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United States Coast Guard

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From: CWO4 W. G. Hamilton Jr.

To: Chief, Navigation Division

Via: Chief, Loran-C Branch
Chief, Transmitter Section

Subj: LORAN STATION ATTU AN/FPN-44B INSTALLATION SUMMARY

Ref: (a) CG EECEN ltr of 11 Aug 1992

Places and Dates of Visit:

1. LORSTA Attu, AK 4 March 1993 to 29 April 1993

Purpose of Trip:

1. Purpose of the trip to LORSTA Attu was to finish installing the AN/FPN-44B transmitters, and change over the operating system from AN/FPN-42 to the AN/FPN-44B.

Members of Party:

LCDR Greg Kmiecik EECEN(Nlx)
Mr. Mike Campbell EECEN(Nlx)
Mr. Donald Boston EECEN(Nlx)
CWO4 W. G. Hamilton Jr. EECEN(Nlx)
ETC Charles Houlroyd EECEN(Nlx)
ET1 Richard Stevens EECEN(Nlx)
ET1 Gary Robinson EECEN(Nlx)
ET2 Matt Asselin EECEN(Nlx)
ET1 Edward Unruh EECEN(Nlx)

Remarks:

1. The majority of EECEN personnel listed above departed EECEN on 1 March 1993 to travel to Kodiak, AK in time to meet the regular 4 March LOG flight to LORSTA Attu.

A. Commander Kmiecik, and I stopped in Anchorage for a 2 March 1992 scheduled meeting with the contractor that will install the building at St. Paul. On 3 march 1993 commander Kmiecik departed for EECEN to resume normal duties while I traveled to Kodiak, AK to meet up with the rest of the

installation team.

B. Commander Kmiecik, and Mr. Mike Campbell arrived on Attu to assist in change-over on 2 April 1993.

2. EECEN personnel successfully finished the installation of the AN/FPN-44B transmitters, and switched operations from the 33 year old 42 transmitters to the newly refurbished 44B transmitters on 19 April.

3. The entire EECEN installation team departed LORSTA Attu on 29 April 1993 for return to EECEN following a very successful installation/system switch-over.

4. PRIOR ATTU TRANSMITTER INSTALLATION EFFORTS

EECEN originally arrived on Loran station Attu 02 October 1992 to install the 44B transmitters, and switch over the systems. Various situations/events conspired against the timely completion of the project in the fall of 1992, and required EECEN to return in the spring of 1993 to complete the project. The following are but some highlights of this first effort:

A. Construction on the building was not complete upon our arrival in early October. The contractor was actively installing, painting, and cleaning throughout October.

B. Opened all transmitter crates during week of 12-18 October, and found major shipping damage to subassemblies. Much of the damage appears to result from improper preparation when initially crated at test facility. Transmitters provided were NOT in "ready for installation (RFI)" condition with many broken, and defective components installed. Repair efforts resulted in over 165 discrete replacements, and/or repairs to the transmitters just to get them installed, and ready for application of 208/460 A/C power.

C. By the end of October, the contractor discovered that the secondary water cooling system for the transmitters was inoperative. This is the first time the circulation pumps have been turned on with water movement in mind.

D. BARC Group designers, Arctic Slope designers, and FDCC Seattle arrived in early November to formally inspect, and accept the project. Their inspection finds debilitating discrepancies in the new power generating building. Repair efforts require major contractor efforts.

E. Contractor terminated his winter efforts, and departed Attu on 22 November 1992 without the Coast Guard accepting the generator building complex. The contractor replaced secondary water cooling circulator pump impellers, seals, and gaskets on 21 November prior to his departure. Work on secondary water system appears to have remedied circulatory problems.

F. Contractor secured his test generator on 22 November 1992. The new transmitter building is without power, and Coast Guard installation efforts are now stopped for the year.

G. EECEN installation personnel departed Attu for the winter on 24 November 1992. At the time of our departure the transmitters were 90% installed. Many required items had been ordered, but were not on board. Neither transmitter had been started, and neither one had distilled water placed into it's water cooled power amplifier system.

5. GENERAL TRANSPORTATION OVERVIEW

A. EECEN personnel departed EECEN on 1 March 1993 to travel to Kodiak, AK in time to meet the regular 4 March LOG flight to LORSTA Attu. EECEN personnel visited LORSTA Kodiak's Narrow Cape transmitting facility on 3 March 1993 located on Kodiak to confirm some last minute details for the Attu transmitter switch-over. All EECEN personnel departed LORSTA Attu 29 April, and returned to EECEN in the early hours of 2 May.

B. Chief Houlroyd, and the installation crew took the opportunity to visit the Kodiak's Loran transmitting facility located at Narrow Cape. This visit allowed the installation personnel to view the transmitters as a set, and check certain items. They checked the color coding of certain wiring, and the transmitter set interface wiring to mention just a few items of interest.

6. ATTU EFFORTS

A. <u>480 KNIFE SWITCH</u> During the initial turn on, and burn in procedures an electrical discrepancy was noted between field connection of 1A3A3CB1's shunt trip, and the technical manual. The manual indicates that the wiring of 1A3A3S2 "locked on" switch will trip 1A3A3CB1 every time S2 was turned off. This is not the case as installed service wide. This discrepancy was corrected by annotating in the master 44B technical manual. SMEF will be advised of this disparity in the manual by separate correspondence. Attachment #1 shows wiring involved.

B. 1BL1 BLOWER MODIFICATION Transmitter operations at Attu required the installation of an agastat time delay relay into each transmitter to temporarily bypass the normal 1S1 air flow switch following a momentary power outage. The operation of the Halon fire damper affixed to the intake blower assemble is not fast enough to allow the main blower air switch 1S1 to activate in the turn on sequence following a momentary power failure. This disparity prevents the transmitter from auto restarting. The Halon louvers require 20 seconds to open so the agastat delay was set to 30 seconds. Attu's master technical manual was annotated to reflect the addition of the new relay. SMEF will be advised of Attu's non standard configuration by separate correspondence. Attachment #2 shows wiring involved in modification.

C. 4S1 DUMMY LOAD SAIL SWITCH EECEN increased the size (value) of the #1 transmitter dummy load sail switch 4S1 vane size from the 2400 CFM vane to the 1600 CFM vane due to a nonstandard improperly manufactured air deflector associated with the #1 transmitter side of the dummy load. This nonstandard deflector caused a turbulence that sporadically caused the high voltage to drop out on the #1 transmitter when operated into the dummy load. The closest vane size to the presently installed 1600 is a 1550 CFM vane found in the AN/FPN-44A transmitter. SMEF will be advised of Attu's non standard configuration by separate correspondence.

D. 3L1 ANTENNA COUPLER TUNING EECEN wired antenna coupler tuning coil 3L1 with dual tuning taps vice the historic single tuning tap method. Previous to this time both transmitters were tuned individually to the tower, and then the single tap was placed equidistant between the 2 tune points. Using the single tap method neither tune point was correct, but both were close. Using the dual tap method each transmitter has the best match possible to the transmitting antenna. This configuration will be used in future installations at both St. Paul, and Port Clarence. SMEF will be advised of Attu's configuration by separate correspondence. Attachment #3 shows the wiring involved in this modification.

E. HARMONIC FILTER OUTPUT ASSEMBLY EECEN altered the normal location of the 1A20 Harmonic Filter output assembly during initial installation. We moved the entire assembly from in front of the 1BL1 main enclosure to the rear wall to the location previously occupied by the 1A2 primary water heat exchanger. This move was necessitated by the added depth of the main enclosure blower Halon fire damper.

F. POWER OUTPUT EECEN personnel verified power output of the 42 transmitters, and validated tuning within the 44B transmitters. They surveyed the exact location of many specific sites on Attu to record data for peak power measurements. They verified peak radiated power output of the 42 transmitter before the switch-over as well as the peak radiated power of the 44B transmitter following the switch-over. Attu's 42 transmitter output was to be 82 KW at 290 amps antenna current for rate 5980, and 181 KW at 432 amps antenna current for rate 9990. The 44B transmitters produce 410 KW peak radiated power on both rates when operating at 650 amps antenna current. EECEN determined that the specific radiation resistance of Attu's transmitting antenna system was 1.94 ohms knowing the exact power, and current. The operation of Attu's antenna system is consistent with other similar antenna systems.

G. BRIDGING During the initial off air period for switch-over EECEN personnel bridged Attu's transmitting antenna to determine the impedance of the transmitting antenna. Attu's transmitting antenna measures 3.2 -J27.99 ohms. These reading are consistent with other 625' antennas.

H. TUNING EECEN personnel tuned both transmitter to the tower before 44B operations were attempted.

I. TOWER EECEN personnel upgraded the transmitting antenna's Z-feed support mechanism.

J. AN/FPN-44A F/C #9 EECEN personnel installed the yet to be distributed F/C #9 modified feedback boards, into both transmitters at Attu. EECEN left three spare board sets at Attu for their ERPAL. SMEF will be advised of this by separate correspondence.

K. AN/FPN-44 TUBE PIN CONNECTOR EECEN personnel replaced the historic 2 piece concentric tube pin connectors of the AN/FPN44/45 transmitter high power transmitting tubes with a new, and improved version of the older AN/FPN-42 tube connector. This new connector is the subject of ECP-130, and is the same type favorably evaluated at LORSTAs Middletown, and William's Lake in 1992. EECEN accomplished this item for ease of tube change-out during initial operations, but the connectors worked so well that we left them in place. Attu's use of these connectors will be part of a long term test prior to the issuance of an official field change in this matter. SMEF will be advised of Attu's long term test by separate correspondence.

L. TRIGGERING EECEN installed an extra double BNC to twinax adapter pair into the transmitting system at Attu to provide solid triggering at the transmitter building for rate dependent tests. To do this we connected the standby local interval from both the 5980, and the 9990 timer set controllers to the a double BNC to twinex adapter, and ran these signals down to the transmitter building on a spare twinex lead. At the transmitter building we attached this twinex lead to an identical twinax to double BNC adapter, and provided the standby local intervals for trigger purposes.

7. GENERAL COMMENTS

A. EECEN personnel spent nearly 16 weeks on LORSTA Attu working on a 8-10 week project. EECEN installation personnel spent better than 5,700 hours installing, repairing, and testing the AN/FPN-44B transmitter set provided. The poor condition of received Loran transmitting equipment, plus significant contractor delays precluded EECEN from providing a finished product on time. The high quality product now sitting on Attu is the result of over 5,000 EECEN technician man hours. EECEN's time, and labor were not in vain, and lessons learned will preclude future occurrences in the NORPAC transmitter replacement project. EECEN, and PACAREA certification efforts indicate that a disparity may exist between transmitters in the feedback circuits, and that there is more energy in the transmitted pulse tail than there should be. These items are being addressed at EECEN

B. At present:

1. Attu is operating on the AN/FPN-44B transmitters at 650 amps antenna current which relates to 410 KW peak radiated power.

2. All pulse, trigger, and control lines are installed from timer room equipments to the transmitters, and have been certified to be installed, and operating properly.

3. Both high rate, and low rate pulse characteristics are outstanding, even though certain LORDAC/certification tests indicate a concern. Attachment #4 documents transmitter voltages, and currents in both operate, and stand-by modes. EECEN personnel are currently working on all aspects of failed tests to correct, or explain indications. All pulses exhibit a calculated ECD between 0.00usec to 0.2usec with a pulse shape error of 0.3%. You may wish to note that the P-GEN drive thumb-wheels, and drive settings from the pulse generators are nearly identical transmitter to transmitter for the specific rates, and that there are no required LPAs when switching from transmitter to transmitter. Pulse train droop is less than 4% on both transmitters. Attachment #5 documents interface wiring between the transmitters, and TCE equipment, and shows actual color code wiring as installed. The wiring is standard as depicted in the AN/FPN-60 technical manual. No changes were made to the wiring in the TCE room other than the required jumper wire changes in

the AN/FPN-60 interface to connect the 44 transmitter to the FPN-60 system. The following applies:

Low rate

XMTR #	/pulse generator #/drive/	ETA/	DPM	ECD/	calc ECD/	calc RMS
#1	6568989886663331	8.71	3.2	0.99	0.24	0.33
#2	6568989986663331	8.67	3.2	0.90	0.02	0.34

XMTR #	/ TINO	/ LEN	/ SYNC	/ TKI
#1	11277.4	723.5	18000.9	3.4 amps
#2	11277.4	723.5	18000.9/10	3.4 amps

High rate

XMTR #	/pulse generator #/drive/	ETA/	DPM	ECD/	calc ECD/	calc RMS
#1	5466987885653332	8.40	2.9	1.03	0.28	0.34
#2	5467987885653332	8.78	2.9	1.04	0.07	0.27

XMTR #	/	TINO	/ LEN	/ SYNC	/ TKI
#1	**	11276.4	723.5	17999.4	3.4 amps
#2	**	11276.4	723.5	17999.4	3.4 amps

**The master at Petropavlosk was off air during the entire period. System TINO/LEN/SYNC number are displayed for discussion purposes only

CWO W. G. Hamilton Jr.

TR.A.5/93.ATT#1
16 June 1993

Attachment #1 to Attu Installation Trip Report

Subj: ATTU TRANSMITTER INSTALLATION 460 VOLT "LOCKED ON" SWITCH MODIFICATION.

1. The AN/FPN-44B transmitters at Attu were wired according to the installation instructions, and prints. During electrical checkout it was noted that the 460 volt breaker 1A53A3CB1 would trip every time we turned the "locked on" key switch 1A53A3S2 to off position. This indication is not consistent with other 44 transmitters in the field. It is quite common to operate S2 from "on" to "off" to gain access to the master key block without having to turn off CB1 before turning S2 to off. CB1 is a mechanical device that will wear out if operated excessively, and the CB1 trip from S2 being turned off is a redundant, and unnecessary feature. When S2 is placed to the "off" position the door interlocks are interrupted, and all high voltage within the transmitter is turned off. We removed the link from S2 to CB1's under voltage trip circuit at S2. We covered the wire connectors removed from S2, with heat shrink, and tye-wrapped them back for safety.

2. Removal of this feature does NOT create any equipment, or personnel safety concerns. S2, when turned to off, continues to open up the door interlock circuit, and thus removes any high voltages present within the equipments. Knife switches 1A53A3S1A, and S1B continue to operate normally thus ensuring that 460, and 208 to bias circuits are removed from the transmitter before the technician can access the master key block to get a key for high voltage sections.

3. The attached schematics document the modification

W. G. Hamilton

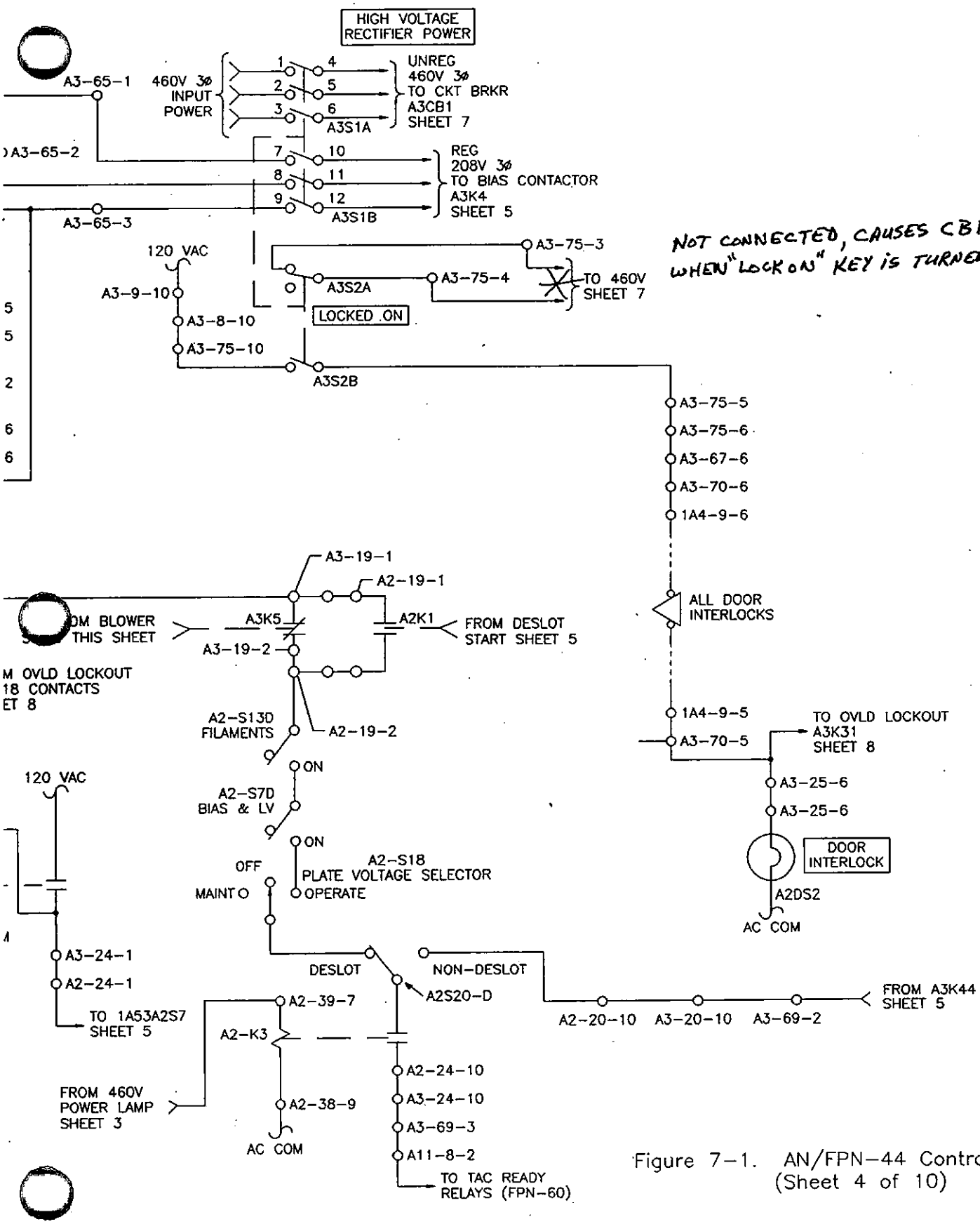
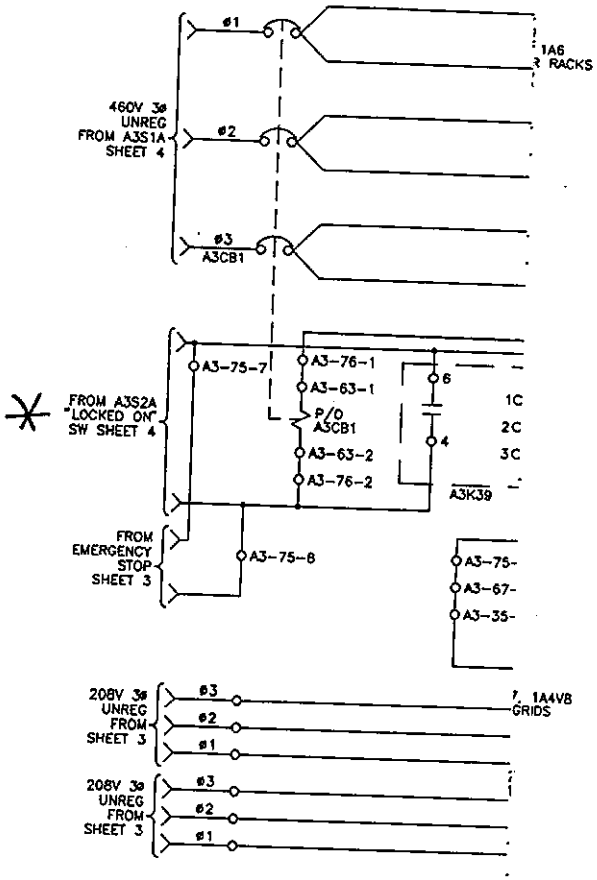


Figure 7-1. AN/FPN-44 Control Circuitry (Sheet 4 of 10)



* NOT CONNECTED, CAUSES CB1 TRIP WHEN "LOCK ON" KEY IS TURNED OFF

NOTES:

1. SEE SHEET 1 NOTES 1 AND 2 FOR KEY TO REFERENCES.

:OM R.PA CATH GND RET
IEET 9

:OM L.PA CATH GND RET
IEET 9

Figure 7-1. AN/FPN-44 Control Circuitry (Sheet 7 of 10)

CHANGE 4

TR.A.5/93.ATT#2
16 June 1993

Attachment #2 to Attu Installation Trip Report

Subj: ATTU TRANSMITTER INSTALLATION "AIR ON" INTERLOCK CIRCUIT MODIFICATION.

1. EECEN installation efforts resulted in the addition of an Agastat relay in the main enclosure blower air interlock shutdown system to allow proper auto restart following a momentary power failure.

2. The transmitter system at Attu was designed to operate with a multi zone Halon fire extinguishing system installed. The multi zone concept required installation of fire dampers on air intakes, and outlets of both Loran transmitters. Unfortunately the motor operated fire dampers attached to the transmitter air intake are not quick enough to preclude a lack of air transmitter shutdown upon auto restart, and thus the transmitter will not auto restart from a short power failure.

3. EECEN installed a 20 to 200 second "delay upon energize" Agastat relay model #7012AE set to 30 seconds delay to bypass 1S1 main enclosure blower sail switch. This allows the transmitter to auto restart while the dampers are continuing to open fully. At the end of the 30 second bypass period the Agastat relay energizes, and allows sail switch 1S1 to operate as designed.

4. This 30 second period without air loss interlock shutdown is not significant, and in no way endangers the transmitter.

5. This additional Agastat relay is the same relay utilized in the 44 transmitter as 1A53A3K7, and is a station ERPAL part listed under 9N 5945-00-238-3365.

W.G. Hamilton

NOTE: AGASTAT WILL BYPASS 1S1 FOR 30 SECONDS AFTER POWER FAILURE. REQUIRED BECAUSE FIRE DAMPER CLOSES ON POWER FAILURE. AUTO RESTART WILL NOT WORK BECAUSE DAMPER TAKES 20 SECONDS TO OPEN.

2 PANEL

NTROL

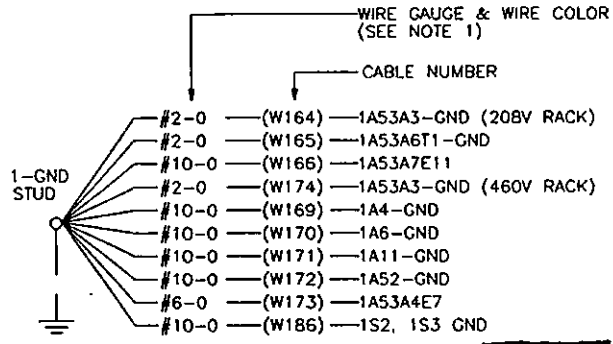
—1A21TB1-10

1A11TB1-1
1A11TB1-2
1A11TB1-3
1A11TB1-4
1A11TB1-5
1A11TB1-6
1A11TB1-7
1A11TB1-8
1A11TB1-9
1A11TB1-10

—1
1A11TB2-2
1A11TB2-3
1A11TB2-4
1A11TB2-5
1A11TB2-6
1A11TB2-7
1A11TB2-8
1A11TB2-9
1A11TB2-10

1A11TB4-1
1A11TB4-2
1A11TB4-3
1A11TB4-4
1A11TB4-5
1A11TB4-6
1A11TB4-7
1A11TB4-8
1A11TB4-9
—10

GROUND STUD CABLES:



NOTES:

1. WIRE COLOR CODE
   0 - BLACK
   91 - WHITE BROWN
   92 - WHITE RED
   93 - WHITE ORANGE
   94 - WHITE YELLOW
   95 - WHITE GREEN
   96 - WHITE BLUE
   97 - WHITE VIOLET
   98 - WHITE GRAY
   9 - WHITE
   90 - WHITE BLACK
   CT - COPPER TUBING
2. UNLESS OTHERWISE SPECIFIED TERMINATIONS AS INDICATED ARE FOR BOTH TRANSMITTERS IN THE STATION SET.
3. (S) INDICATES SPARE WIRE

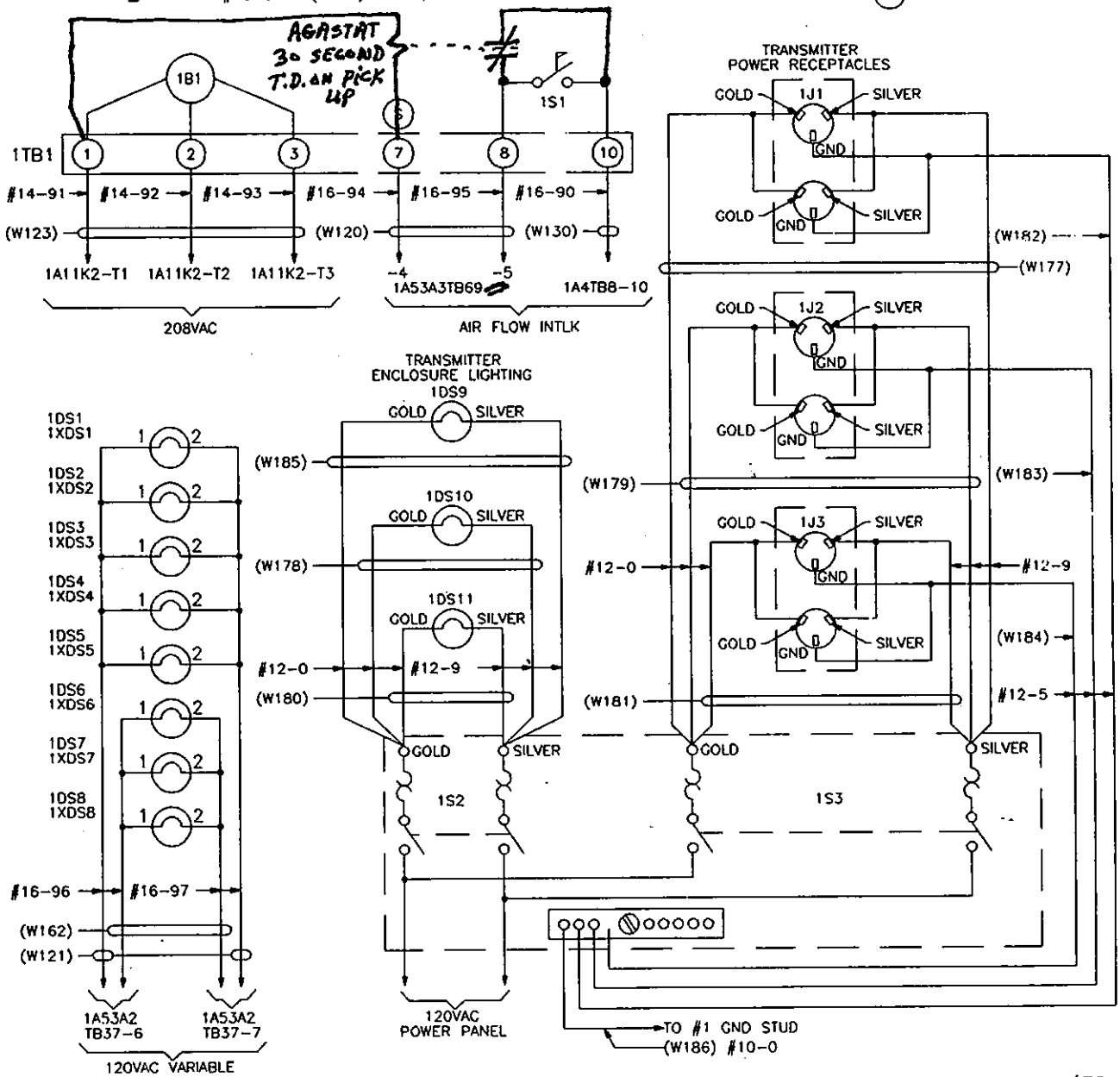


Figure 7-19. Transmitting Group OT-96/FPN-44A(1 Wiring Diagram (Sheet 2 of 3)

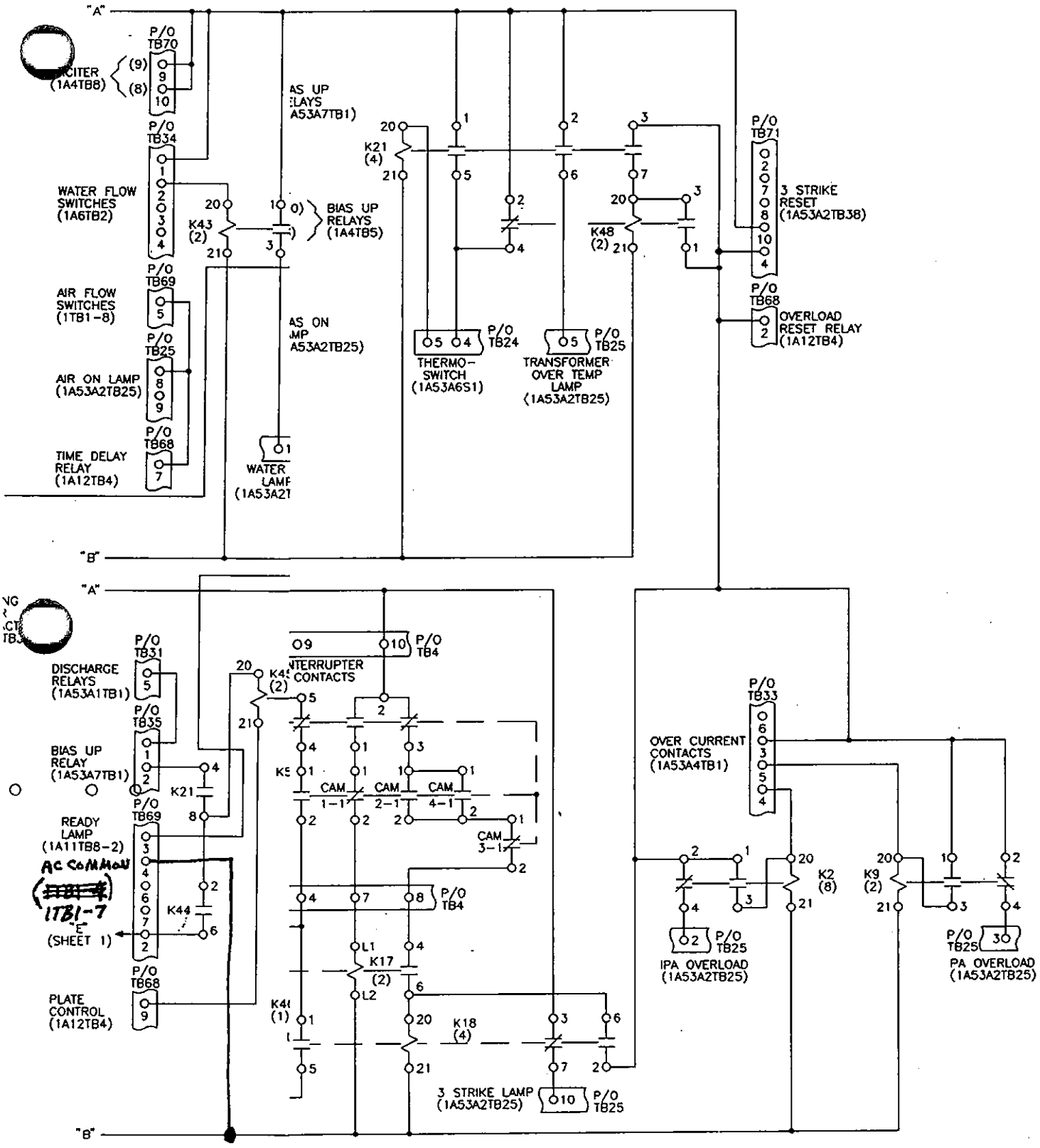


Figure 7-39. 208-Volt Rack Assembly, P/O Relay Assembly RE-1113/FPN-44A(1A53A3), Schematic Diagram (Sheet 2 of 2)

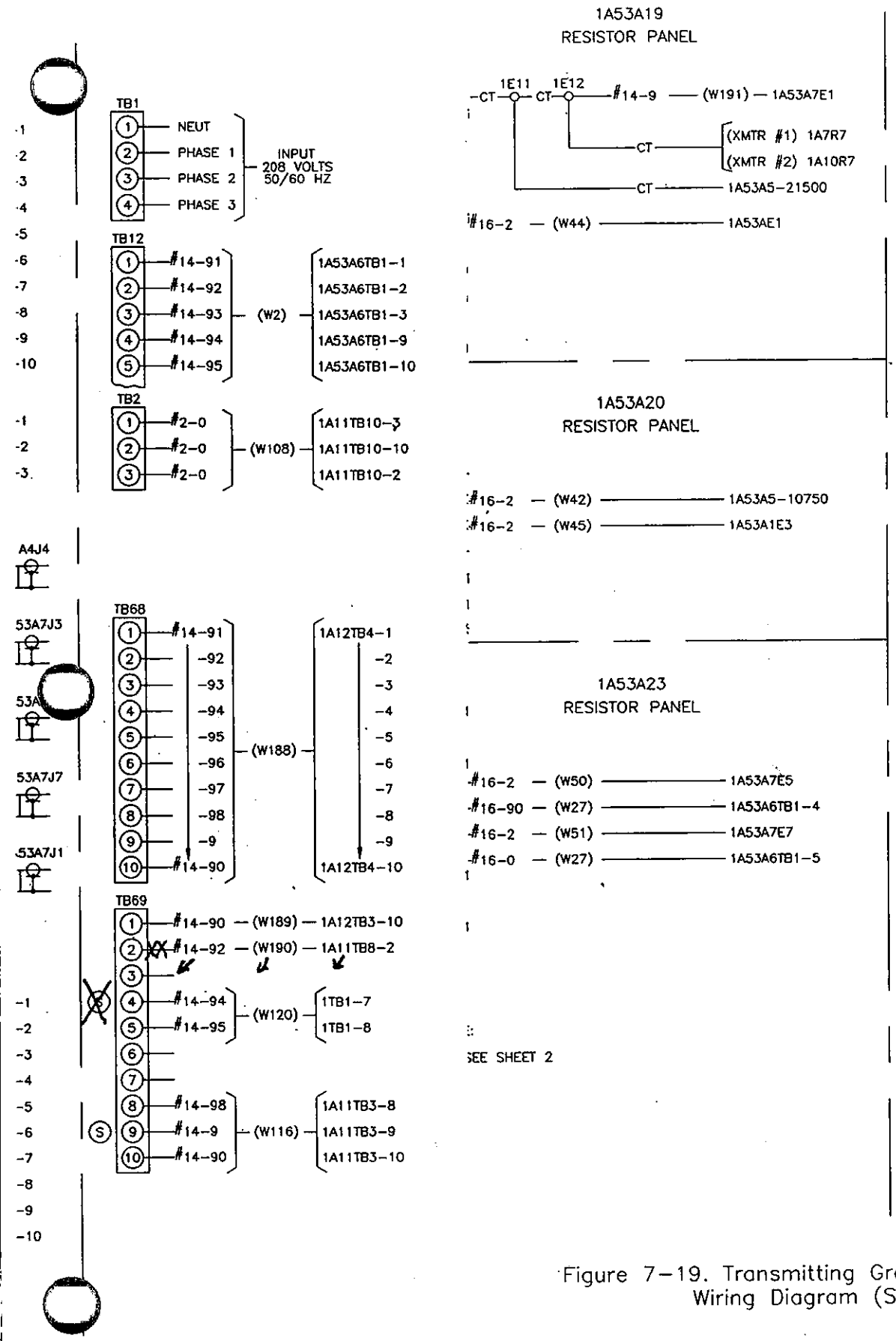


Figure 7-19. Transmitting Group OT-96/FPN-44A(1), Wiring Diagram (Sheet 1 of 3)

TR.A.5/93.ATT#3
16 June 1993

Attachment #3 to Attu Installation Trip Report

Subj: ATTU TRANSMITTER INSTALLATION ANTENNA COUPLER TUNING MODIFICATION.

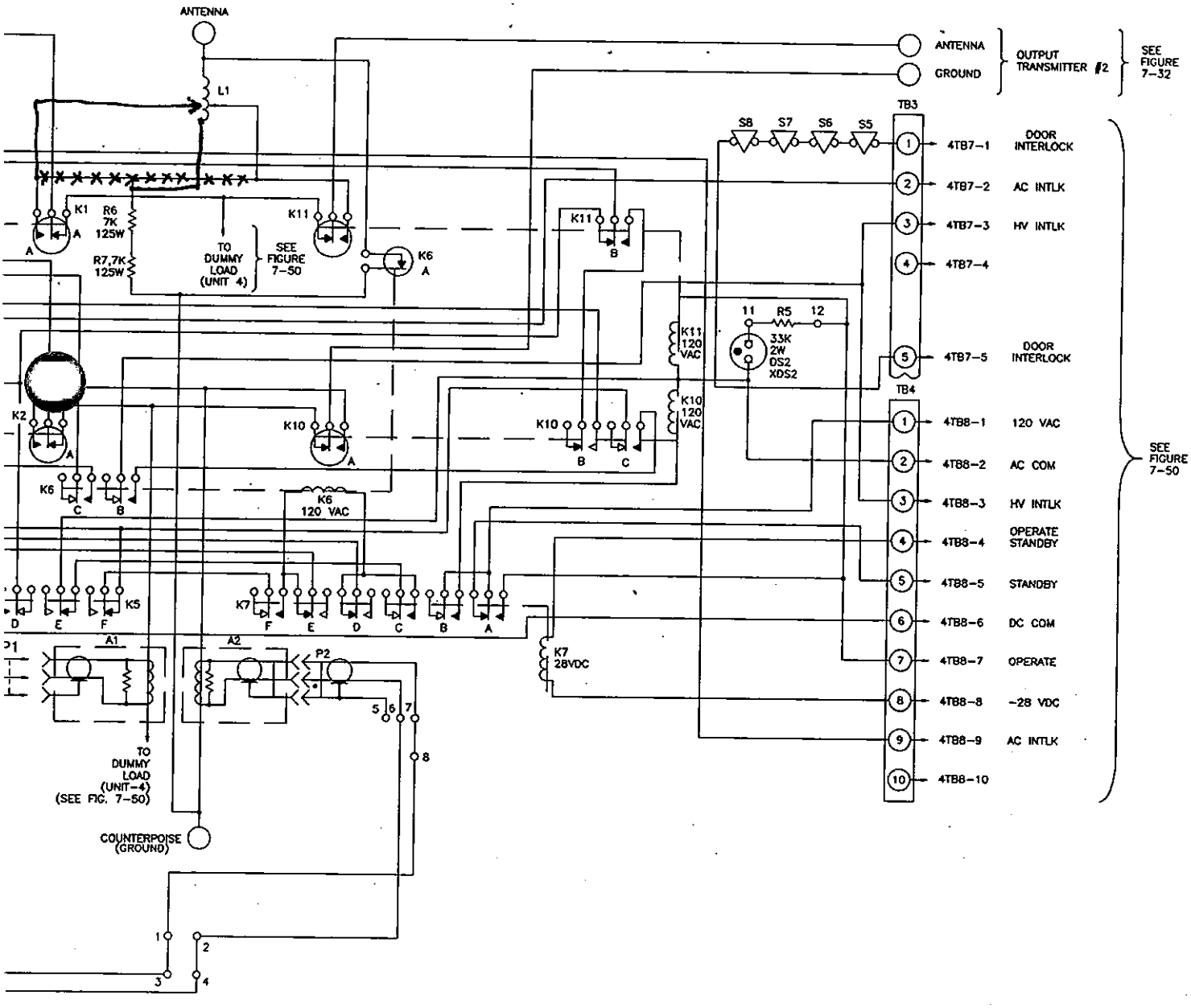
1. EECEN installation personnel modified the antenna coupler at Attu to allow a better match between the transmitters, and the antenna. EECEN departed from the historic single tuning coil tap to an improved double tuning tap arrangement.

2. Historically, when tuning a transmitter set to the transmitting antenna, one would find the best tune point for the #1 transmitter, and mark the spot on the coil. One then would find the best tune point for the #2 transmitter, and mark that spot on the coil. The final coil tap position is the center of the difference between the 2 spots on the tuning coil which results in neither transmitter being really correct, but both being close. EECEN has added an additional tap to the network to allow each transmitter to be precisely tuned for it's best match to the transmitting antenna.

3. The addition of the extra lead appears to have no adverse affects on the operation of either transmitter, or the Loran system as a group of equipments.

4. Lorsta St. Paul, and Port Clarence will be installed with the same double tap arrangement. The attached schematics shows the double tap wiring arrangement.

W. G. Hamilton



ATTACHMENT #3

Figure 7-49. Antenna Coupler CV-2174/FPN-44 (3), Schematic Diagram

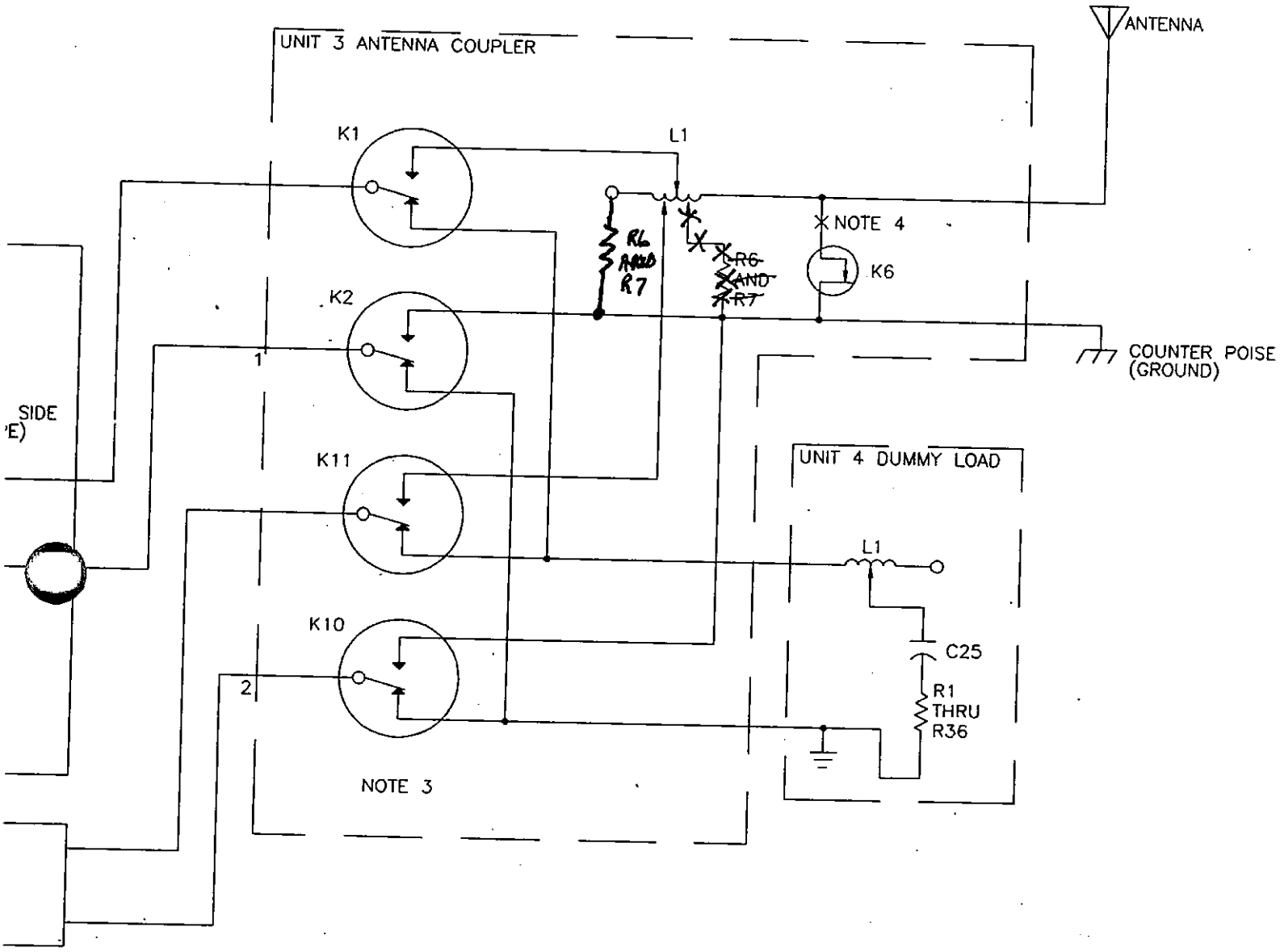


Figure 5-110. Antenna Coupler CU-2171/FPN-44A Tuning Test Setup

TR.A.5/93.ATT#4
16 June 1993

Attachment #4 to Attu Installation Trip Report

Subj: ATTU TRANSMITTER INSTALLATION FINAL TRANSMITTER READING SHEETS.

1. Attached are the final transmitter reading sheets dated 24/25 April 1993 reflecting the Attu AN/FPN-44B transmitters. Readings for both on air, and dummy load operations are provide for your information.

W. G. Hamilton

USCG LORSTA ATTU

AN/FPN-44B TRANSMITTER READINGS

XMTR NR. 1 S/N 09

DUMMY LOAD [ ]

EPA PEAK VOLTS LO 65.0 RATE: 9990

HI 65.0 RATE: 5980 ANTENNA [X]

CONTROL INDICATOR (1A53A2)

	1-2	2-3	3-1
460 VAC LINE	300	300	305
208 VAC LINE	120	120	120
208 VAC REG	122	122	122

5KV BIAS:	LOW VOLTAGE PLATE:	FILAMENT HOURS:	PLATE HOURS:
5.25 KV	.5 KV	656.1	495.3

IPA PLATE

CURRENT: .58 A VOLTAGE: 10.5 KV

PA PLATE

CURRENT: 3.4 A VOLTAGE: 21.2 KV

MAINTENANCE: [ ]

OPERATE: [X]

AMPLIFIER GROUP (1A4)

LEFT PA BIAS: 1.04 KV

LEFT PA BIAS CURRENT: .24 A

RIGHT PA BIAS: 1.05 KV

RIGHT PA BIAS CURRENT: .23 A

LEFT 2ND IPA BIAS: 3.60 KV

RIGHT 2ND IPA BIAS: 3.40 KV

LEFT 1ST IPA CATHODE: 55 MA

RIGHT 1ST IPA CATHODE: 55 MA

2ND IPA PLATE CURRENT (M3): 300 MA

2ND IPA PLATE CURRENT (M4): 300 MA

-260 VDC : X -150 VDC : X -24 VDC : X +24 VDC : X

+250 VDC : X -28 VDC : X -12 VDC : X

PA TUBE RACK (1A6)

PA CATHODE CURRENT

(M1): .90 A

(M3): .86 A

(M2): .75 A

(M4): 1.00 A

WATER LEAKAGE CURRENT: .09 MA

INLET TEMP: 35 C

OUTLET TEMP. (V1): 34 (V3): 40

(V2): 37 (V4): 34

FLOW GAUGES: V1 : X V3 : X V2 : X V4 : X

DATE: 25 APRIL 93 TECHNICIAN: _____

ATTACHMENT #4

USCG LORSTA ATTU

AN/FPN-44B TRANSMITTER READINGS

XMTR NR. 1 S/N 09

DUMMY LOAD [X]

EPA PEAK VOLTS LO 65.0 RATE: 9990

HI 65.0 RATE: 5980

ANTENNA [ ]

CONTROL INDICATOR (1A53A2)

	1-2	2-3	3-1
460 VAC LINE	300	300	310
208 VAC LINE	120	120	120
208 VAC REG	120	120	120

5KV BIAS:	LOW VOLTAGE PLATE:	FILAMENT HOURS:	PLATE HOURS:
5.25 KV	.5 KV	634.4	491.2

IPA PLATE

CURRENT: .55 A VOLTAGE: 10.5 KV

MAINTENANCE: [ ]

PA PLATE

CURRENT: 2.5 A VOLTAGE: 21.0 KV

OPERATE: [X]

AMPLIFIER GROUP (1A4)

LEFT PA BIAS: 1.05 KV

LEFT PA BIAS CURRENT: .20 A

RIGHT PA BIAS: 1.05 KV

RIGHT PA BIAS CURRENT: .23 A

LEFT 2ND IPA BIAS: 3.30 KV

RIGHT 2ND IPA BIAS: 3.20 KV

LEFT 1ST IPA CATHODE: 57 MA

RIGHT 1ST IPA CATHODE: 60 MA

2ND IPA PLATE CURRENT (M3): 320 MA

2ND IPA PLATE CURRENT (M4): 320 MA

-260 VDC : X -150 VDC : X -24 VDC : X +24 VDC : X

+250 VDC : X -28 VDC : X -12 VDC : X

PA TUBE RACK (1A6)

PA CATHODE CURRENT

(M1): .65 A

(M3): .65 A

(M2): .50 A

(M4): .70 A

WATER LEAKAGE CURRENT: .10 MA

INLET TEMP: 36 C

OUTLET TEMP. (V1): 34 (V3): 40

(V2): 37 (V4): 34

FLOW GAUGES: V1 : X V3 : X V2 : X V4 : X

DATE: 24 APRIL 93

TECHNICIAN: _____

USCG LORSTA ATTU

AN/FPN-44B TRANSMITTER READINGS

XMTR NR. 2 S/N 10

DUMMY LOAD [ ]

EPA PEAK VOLTS LO 65.0 RATE: 9990

HI 65.0 RATE: 5980 ANTENNA [X]

CONTROL INDICATOR (1A53A2)

	1-2	2-3	3-1
460 VAC LINE	420	420	422
208 VAC LINE	160	165	160
208 VAC REG	175	175	175

5KV BIAS:	LOW VOLTAGE PLATE:	FILAMENT HOURS:	PLATE HOURS:
5.2 KV	.5 KV	628.2	503.1

IPA PLATE

CURRENT: .55 A VOLTAGE: 10.5 KV

PA PLATE

CURRENT: 3.4 A VOLTAGE: 21.2 KV

MAINTENANCE: [ ] OPERATE: [X]

AMPLIFIER GROUP (1A4)

LEFT PA BIAS: 1.02 KV RIGHT PA BIAS: 1.05 KV

LEFT PA BIAS CURRENT: .24 A RIGHT PA BIAS CURRENT: .20 A

LEFT 2ND IPA BIAS: 3.15 KV LEFT 1ST IPA CATHODE: 60 MA

RIGHT 2ND IPA BIAS: 3.20 KV RIGHT 1ST IPA CATHODE: 62 MA

2ND IPA PLATE CURRENT (M3): 290 MA

2ND IPA PLATE CURRENT (M4): 290 MA

-260 VDC : X -150 VDC : X -24 VDC : X +24 VDC : X

+250 VDC : X -28 VDC : X -12 VDC : X

PA TUBE RACK (1A6)

PA CATHODE CURRENT

(M1): .85 A

(M3): .85 A

(M2): .85 A

(M4): .90 A

WATER LEAKAGE CURRENT: .25 MA

INLET TEMP: 30 C

OUTLET TEMP. (V1): 26 (V3): 34

(V2): 30 (V4): 36

FLOW GAUGES: V1 : X V3 : X V2 : X V4 : X

DATE: 24 APRIL 93 TECHNICIAN: _____

USCG LORSTA ATTU

AN/FPN-44B TRANSMITTER READINGS

XMTR NR. 2 S/N 10

DUMMY LOAD [X]

EPA PEAK VOLTS LO 65.0 RATE: 9990

HI 65.0 RATE: 5980 ANTENNA [ ]

CONTROL INDICATOR (1A53A2)

	1-2	2-3	3-1
460 VAC LINE	420	420	422
208 VAC LINE	175	175	175
208 VAC REG	175	175	175

5KV BIAS:	LOW VOLTAGE PLATE:	FILAMENT HOURS:	PLATE HOURS:
5.2 KV	.5 KV	653.5	528.0

IPA PLATE

CURRENT: .52 A VOLTAGE: 10.5 KV

PA PLATE

CURRENT: 2.4 A VOLTAGE: 21.2 KV

MAINTENANCE: [ ] OPERATE: [X]

AMPLIFIER GROUP (1A4)

LEFT PA BIAS: 1.05 KV RIGHT PA BIAS: 1.12 KV

LEFT PA BIAS CURRENT: .22 A RIGHT PA BIAS CURRENT: .18 A

LEFT 2ND IPA BIAS: 3.30 KV LEFT 1ST IPA CATHODE: 62 MA

RIGHT 2ND IPA BIAS: 3.50 KV RIGHT 1ST IPA CATHODE: 62 MA

2ND IPA PLATE CURRENT (M3): 340 MA

2ND IPA PLATE CURRENT (M4): 340 MA

-260 VDC : X -150 VDC : X -24 VDC : X +24 VDC : X

+250 VDC : X -28 VDC : X -12 VDC : X

PA TUBE RACK (1A6)

PA CATHODE CURRENT

(M1): .60 A

(M3): .58 A

(M2): .60 A

(M4): .63 A

WATER LEAKAGE CURRENT: .32 MA

INLET TEMP: 31 C

OUTLET TEMP. (V1): 28 (V3): 37

(V2): 32 (V4): 37

FLOW GAUGES: V1 : X V3 : X V2 : X V4 : X

DATE: 25 APRIL 93 TECHNICIAN: _____

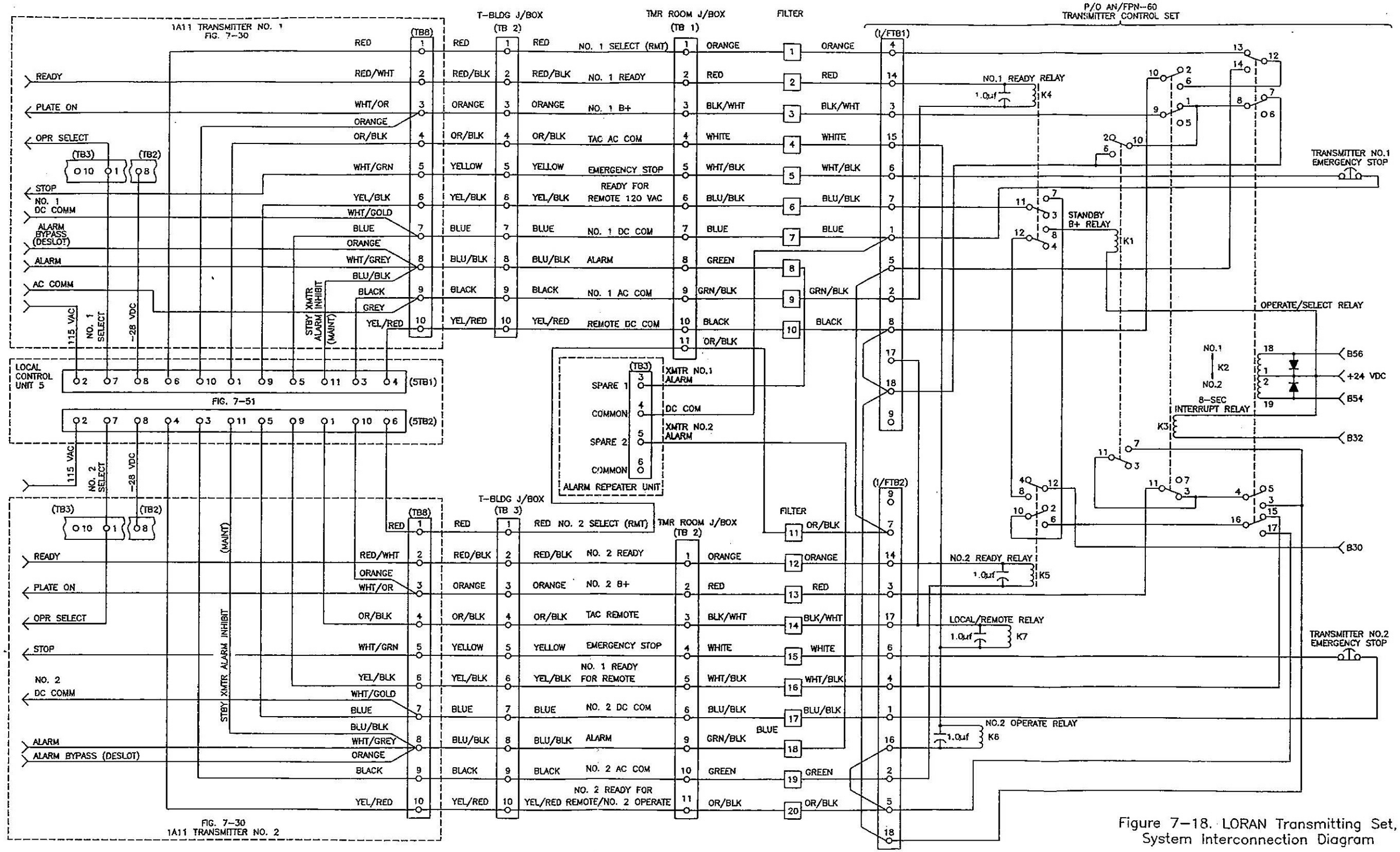


Figure 7-18. LORAN Transmitting Set, System Interconnection Diagram