBER OF BUGS SETTING in SYSTEM SETTINGS. This ensures that you can toggle to your desired BUG by pressing the BUG HOTDECK TOUCH KEY when in BUG MODE.



Toggle between up to 4 active BUG sources or display two at once in DUAL VIEW MODE ("2X").

TURNING ON YOUR BUG, YOUR BUG'S BACKSIDE & ASSORTED HOT TIPS...

- You must turn your BUG on with it's physical BUTTON and turn it off by pressing one of two KILL BUG TOUCH KEYS located in BUG MODE or the VITALS MENU. PRESS AND HOLD the onboard BUTTON until the START UP LED SEQUENCE is complete and you see a blinking blue light. If you see a blinking orange light it means your BUG is not on the same RF CHANNEL as your system and needs to be aligned.
- When placing a BUG on a target please ENSURE THAT YOUR BUG SENSOR IS FACING YOUR TARGET and is in line of sight of your BASE UNIT (within a 140 degree field of view).
- BUG distance is a reading taken by the BASE UNIT (from where your FPO is set) to your BUG's "backside". **THE FLAT STICKER SIDE IS EFFECTIVELY THE END OF YOUR TAPE!**
- You can hide your BUG under porous materials, however, increased density of the material will reduce the ability of your BASE UNIT to read your BUG's ultrasonic pings. The more baffling, the less your BASE UNIT will hear.
- Use the BGO (BUG OFFSET) to add distance to or subtract distance from your BUG to your target according to BUGs position in relation to your target. A diagram in the BGO MENU illustrates what to do.
- Use CROSSOVER MODE (located via the "XO" TOUCH KEY in BUG MODE) to avoid BUG to subject offset issues by setting a user defined "X-OVER" point where your distance readings will automatically switch between BUG and RANGEFINDER sources.



The BUG plane



Cine RT Preston Y cable & Preston "Snakebelly" Serial Cable

WHY 2 AND Y TOO?

Many people have asked why we offer individual power and serial cables and why we have a Y serial cable instead of a single integrated power and serial cable.

We made the decision for a variety of reasons, mostly related to keeping the BASE UNIT compact. We also discovered that keeping the power and serial inputs separate minimized potential issues with the component's sensitive analog electronics.

Because an MDR, UMC4, LCUBE, etc, is often chained to "noisy" components such as motors, the serial power supply can be dirtied and inject noise into the analog front-end of the system; thereby potentially causing disturbance and/or reducing the Cine RT's ability to work at longer ranges.

In short, we wanted to avoid potential electrical noise issues which could occur when you crank the remote focus knob during big focus pulls! The "Y" cable is a safe concession and provides users with an alternative to the two cable system.



Right angle connectors configure cables back towards the camera.

"SNAKEBELLYS" AND "PIGTAILS"

We have been asked if Cinetape Serial Cables can be used with the Cine RT and the answer is **NO!** We aren't trying to be difficult, it's simply that our serial cable contains proprietary in-line electronics - which appear as a little plastic mesh "belly" on our single serial cables and as a box on our Y cables.

If you wish to salvage the 7 Pin Fischer or 16 Pin Lemo connector from your disused Cinetape cables, we offer a cable with the your choice of Cine RT connector(s), in-line electronics and an ample "pigtail" or "flying leads" on which to attach your serial connector. We price this cable affordably and will, of course, provide the pinning info for you to add your old connector.

CAUTIONARY CABLES...

- Please be careful to use the correct serial cable to connect to your lens control device. **DO NOT PLUG A CINE RT PRESTON SERIAL CABLE INTO AN ARRI LBUS PORT** as you could damage both the cable and your BASE UNIT.
- Select the correct serial output from SERIAL OUT (under SETTINGS in SYSTEM SETTINGS) for your lens control system: Select PRESTON when using an MDR 2, 3 or 4 to get distance info to an HU3 or CLASSIC when using a ARRI LCUBE, UMC4, or ALEXA EXT Port pinned for the RS 232 serial protocol. CLASSIC mirrors the serial protocol of the Cinetape and is compatible with devices that accept RS 232 serial data.

DIPATCHES FROM FOCUSBUG HQ

NEWSFLASH: RT AROUND THE WORLD BY ULTRASONIC!

The CINE RT has landed in over 13 countries and, whether it be in their own backyard or abroad, Cine RT owners and users have introduced the system to a variety of working conditions: From the frozen Canadian Arctic to humid Costa Rica and arid Morocco, assistants are putting the system through it's paces. Not only are we excited to have our own testing confirmed by real-world use, we are very happy to have become part of such an expansive community.

FOCUSNOTES

Some first-hand tips and insightful observations from the field:

David "Spooky" Churchyard, 1st AC, United Kingdom:

David recently used the Cine RT in the field on the Bob Richardson shot feature "My Private War". To combat dust and particulate David employed a sheer stocking over the BASE UNIT horns. We don't know if Spooky employed the finest European silk hose or simple picked up a highly flammable nylon drugstore legging, but whatever he used seemed to do the trick.



David Churchyard



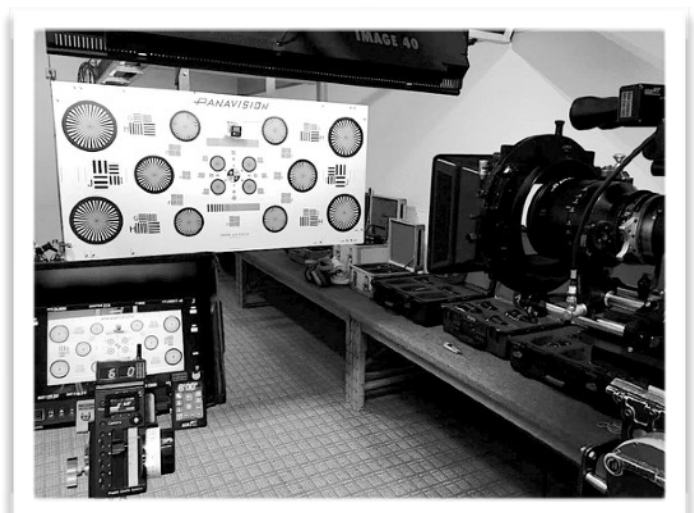
Christian Eggenberger

Christian Eggenberger, 1st AC, Canada:

While working in Yellowknife on the Roger Vernon lensed "Red Snow" Christian experienced regular air temperature conditions of -26 degrees Celsius (-14.8 Fahrenheit). He texted us saying "it's -37 (-34.6 Fahrenheit) with the windchill". Raised in the north, Christian was not phased, neither was the Cine RT, however, battery life did take a hit: "The handset lasts 2.5-3 hours in -20 (-4 Fahrenheit) from fully charged to battery depleted..." Best to keep a 12v jumper on standby in such conditions!

Doug Lavender, 1st AC, Canada:

When we caught up on Doug on the set of the Seamus McGarvey shot "Bad Times at the El Royale", he filled us in on his new process of lens testing: Doug frees up his 2nd AC to go take care of other prep business by placing a BUG against the surface of the lens chart - he is then able to expedite his tests, easily moving the chart through the required distances...



Doug Lavender



Larry Portmann

THE RIGHT KIND OF FEEDBACK

A big shout out to all of you who have contributed so much to our product! Without your comments and observations the Cine RT would not be what it is today. Please continue to share your thoughts with us! We take your suggestions seriously and, who knows, you might just see your idea appear in a later firmware update or design adjustment...

Speaking of which, thanks to Larry Portmann (1st AC, Canada) for the photoshop shenanigans! We imagine that although this mod would likely drive sales through the roof, it could potentially both slow Handset function and upset some camera operators.

GOOD OL' THIRD-PARTY TIMES!

A few ingenious Cine RT owners have concocted some signature innovations of their own!

Keith Davis, 1st AC, USA:

With the help of Clean Camera Support, Keith has manufactured a limited run of mounting blocks which allow the Cine RT to couple with the PV/Clean Style Gearbox, while still retaining the 1/4" back mount-option. If interested please contact him at keithdavis600@gmail.com



Keith Davis



Lewis Hume

Lewis Hume, 1st AC, UK:

Lewis recently told us that although he originally conceived of using the High-Bright Display on the camera he "...soon found the benefits of the High-Bright being mounted on the handset (HU3) especially out in the sun...". Lewis runs a 3D printing business called "Gizmo 3d Printing" and will soon launch a website making all their bits available in North America and Europe. In the meantime please reach him for details at lewishume@mac.com or through the Gizmo 3D Printing Facebook Page: @Gizmo3d

Patrick Borowiak, 1st AC, USA:

Patrick has designed and 3D printed an ABS ball mounting block option that mates with the Ultra Arm Dual Clamp System. Patrick has given us the nod to investigate this option in aluminum as part of our product line. In the meantime if you require one please contact Patrick as he might be able to hook you up: pjborowiak@live.com



Patrick Borowiak

FUTURE FOCUS

Speaking of updates and innovations, you may have heard rumours regarding several upcoming FOCUSBUG TECHNOLOGIES product releases: In development is our "Cine PT (Pan & Tilt) MOUNT" aka the "SCARAB" (as double-branding seems to be our thing): A silent and smooth pan and tilt option for the BASE UNIT which is remotely operated through the HANDSET firmware.

The "PT" will pave the way for our "Cine LR (Laser Rangefinder) BASE": A compact laser rangefinder add-on which will integrate into your Cine RT System. If you are interested in either future product please let us know! Consulting with you will help ensure the creation of a product that is the best fit with your existing ultrasonic set up.



Jon finishing a long week in the shop and about to start work on a gift from a satisfied customer...

SERVICE OPTIONS NEAR YOU

We are presently working with a number of international associates to provide you with local options for updating your Cine RT system firmware and general service/maintenance.

Residents of London and Los Angeles will be the first to receive this option. We will make a general announcement when the service is available. Major repairs, however, will likely need to happen at our shop in Vancouver...

WE DON'T WANT TO BUG YOU, HOWEVER...

As many of you know, awareness of the Cine RT System has largely spread by word of mouth, focusbug.com and social media.

Our presence on [Instagram](https://www.instagram.com) and [Facebook](https://www.facebook.com) has been growing steadily and we plan to continue to foster that grassroots approach; however, we require your feedback to do it right.

If you feel moved to post some inspired poetry or prose please put quill to parchment. Likewise, if you have captured indisputable photographic evidence of the reclusive Cine RT in it's natural habitat, we would love to feature your work. That said, more than anything, we generally just like to keep tabs on what you are up to.



FEEL FREE TO BUG US!

Should you have any questions or concerns please contact Laird at sales@focusbug.com or Jon at support@focusbug.com.

If you need to talk to a human being, Laird apparently qualifies and can be reached at [\(011\) 1-604-537-7137](tel:(011)1-604-537-7137).

We are located in Vancouver, Canada and are usually available during Pacific Standard Time business hours (and often more).

If you are located in the UK or Europe feel free to contact Donna at The Panastore, our official reseller located at Panavision London donna.robins@panavision.co.uk

