



TCS, Inc. Antenna Control Units Running LINUX

In today's connected world, no piece of telemetry equipment is an isolated island. Aside from pointing antennas towards targets and providing telemetry data, today's antenna controllers need to keep themselves free from outside network attacks. To respond to this need, TCS, Inc. introduces a line of Linux-Based Antenna Control Units. They run on top of Red Hat® Enterprise Linux. Each ACU is built with the Defense Information Systems Agency's Security Technical Implementation Guides (STIG) in hand.

Our ACU platform has gone through a rebirth. Rewritten from the ground up, the ACU software takes advantage of today's hardware as well as the flexibility that the Linux environment brings to the table. Developed for 64-bit environments, the ACU-M1L is written for today's requirements and tomorrow's challenges.

The GUI has been modified to improve what data the operators can see as well as how they see it. This was done while still maintaining our look and feel that our operators are accustomed to. Some familiar features such as the Sky View and our representation of the present angles are still here.

We designed the ACU-M1L software to run in our ACU chassis, a rack-mounted server style chassis, an embedded ACU-M3 chassis, or an embedded ACU-M4 that runs without writable storage for classified operations. We provide common functionality and use-ability across all of our hardware platforms if the hardware allows.

Regardless of the application, the ACU-M1L can be setup to work from a remote site, or right at the pedestal. We provide a Remote Application that controls the ACU with a common looking GUI. We also provide an XML based Interface Control Document so that the M1L can be a part of network operations.



The ACU-M1L Front Panel

The ACU-M1L handles both satellite and range applications. For satellite applications, the M1 propagates the satellite trajectory from satellite elements in several formats or program tracks from a predicted trajectory. A schedule for tracking several satellites can be programmed from the front panel or remotely. The ACU can automatically download satellite elements from the Internet or from a networked storage area. NORAD Two Line Elements may also be entered manually via the Manual TLE Entry Menu.

For range applications the M1L can either autotrack or be slaved to any slave source that follows the target. Many slave formats are currently supported over Ethernet, Synchronous and Asynchronous Serial and Serial connections. Our ACU lineup can take Azimuth and Elevation pairs, target locations in Earth Centered coordinates, or Azimuth, Elevation, and Range data from a Radar.

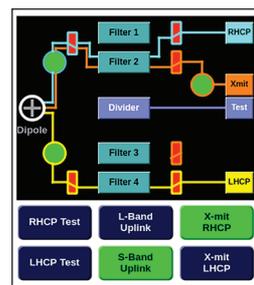
If the ACU-M1 is already controlling your antennas, an upgrade path is available to bring your hardware up to date in order to allow Red Hat Enterprise Linux and the ACU software to run on your system.



World View



Track File View



Feed View



Recorder View

AOS	Satellite	Time	Duration	MEI	Az	El
04:27:38	POLAR	04:16:04	03:07:45	41	302	36
08:33:59	SWNS	08:09:43	03:02:26	25	48	3
Below Horizon						
AOS	Satellite	Time	Duration	MEI	Az	El
08:43:41	CXO	00:00:00	00:39:16	11		
08:59:19	FORMOSAT-3	00:15:36	00:05:24	1		
09:09:23	INTEGRAL	00:25:40	19:54:37	72		
09:15:29	RHESSE	00:31:46	00:11:56	45		
09:32:20	ODIN	00:48:37	00:05:08	2		
10:02:22	TERRA	01:19:39	00:08:49	5		
10:29:39	ARABONTO EX	01:45:56	00:33:22	21		
10:36:08	HST	01:52:26	00:07:28	4		
11:13:32	FORMOSAT-3	02:29:50	00:14:37	29		
13:48:50	TIRIED	05:02:07	00:11:35	17		
13:50:13	SORPE	05:06:30	00:07:11	3		
14:14:52	FORMOSAT-3	05:31:09	00:15:19	41		
14:19:27	ORSTED	05:35:44	00:13:31	26		
16:19:19	CORLIUS	07:35:37	00:04:43	1		

Schedule View

AreaViews As Seen On The Front Panel Of The ACU Software.

ACU-M1L

Dimensions	10.25" x 19" x 13" (7U) , Less Than 30 lbs (13.6 kg)
Power	90V _{AC} to 220V _{AC} - Less than 200W (Typical)
Purpose	User-friendly interface for operator control. Maximum hardware expansion possibilities. Embedded receivers possible. Full Autotrack Capability
Display	15" Color Touch Screen
Temperature	Operational: 0°C to +40°C Storage: -20°C to +65°C
Supported Interfaces	Ethernet, Synchronous Serial, Asynchronous Serial, GPIB, Up to 8 Receiver AM & AGC Inputs, Optional GPS/IRIG Interface, USB
Computer Specifications	Intel Core 2 Duo 2.2GHZ, 2GB DDR2 RAM, 80GB SSD, DVD-RW Operating System: Red Hat Enterprise Linux 6 (64-bit)



ACU-M2L

Dimensions	17" x 19" x 3.5" (2U) , Less Than 30 lbs (13.6 kg)
Power	90V _{AC} to 220V _{AC} - Less than 200W (Typical)
Purpose	Useful in unmanned, remote control applications, as part of a constellation with many systems. Minimal hardware expansion possible.
Display	No display. External VGA connection. <i>(Optional display shown)</i>
Temperature	Operational: 0°C to +50°C Storage: 0°C to +50°C
Supported Interfaces	Ethernet, Synchronous Serial, Asynchronous Serial, GPIB, Up to 2 Receiver AM & AGC Inputs, Optional GPS/IRIG Interface
Computer Specifications	Intel Core I3 3.1GHZ, 4GB DDR3 RAM, 80GB SSD, DVD-RW, USB Operating System: Red Hat Enterprise Linux 6 (64-bit)



ACU-M3L

Dimensions	6" x 6" x 4.5"
Weight	3.25 lbs (1.5 kg)
Power	28V _{DC} - Less than 40W (Typical)
Purpose	Designed to be embedded inside pedestal. Remote interface only. Antenna system is a "node on the network". Rugged for outside use.
Display	No display. VGA Connection for troubleshooting
Temperature	Operational: -40°C to +85°C Storage: -40°C to +85°C
Supported Interfaces	Ethernet, Asynchronous Serial, GPS Timing, Network Timing
Computer Specifications	Intel Atom 1.6 GHZ, 1GB RAM, 2GB On-Board Flash, USB Operating System: CENTOS Linux 6 (64-bit)



ACU-M4L

Dimensions	20" x 19" x 7" (4U) , Less Than 30 lbs (13.6 kg)
Power	90V _{AC} to 220V _{AC} - Less than 200W (Typical)
Purpose	Useful in unmanned, remote control applications, classified operations where data storage is not feasible, with full Autotrack Capability
Display	No display. External VGA connection. <i>(Optional display shown)</i>
Temperature	Operational: -40°C to +85°C Storage: -40°C to +85°C
Supported Interfaces	Ethernet, Synchronous Serial, Asynchronous Serial, GPIB, Up to 2 Receiver AM & AGC Inputs, GPS Interface, Embedded Receivers Capable
Computer Specifications	Intel Core i3, 16GB DDR3 RAM, DVD-RW, USB Operating System: Red Hat Enterprise 6 (64-bit) Net Boot or Live DVD



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