OPERATIONS BULLETIN NO. 583

Bruce C. Brown

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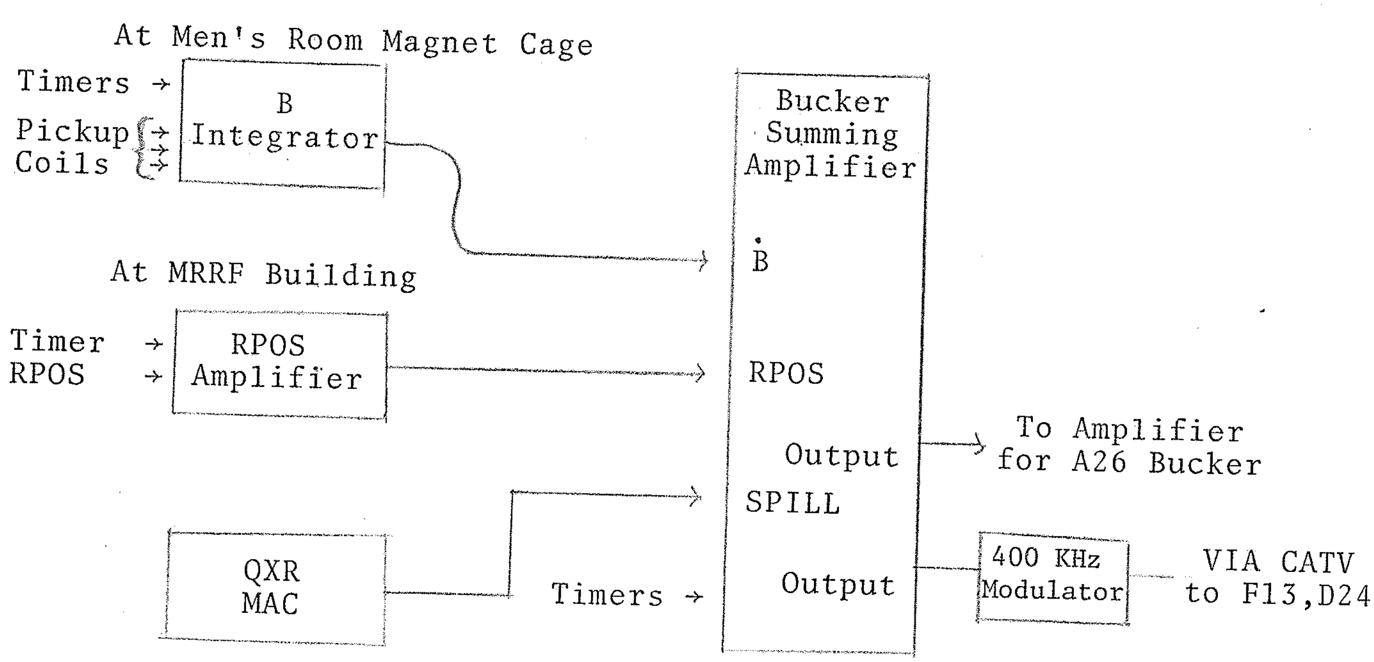
HOW TO MAKE THE BUCKERS WORK

Changes in the Bucker system for controlling the spill have reached some sort of plateau. This bulletin will describe operating aspects of the changed system and will describe some procedures for normal operation, set-up and troubleshooting.

The Bucker system is a set of three air core quads which seek to keep the MR tune constant when opposed by ripple in the quad and bend bus currents. Signals currently used to indicate the ripple are integrators tied to pick-up coils for quad ripple and the radial position signal (RPOS) for bend ripple. A learned spill signal which is stored and updated the Bucker part of the QXR MAC is also used. These signals are appropriately summed and amplified in the Bucker Summing Amplifier. The signals for Buckers



at F13 and D24 are sent over the CATV system through the 400 KHz modulator box in the control room. The transistor power supplies which drive the Buckers are undirectional in current so an offset level must be supplied. This is derived from a local screw driver adjusted pot for D24, F13. For A26 there is an offset pot adjustment on the front of the Bucker Summing Amplifier.

Normal Operation

The Bucker system contains a huge number of knobs and pots. Since a 10-20% change in any of them may significantly degrade the spill, a procedure and a hierarchy for changes should be observed.

1. If spill duty factor (SDF) drops below ∿ 70%, one should expect a system fault - see troubleshooting section - don't expect to get it back by knob twiddling.

2. Since many shifts have been spent in seeking a best operating condition already, I don't expect to get vast improvements by amplifier gain adjustments. But it is allowed however, if you want to change a setting.

   A. Justify the change with numbers and hard copies. SDF can be slow time plotted by plotting channel 4402 for flattop or channel 4404 for front porch operation.

   B. Leave a record of change and your evidence for it in SWYD Log Book. A note in the main log is probably also a good idea but that is no substitute for leaving a note where we can still find it in a month - THE SWYD LOG.

3. Tuning of the spill, $\dot{B}$ and RPOS signals is considered normal tuning - carry it out under above guide lines.

4. Less normal tuning should require that you really believe you have clearly improved things. This will apply to:

   A. Changes of D/A level (gain control) for F13, D24.

   B. Changes of parameters for Bucker part of P69 - QXR MAC.

5. Other amplitude controls should not be changed. Contact Bruce Brown or Bob Webber if you think you have reason to change them.

These include offset levels A26 and esp. D24, F13, 400 KHz modulator attenuator level and levels on the integrator pots.

Set Up Timing

Changes of spill times, flattop length or front porch operation all require changes of timing for Buckers in order to get good spill. The list of associated changes should reviewed in previous bulletins. (B. C. Brown, Operations Bulletin No. 539; J. Bauman, Operations Bulletin No. 500) The list of device names, types and locations follows.

1. To start and stop $\dot{B}$ integrators on QUADS, BENDS, set predets in RR near Men's Room Magnet Cage (front porch and flattop → 4 numbers).

2. To start amplifier for sending RPOS signal set RPOSS on page 18. This presently only opens a one-shot. We will have to make changes for front porch operation.

3. Start interrupt to the QXR MAC (both QXR and Bucker) comes from two predets in MCRR#20.

4. Start and stop for the F13, D24 Buckers is supplied by CC20 cards. They are set on P43.

5. Start and stop for A26 Bucker (plus several other extraction QXR features) are controlled by four predets in MCRR#20.

6. QXR and Bucker spill lengths are set on P69. The P69 Bucker time will determine

   A. How long the memory output extends (starts at the QXR interrupt time plus Bucker beginning wait time).

   B. Spill length for calculating SDF.

7. Start and stop for RF spill monitor - CC20 cards controlled by P43 - four times.

Some Troubleshooting Hints

(Some of these are easier than calling the experts.)

If the spill duty factor gets worse - say consistently below 70% - then probably something is really wrong with the system. Try looking at some of the following:

1. Fast time plot the three Bucker supplies - do they all show signals with comparable amplitudes (F13 should be somewhat smaller).

2. Set up the scope to look at the spill. Spill Duty Factor is primarily a measure of how much dc component you have above the spikes. Does it look like the spill is bad? (Operators should look when it's good, so they will know.) Is it bad uniformly or are there special times during spill when it is bad?

3. If only part of spill is bad, look a timing set up. Check all devices (for example last ¼ sec of spill bad recently indicated a failure to change times at MR Magnet Cage.) If not Bucker things wrong, how about MR power supplies? Look at ripple on scope - are there bad places?

4. If spill looks good, duty factor may be miscalculated. One recent cause - wrong times on P69. The times were set for 2 sec flattop (with only a 1 sec flattop available).

5. Spill looks rotten (and/or experimenter's complained) but SDF is high - the spill may have false dc level. Look through system starting at RF spill monitor. RF spill monitor will give out dc level if its timing has been lost. Try resending on P43.

6. Clock shifts and similar problems can cause the system to have unmanageable difficulties. Look at the line monitor on scope which is triggered by a predet.

Normal Distribution: