

UPLC Power Amp Enhancements – Technical Advisory 3/8/2013

As of March 2013, all UPLCs are being shipped with a new improved Power Amplifier design that has the following 3 new features, two of which are standard and will be functional immediately and one of which will be optional and enabled with a future firmware (version 3.08) release later this year. The changes were only in the metering circuit that measures power and in the self diagnostic circuit. The primary functionality of the core amplifier circuit remains exactly the same. This new Power Amp will work in all vintages of the UPLC chassis, but does require a change of the electronic catalog number when putting into an existing chassis that has the old Power Amp. The catalog ordering information changes as shown below.

UPLC Catalog # for old standard Power Amp = USxxxxx**N**SX (Power Amp part # CU20-PA1MN-001)

UPLC Catalog # for new improved Power Amp = USxxxxx**A**SX (Power Amp part # CU20-PA1MN-002)

1. **TX power level measurement** circuit will only measure forward power (available immediately)

The old standard Power Amp design effectively measured the summation of the TX forward power and reverse (reflected) power to give actual total TX power. It did this by multiplying RF voltage and current. This design is susceptible to incorrect measurements of TX forward power for a few applications where there is a high level interfering signal, relative to the TX signal, coming from another source. The actual transmit level is steady and the UPLC functions as it should, but the displayed measured value of the TX level can fluctuate. This can cause nuisance false “TX Power Level Low” SOEs that could fill up the SOE memory. The 2 applications causing interference include high level signals coming from a far end transmitter on a low attenuation line, or another transmitter not having adequate isolation, 20 dB or greater, to the UPLC transmitter where both transmitters are connected to an isolating hybrid. For practical purposes, this issue only occurs on UPLCs in the FSK mode with short or low attenuation power lines, or where UPLCs in the FSK mode are combined with ON-OFF carrier sets through hybrids and there is not enough isolation in the hybrid. This issue with the old standard Power Amps does not affect the protective relaying functionality of the UPLC as a power line carrier transmitter/receiver. Please see product advisory letter CU46-13001 that was issued detailing the symptoms and affected units more thoroughly and directions to take if any upgrades to existing units are needed.

The new improved Power Amp’s TX power output measurement circuit is new and employs a directional coupler rather than a multiplier, so the forward power measurement is completely unaffected by interfering signals. It is designated in the UPLC catalog number by the letter “A” in the 3rd from the last digit of the catalog number. The electronic catalog # controls the calculation of the measured TX power level making it match the hardware design of the Power Amp and thus a software key is required to change an existing UPLC that had an old Power Amp.

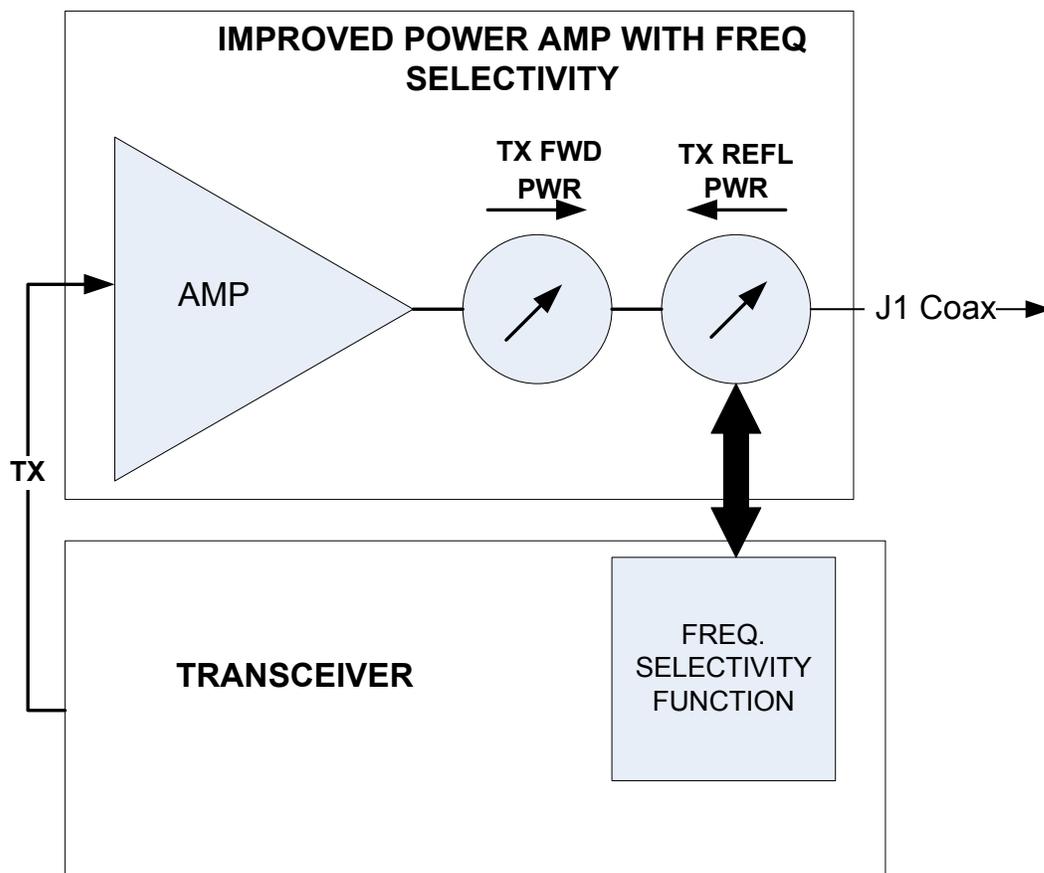
2. **TX reflected power measurement** enhanced to have frequency selectivity as an orderable option, letter ‘F’ in the 3rd from the last digit of the catalog number. (This is a future firmware feature that is already supported in the new improved Power Amp hardware.)

Typically in the past, TX reflected power was only measured at the time of commissioning or during maintenance, when other transmitters, except for the unit under test, could be turned off so they

would not interfere with the measurement. If it was not possible to turn off the other transmitters, then a frequency selective voltmeter had to be used in conjunction with a reflected power meter. Modern test equipment has built-in frequency selective voltmeters in their reflected power meters and we are now doing the same thing in the UPLC. This issue is mainly a problem in FSK systems, as ON-OFF systems are normally in the transmitter-off state. The new Power Amp with this frequency selective option will measure the TX frequency's reflected power only and will not be affected by any other interfering frequencies. This will give much more accurate readings and also allow customers to set the UPLC reflected power alarm max threshold at only 10% above the normal measured value as any interfering signals will no longer make it cause a false alarm.

To achieve this enhancement to the UPLC required some changes to the hardware and firmware. The hardware changes include this new Power Amp, a new Transceiver board with the additional frequency selectivity circuit on it, and 2 new traces on the UPLC backplane to connect this circuit on the 2 boards together. The firmware change will be released as version 3.08 and is scheduled for a release date around the end of the 2nd quarter 2013 or earlier at which time all the supporting hardware will be shipping as standard product. A modification kit will be made available to those wanting to do retrofits to add this feature at the time of the firmware release.

UPLC SIMPLIFIED SCHEMATIC DIAGRAM



3. Improved self diagnostics (available immediately)

The self monitoring has been enhanced to actually verify that the Power Amp is amplifying the input signal correctly instead of just monitoring dc supply voltages on the Power Amp.

Any questions regarding this change may be directed to the product manager at the following email/phone. We appreciate your understanding as we continue to work to improve our products.

Tony Bell

tony.bell @ametek.com

Phone 800-785-7274 ext. 4211