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TECHNICAL MANUAL
for
RECEIVING SET, RADIO
AN/FRR-72
—
SYSTEM



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y. **OTTAWA, CANADA**

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THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

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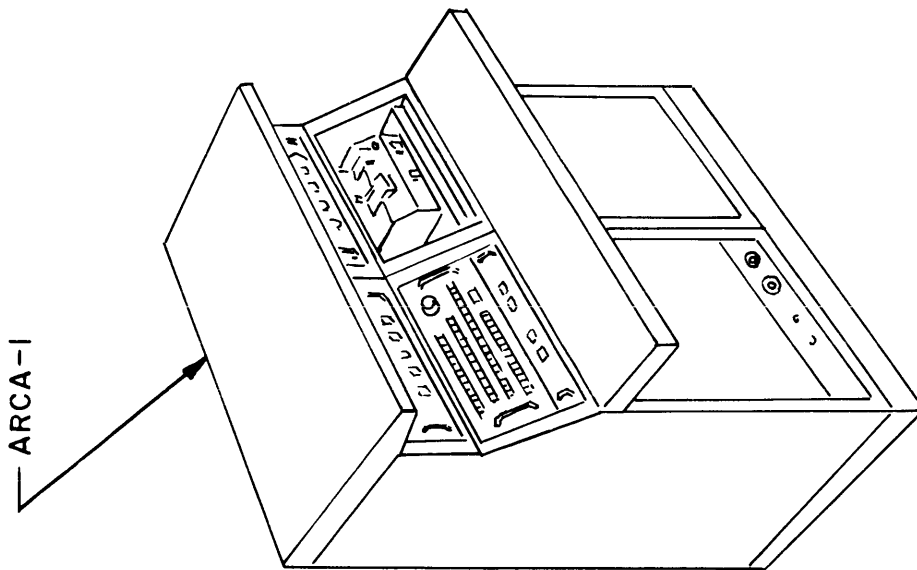
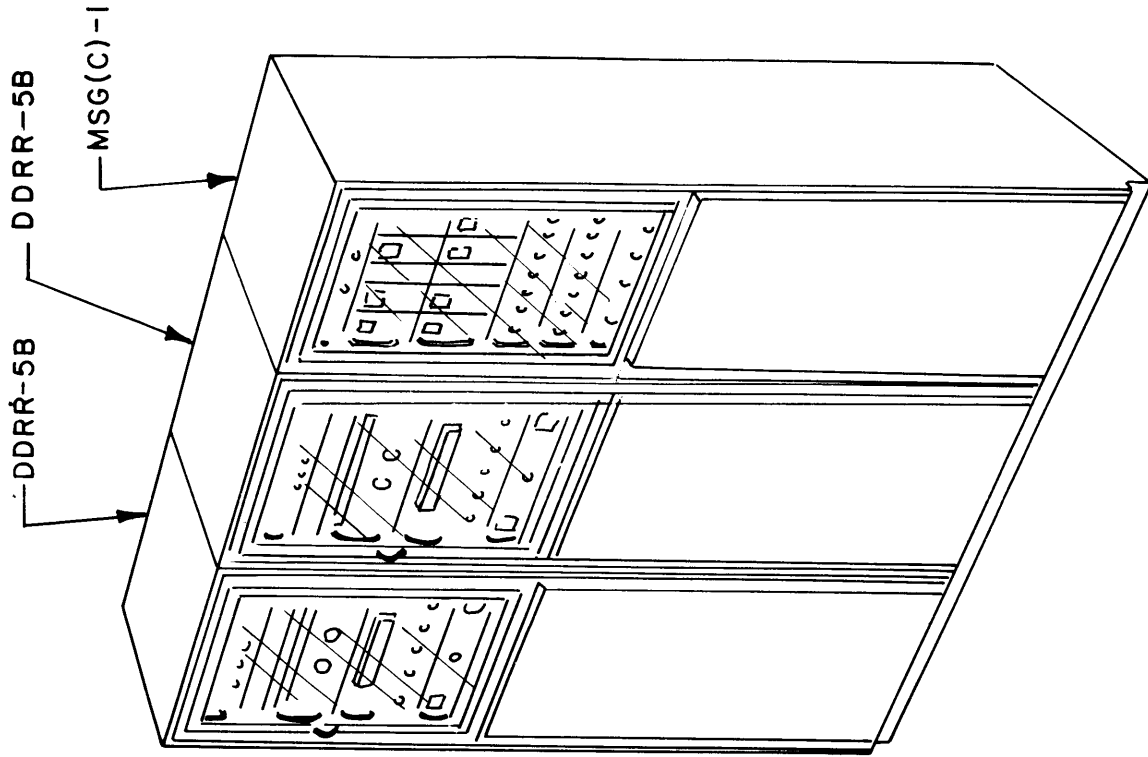


Figure 1-1. AN/FRR-72 Radio Receiving Set

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SECTION 1

GENERAL INFORMATION

1-1 GENERAL DESCRIPTION

AN/FRR-72 Radio Receiving Set, (see figures 1-1 and 1-2) is an automatically tuned dual diversity 2-32 mc receiver and a remote control console. The receiver, tuned by teletype code from the console is made up of three rack units: two single TMC Model DDRR-5B TechniMatic* Tuned Receiver units and one Model MSG(C)-1 Independent AGC Receiving System. The DDRR-5B, by itself, receives AM, CW, MCW, SSB, ISB, FSK and FAX signals. Coupled with the MSG(C)-1, the two DDRR-5B units have the additional capability of receiving a 4-channel ISB signal in dual frequency or dual space diversity, with an audio output of 4 discrete 3-kc wide channels of information. Each DDRR-5B receiver has a memory unit and decoder for the tuning code input, servo-correction loops for fine tuning and stability, and a readback signal to the remote console containing control positions for constant monitoring. Each receiver may also be manually tuned.

TMC Model ARCA-1 Tape Automatic Receiver Remote Control System console contains a push-button programming board, a receiver selector control, a tape or card puncher/reader and two read-back monitor panels, one for each receiver. Control of the receiver is a series of 5-bit codes sent out in the standard 7.42-unit teletype pattern, either by wire or FSK radio transmission, from the programming panel. The readback from the receiver is in the same form and is continuous. Besides tuning the receiver, the push-button programming board can pre-program a tuning message/s on punched tape or punched card which can be used later for rapid tuning. The puncher can also be switched in to punch-record a push-button tuning operation for future use or analysis.

*Trademark applied for.

1-2 REFERENCE DATA

Table 1-1 and 1-2 list the technical specifications pertinent to the AN/FRR-72, divided into the control station site and the remote receiver site.

TABLE 1-1. ELECTRICAL CHARACTERISTICS, DDDR-5B/
DDRR-5B/MSG(C)-1 RECEIVER (per receiver system)

Frequency Range:	2-32 mc, covered in 100 cps increment steps.
Maximum r-f Bandwidth:	15 kc, symmetrical around carrier.
Modes of Reception:	AM, CW, MCW, SSB, 2-Channel and 4-Channel ISB, FSK and FAX. All in space or frequency diversity or in single receiver operation.
Receiver Stability:	Within 1 part in 10^8 for 24 hours for a change in ambient temperature of 15°C within the limits of 0 to 50°C .
AFC:	Automatic Frequency Control compensates for transmitter/receiver frequency drift. AFC locks onto carrier suppressed to a maximum of 30db * below PEP and will remain synchronized for approximately ± 750 cps at a maximum drift rate at 10 cps per second. A memory circuit will maintain tuning position during signal fades. Audio output is within 1 cycle of transmitted intelligence.
Noise Figure and Sensitivity:	6 db or better over the band, i.e.: with a 1 uv signal and a 7.5-kc bandwidth, the output signal-to-noise ratio is 15 db or better.
Antenna Input Impedance:	Nominal 50 ohms, unbalanced.
Audio Output:	Two 3.5-kc or 7.5-kc channels per DDDR-5B receiver, one 600-ohm balanced and center-tapped 0-1 mw output per channel. For 4-channel ISB, four 3-kc channels per DDDR-5B receiver, one 600-ohm balanced and center-tapped 0-10 mw output per channel.

*When PEP = 5-microvolt minimum input signal at the antenna.

Monitor Audio Outputs: One passive 4-watt speaker for 2-channel output and one dynamic 4-watt speaker for 4-channel output. Channel selector switches, headset jacks and volume controls for each channel.

Audio Response: 2-channel output: flat within ± 1.5 db from 20 cps to 7.5-kc per channel.
4-channel ISB output: flat within ± 1.5 db from 50 cps to 3-kc per channel.

IF Bandwidth Selectivity per Channel for 2-Channel Output:

1. 1-kc symmetrical about carrier.
2. 6-kc symmetrical about carrier
3. 15-kc symmetrical about carrier
4. 250 cps to 3500 cps upper sideband.
5. 250 cps to 3500 cps lower sideband.
6. 250 cps to 7500 cps upper sideband.
7. 250 cps to 7500 cps lower sideband.

Adjustable Audio Filtering per Channel (all modes): Passive audio filters provide adjustable high and low cutoffs for audio bands as follows (per channel):

100 cps	}	(2- or 4-	2.5-kc	(2- or 4-channel)	
250 cps		channel	5.0-kc	}	
500 cps		outputs)	10.0-kc		(2-channel output)
1-kc					

Tunable IF Rejection: Notch rejection with plus or minus 82 cps at the 1 db points and plus or minus 10 cps at 60 db points. Notch tunable across the full i-f of 15 kc for 2-channel output; across each channel for four-channel output.

Intermodulation: Intermodulation products are down 60 db from the maximum tone in the desired sideband as a result of two signals in the unwanted sideband.

Image Ratio: 80 db referenced to 1 uv input signal.

Spurious Response: (as defined by CCIR): For synthesized operation, no greater than .01 uv when referred to the antenna.

IF Rejection: Better than 80 db average.

AGC (for 2-Channel Output): AGC feedback from i-f filter output for each channel, through comparator controls gain of r-f and i-f stages. Output remains within ± 1.5 db for a 100 db change in input within input range of 1 uv to 0.1 volt. AGC decay time adjustable from 1 to 10 seconds by front panel control.

AGC (for 4-Channel ISB):	Four separate AGC systems, one for each channel, with an adjustable 1-10 second decay time for each channel. Output remains within ± 1.5 db for a 60 db change in input within input range of 1 uv to 0.1 volt.
Audio Frequency Distortion:	Intermodulation products are down at least 40 db through the audio channels.
Hum Level:	Minus 50 db at full audio output.
Remote Tuning Signal Input:	Keying for serial pulses in 7.42-unit teletype transmission pattern with 22 millisecond (60 WPM) or 13.7 millisecond (100 WPM) pulse widths, selected by printed circuit card insertion.
Remote Tuning Readback Signal Output:	Dry contact keying through polar relay for serial pulses in 7.42-unit teletype transmission pattern. 60 WPM or 100 WPM transmission speed, selected by printed circuit card insertion. Constant cycling of 12 position codes. Relay contacts closed in mark (1) condition, opened in space (0) condition.
Receiver Recognition Character, Remote Tuning Signal Input:	Receiver #1 (J); Receiver #2 (S). Entered as a letter on stunting circuit p/c card #A3813 in memory bin of RTMU-1 Signal Data Converter-Storer.
Power Supply Requirements:	3150 watts, average.
Ambient Temperature and Humidity:	0 to 50°C and up to 90% humidity.

TABLE 1-2. ELECTRICAL CHARACTERISTICS, ARCA-1

Tuning Signal Output:	Dry contact keying for serial pulses in 7.42-unit teletype transmission pattern with 22 millisecond (60 WPM) or 13.7 millisecond (100 WPM) pulse widths. For code, see RTPA-1 manual, Table 1-1.
Readback Signal Input:	Keying for serial pulses in 7.42-unit teletype transmission pattern with 22 millisecond (60 WPM) or 13.7 millisecond (100 WPM) pulse widths. Continuous cycling of 12 codes per cycle, in sequence as listed in RTIA-1 manual, Table 1-1.
Tape:	1-inch, 7/8-inch, or 11/16-inch wide standard paper tape for 5-level code structure.
Power Requirements:	360 watts, average.

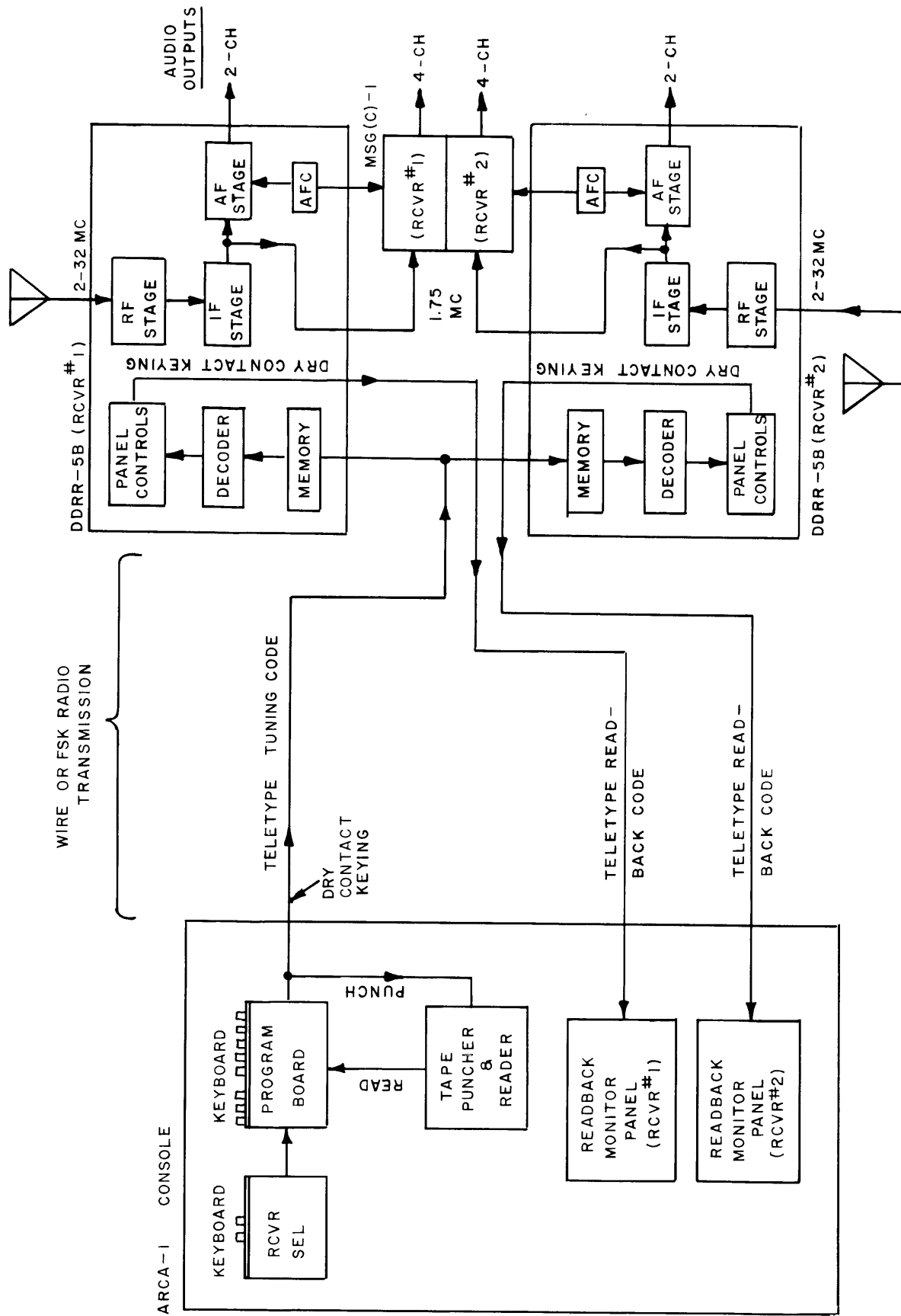


Figure 1-2. Simplified Functional Block Diagram

SECTION 2
INSTALLATION

2-1. UNPACKING AND HANDLING.

For unpacking and initial inspection procedures, see DDDR, MSG (C) and ARCA Technical Manuals.

2-2. INSTALLATION OF RECEIVERS.

a. LOCATION. - Position racks as shown in Figure 1-1 or in any convenient positioning. The two DDDR TechniMatic Tuned Receivers and the one MSG(C) Independent AGC Receiving System, when placed together as shown in Figure 1-1, take up a total floor area of 74-inches in frontage x 30-inches deep. The racks are 83-inches high. Allow 2 feet in the rear of the racks for opening the service doors. Locate equipment in a well-ventilated room.

b. ASSEMBLY. - Assemble components and install cabling into the racks as described in the DDDR and MSG (C) Technical Manuals.

NOTE

The receiver recognition code for Receiver #1 is the 5-bit teletype code for J (11010); the code for Receiver #2 is S (10100). The RTRS Receiver Selector panel in the ARCA is wired for this arrangement. The P/C card in the RTMU unit of each DDDR which receives the recognition code is Z5003. On each card is the letter "J" or "S". Check to ensure that the right card is in the right RTMU.

c. INTERCONNECTION OF DDDR AND MSG(C). - Install interconnecting cabling as shown in figure 2-1. The cables and necessary "T" connectors (CA-864 Branched RF Cable Assemblies) are supplied in the shipment of each AN/FRR system.

d. CONNECTION OF EXTERNAL EQUIPMENT.

(1) GENERAL. - Connect external equipment as described in paragraphs 2-2d (2) through 2-2d (6) and figure 2-2.

(2) ANTENNA. - For space diversity, connect each DDRR receiver to an antenna; for frequency diversity connect both receivers to the same antenna. The DDRR is normally used with a sloping V, rhombic, or log-periodic antenna. The antenna input is for a 50-ohm, unbalanced transmission line. Make antenna connection for each receiver at CP3001 ANTENNA adapter located on the A3860 vertical panel inside the rack at the rear. CP3001 is a receptacle for a QDS (quick disconnect) series r-f coaxial plug. TMC #PL-149 QDS plugs are supplied in shipment for this purpose. TMC #SA-105 QDS-to-BNC adapter and #UG-88/U BNC plug are also supplied to provide BNC connections, if preferable.

(3) AUDIO LOADS. - Use terminals 7 through 13 on terminal block TB3001 on the rear rack panel A3860 of each DDRR for the connection of the 2-channel audio loads (CHANNELS A and B) for each receiver system. Use terminals 5 through 16 on terminal blocks TB8501 and TB8502 on the A3852 rear rack panel of the MSG(C) for the connection of the 4-channel audio loads (A2, A1, B1, B2) for the two receiver systems, as marked on the panel.

(4) REMOTE TUNING INPUT. - Connect remote tuning code input source at terminals 2 and 5 of TB3002 on A3860 rear rack panel of DDRR, receiver #1. Run jumper wires (2 to 2 and 5 to 5) to TB3002 of DDRR receiver #2. (NOTE: This arrangement is for utilizing the internal -12 volt supply in the RTMU units to create the pulses into the RTMU, using a dry contact keying input.)

(5) REMOTE TUNING READBACK OUTPUT. - Connect remote tuning readback line for each DDRR receiver system at terminals

3 and 4 on TB3002 terminal block on the A3860 rear rack panel. Bring lines out separately for each receiver as shown in figure 2-2.

(6) INPUT POWER. - Connect 115 VAC, 50/60 cps, single phase line voltage to the two DDDR Receivers and MSG(C) System as described in the Technical Manuals for these units.

e. PRESETTING CONTROLS FOR REMOTE OPERATION. - Set DDDR and MSG(C) controls to positions indicated in Table 2-1, by hand, before operating by remote control. The one listing for DDDR applies for both DDDR units. Positions of controls not listed are optional. Note: Remote-operated controls (not in list below) turn clockwise only.

TABLE 2-1. MANUAL CONTROL PRE-SETTINGS FOR REMOTE TUNING

<u>CONTROL</u>	<u>POSITION</u>
<u>DDRR</u>	
HFRR NOISE SILENCER/OFF/ ALIGNMENT SIGNAL switch	OFF
HFRR TUNE/SYNC/OPERATE switch	OPERATE
AFC TUNING knob	0
AFC CARRIER SELECTOR switch	OSC
AFC SENSITIVITY knob	Fully CW
HSS CHANNEL A/OFF/B switch	OFF
HFIR AGC DECAY knob	Mid-position
HNF NOTCH ON/OFF switch	OFF
HFAR CHANNEL A LEVEL ADJUST knob	See NOTE, page 2-7

TABLE 2-1. MANUAL CONTROL PRE-SETTINGS FOR REMOTE TUNING (CONT)

<u>CONTROL</u>	<u>POSITION</u>
<u>DDRR(CONT)</u>	
HFAR CHANNEL B LEVEL ADJUST KNOB.....	See NOTE, page 2-7
HFAR CHANNEL A BFO knob	Audio tone as required for CW
HFAR CHANNEL B BFO knob	Audio tone as required for CW
HFAR POWER STANDBY/OPERATE switch	OPERATE
HAF CHANNEL A FILTER CUTOFF KCS, LOW CUTOFF switch	OUT
HAF CHANNEL A FILTER CUTOFF KCS, HIGH CUTOFF switch	OUT
HAF CHANNEL B FILTER CUTOFF KCS, LOW CUTOFF switch	OUT
HAF CHANNEL B FILTER CUTOFF KCS, HIGH CUTOFF switch	OUT
HFP MAIN POWER, STANDBY/OFF switch (located at rear)	STANDBY
RTMU POWER ON/OFF switch	ON
RTTD DECODER READY ON/OFF switch	ON
<u>MSG(C)</u>	
BSP (RECEIVER 1 & 2) INCR knobs	fully ccw
MSA (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ AGC DECAY knobs	Mid-position
MSA (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ , and B ₂ LINE LEVEL knobs	See NOTE, page 2-7
MSA (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ SQUELCH ADJUST knobs	Fully CCW

TABLE 2-1. MANUAL CONTROL PRE-SETTINGS FOR REMOTE TUNING (CONT)

<u>CONTROL</u>	<u>POSITION</u>
MSA (UNITS 1 & 2) STANDBY/ON switch	ON
MAF (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ HI CUTOFF KC switches	OUT
MAF (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ LO CUTOFF KC switches	OUT
MNF (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ NOTCH ADJUST knobs	0
MNF (UNITS 1 & 2) CHANNELS A ₁ , A ₂ , B ₁ and B ₂ NOTCH switches	OUT
MCG (UNITS 1 & 2) INT/AFC/SYN switches	SYN
HFP MAIN POWER, STANDBY switch	STANDBY

2-3. INSTALLATION OF ARCA CONSOLE

a. LOCATION. - In planning the location of Model ARCA-1 Tape Automatic Receiver Remote Control System console, refer to its Technical Manual for overall dimensions.

b. ASSEMBLY. - Detailed procedure for the assembly of modules into the console, internal cabling interconnections, and installation of tape in tape puncher is given in the ARCA Technical Manual.

c. CONNECTION OF EXTERNAL EQUIPMENT. -

(1) GENERAL. - Connect external equipment as described in paragraphs 2-3c (2) through 2-3c (5) and Figure 2-2.

(2) TUNING SIGNAL OUTPUT. - Make tuning signal output connection at TB9002 terminal block on the rear of the console as shown in Figure 2-2.

(3) READBACK SIGNAL INPUTS. - Make readback signal input connections at TB9002 terminal block on the rear of the console

as shown in Figure 2-2.

(4) TAPE TIMER. - If tape timer is to be used (to send a series of pre-programmed messages on tape at timed intervals), plug in timer at TIMER jack on RTPA Electronic Programmer front panel. A cable with TMC #PJ309 mating plug is supplied in shipment.

(5) INPUT POWER. - Connect 115 VAC, single phase, 60 cps line voltage at FL9001 Filter as described in the ARCA Technical Manual. This also presents additional auxiliary line voltage at the two UTILITY outlets on the front panel of Model DCP Power Panel.

2-4. LINKAGE OF ARCA WITH DRRR/MSG (C)

Refer to figure 2-3, Linkage Diagram, AN/FRR. There are 3 interconnecting signal lines between the console and the receiver; one tuning message line and two separate readback message lines, one from each DRRR. All three signals are in the same 7.42-unit serial pulse teletype form. The transmission may be with pulse-widths based on 60 WPM or 100 WPM, and it may be wire transmission or FSK (frequency shift keying) radio transmission.

For wire or radio transmission linkage, determine whether a 60 WPM or 100 WPM rate is to be used. Then check the DRRR and ARCA units to ensure that the corresponding clock generator printed circuit cards are installed. There are two cards in each of the DRRR Receivers and two cards in the ARCA Console. In the DRRR, the two cards are Z5001 in the RTMU memory bin and Z5015 in the RTMU readback bin. In the ARCA console, the two cards are Z1005 in the RTPA and Z2030 in the RTIA unit. The AN/FRR

system is shipped with 60 WPM cards installed in the bins; another set of 100 WPM cards are supplied in the shipment. The cards are distinguished by "60 WPM" or "100 WPM" stenciled on them.

NOTE

The AN/FRR Tuned Receiver System is designed for a particular audio channel switching arrangement that contains as associated on/off audio output channel control to be located at the ARCA Console site. Wiring connections for the 12 lines (two 2-channel and two 4-channel outputs) are described in paragraph 2-2d (3). After installation of lines, manually tune the DDDR and MSG (C) units to test signals and adjust the 12 LINE LEVEL ADJUST knobs to bring a "VU" reading on their 12 corresponding LINE LEVEL METERS.

When using radio linkage for tuning code and readback transmission, polarity of binary code inputs and outputs should be taken into consideration. Refer to Figure 2-2. The tuning output of the ARCA is in the form of dry contact keying from a polar relay in the RTPA across terminals 2, 3 and 4. A "1" bit produces closed contacts connecting terminals 3 and 4. A "0" bit produces closed contacts connecting terminals 2 and 4. Generally, wire output connections are made to terminals 3 and 4 only. The tuning input at terminals 2 and 5 of terminal block TB3002 on the DDDR is into a -12V supply in the RTMU unit. To produce a "1" into the RTMU it is required to close a set of contacts connecting terminals 2 and 5; to produce a "0" it is required to open these contacts. The readback output from the RTMU appears across terminals 3, 4 and 6 of terminal block TB3002 on the DDDR. It is in the form of dry contact keying from a polar relay in the RTMU. A "1" bit closes contacts connected to terminals 3 and 4; a "0" bit closes contacts connected to terminals 3 and 6. Gen-

erally, wire output connections are made to terminals 3 and 4 only. The RCVR #1 readback input at the ARCA is connected across terminals 5 and 6 and is in the form of keying into a -12V supply in the RTIA unit. To produce a "1" bit into the RTIA, it is required to close a set of contacts connecting terminals 5 and 6; to produce a "0" bit it is required to open these contacts. The RCVR #2 readback input at the ARCA is connected across terminals 7 and 8 and is in the form of keying into a -12V supply in the RTIA unit. To produce a "1" bit in the RTIA, it is required to close a set of contacts connecting terminals 7 and 8; to produce a "0" it is required to open these contacts.

When using wire linkage (instead of radio) for tuning code and readback transmission, it is only necessary to make up and install a cable as shown in Detail A of Figure 2-2.

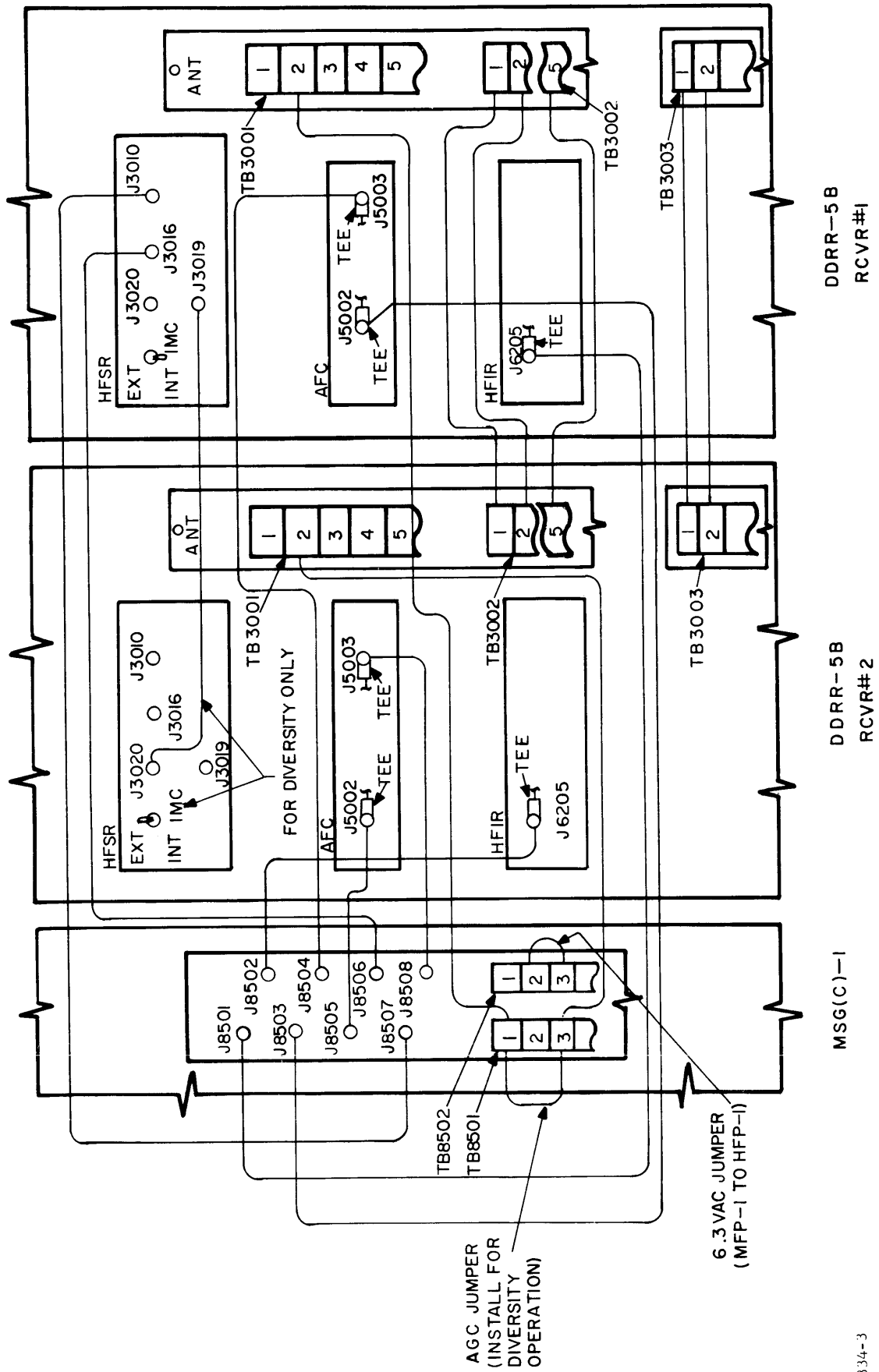
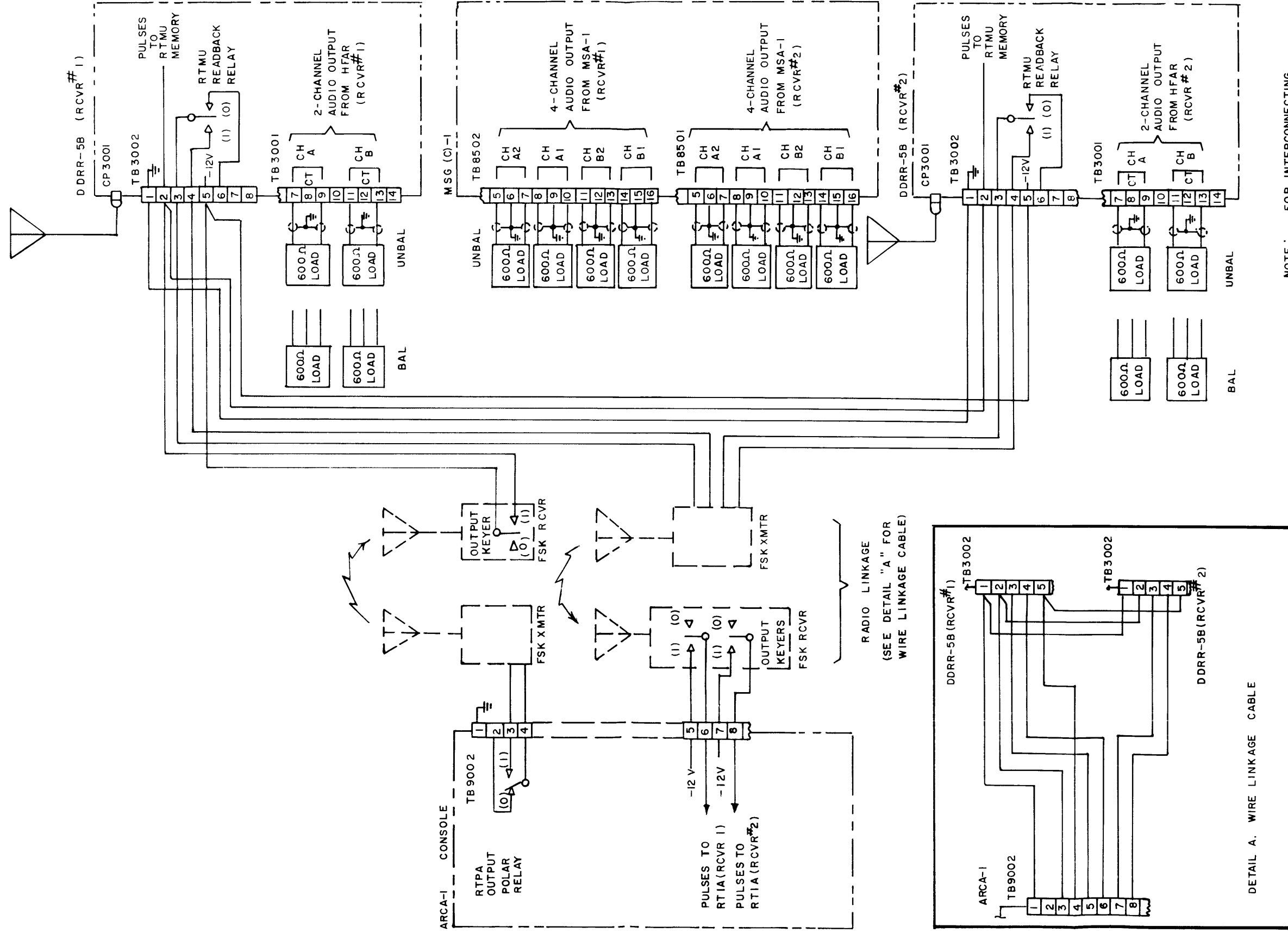


Figure 2-1. Interconnecting Cabling Diagram, DDDR-5B/
DDDR-5B/MSG(C)-1



NOTE: FOR INTERCONNECTING WIRING BETWEEN THE 2 DDRR-5B RECEIVERS AND MSG(C), SEE FIGURE 2-1

Figure 2-2. Connection Diagram, External Equipment to AN/FRR-72

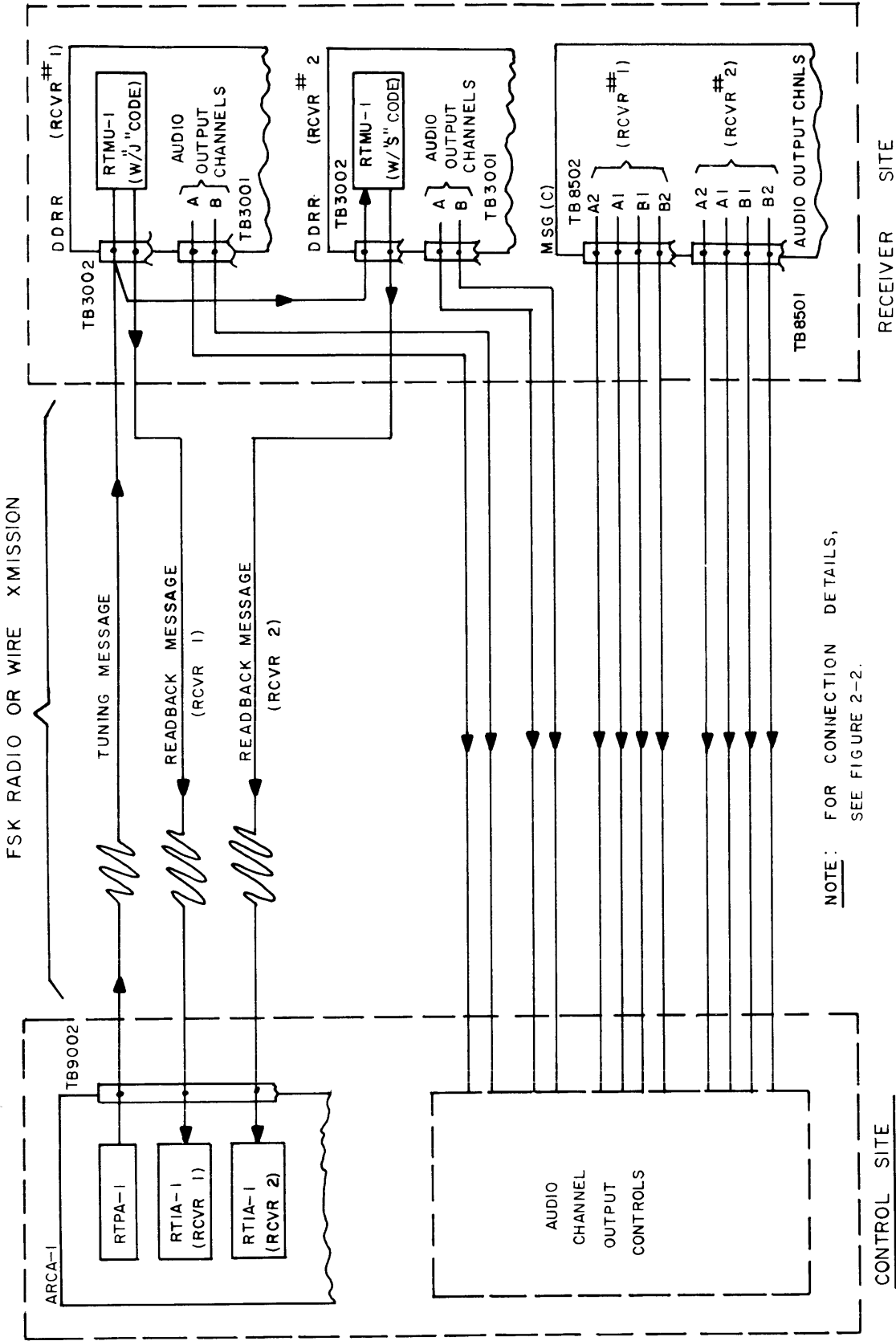


Figure 2-3. Linkage Diagram, AN/FRR-72

SECTION 3

OPERATOR'S SECTION

3-1 INTRODUCTION

This section contains general information and notes on the tuning of the remote receiver by the ARCA-1 Tape Automatic Receiver Remote Control System console. Detailed tuning instructions for the DDDR-5B and MSG(C)-1, together with all their capabilities are included in the individual technical manuals for those units (included in the shipment).

The remote control acts on the two DDDR-5B TechniMatic tuned receivers, the controls on the MSG (C)-1 Independent Receiving System having been preset at the receiver site if it is to be a 4-channel ISB tuning. Before operating the receivers by remote control, ascertain that the necessary controls on the DDDR-5B Receivers and the MSG(C)-1 have been preset as described in Section 2, paragraph 2-2e.

3-2 PUSH-BUTTON TUNING

a. FOR ALL SIGNALS. - Set DCP-2 MAIN POWER switch to ON. Set RTIA-1 Channel Frequency Indicator POWER switches to ON. POWER and READY lights will come on and a display of DDDR-5B control positions will appear in all the windows for both receivers. Set RTPA-1 Electronic Programmer operation switch to MANUAL PROGRAM. Set RTPA-1 PROGRAMMER POWER switch to ON. On the RTRS-1 Receiver Selector Panel, push the NO PUNCH button, then push either the 1 or 2 button (for receiver #1 or #2, respectively).

NOTE

Always start message with one receiver button. This sends the first receiver recognition code.

Then, starting from the left end of the RTPA-1 FUNCTION buttons, work towards the right, alternating FUNCTION buttons with their corresponding control position buttons*. Then push TUNE button and observe RTIA-1 panel for that receiver. The READY lamp will go out and the IN TUNE PROCESS lamp will light. The megacycle reading of the carrier frequency will proceed to move for about 15 seconds while the DDDR-5B servo correction loops work to lock the HFO onto the synthesizer. The other window readings will come up quickly. The IN TUNE PROCESS light will remain lit until the controls have stopped moving; then the READY light will come on again. Check the readings on the RTIA-1 panel; they should agree with the message sent at the RTPA-1 panel. If the RTIA-1 FAULT light is lit, the RTIA panel reading does not represent true control positions of the DDDR-5B and malfunctioning somewhere in the system is indicated.

NOTE

Include CH A IFBW button in all frequency selection messages. This code also energizes the receiver frequency selection servo motors.

In the AN/FRR-72 system, the audio outputs of the DDDR-5B units and MSG(C)-1 are routed back to the remote control station for on/off control of each channel at that site.

Example 1: To tune one DDDR-5B receiver for a 26.5781 megacycle carrier (suppressed or partial), SSB transmission with a 3.5-kc upper sideband to be routed to channel A audio output, with the AFC (Automatic Frequency Control) feature and an r-f gain setting of 8, push the RTRS-1 Receiver Selector "1" or "2" button, then press the following buttons:

MC 17-31, 26 MC 11; 100 KC, 5; 10KC,
7; 1 KC, 8; .1KC, 1; CH A IFBW, 3.5U;
CH A DET, SSB; CH B IFBW, 3.5U; CH B
DET, SSB; AFC, ON; RF GAIN, 8; TUNE.

*As each FUNCTION button is pushed, the corresponding control position button row will light up.

Then switch channel A in and channel B out at the local channel switching device.

Example 2: To tune one DDDR-5B receiver for a 16.5000 megacycle carrier (suppressed or partial), ISB 4-channel transmission, without the AFC feature, with an r-f gain setting of 9, first have the MSG(C)-1 Demultiplexer controls set for A1, A2, B2 and B1 channels per Table 2-1, push the RECEIVER SELECTOR button and then press the following buttons:

MC 2-16, 31 MC 16; 100KC, 5; 10KC,
0; 1 KC, 0; .1KC, 0; CH A IFBW; AFC, OFF;
RF GAIN, 9; TUNE.

Example 3: To tune one DDDR-5B receiver for a 3.4523 megacycle carrier, AM transmission with 3-kc sidebands, channel B output, without AFC and with AGC, push RTRS-1 Receiver Selector button "1" or "2" and then press the following buttons:

MC 2-16, 18 MC 3; 100KC, 4; 10KC,
5; 1KC, 2; .1KC, 3; CH A IFBW, 6;
CH A DET, AM; CH B IFBW, 6; CH B
DET, AM; AFC, OFF; RF GAIN, AGC;
TUNE.

Then switch channel A out and channel B in at the local channel switching device.

Example 4: To tune one DDDR-5B receiver for a 16.5000 megacycle carrier, AM transmission with 3-kc sidebands, single sideband reception, channel A output, with AFC and AGC, push Receiver Selector button "1" or "2" and then press the following buttons:

MC 2-16, 31 MC 16; 100KC, 5; 10KC,
0; 1 KC, 0; .1KC, 0; CH A IFBW, 3.5U;
CH A DET, SSB; CH B IF BW, 3.5U;
CH B DET, SSB; AFC, ON; RF GAIN, AGC; TUNE.

Then switch channel A in and channel B out at the local channel switching device.

NOTE

Generally one sideband will give good reception on an AM transmission. If the 3.5U settings do not give a clear signal, switch channel A out and channel B in. If necessary, adjust carrier frequency tuning to lock AFC as described in paragraph 3-2d.

If tuning for diversity reception, tune the other DDDR-5B in the same manner.

New tuning instructions or changes may be sent out as soon as the READY lamp lights on the RTIA panel for that receiver.

b. CHANGES OR CORRECTIONS. - For changes or corrections in the tuning instructions, push the proper RTRS-1 Receiver Selector button (1 or 2) and then push only those buttons involving the change, first pushing the FUNCTION button and then its new position button. Then push the TUNE button. The RTIA readback panel will show the change that was made. For changing the carrier frequency, however, start with the extreme left FUNCTION MC button (either the MC 2-16 or the MC 17-31) and then proceed alternating position buttons with FUNCTION buttons through the CH A IFBW button, then the TUNE button.

c. SIMULTANEOUS TAPE RECORDING. - If it is desired to record the message on punched tape or card at the same time, insert the tape or card in the RTKY-1 Perforator-Reader as described in the RTKY-1 technical manual, set RTPA-1 operation switch to MANUAL PROGRAM/TAPE PUNCH, PUNCH READER POWER switch to ON, push RTRS-1 PUNCH button, the "1" or "2" button and proceed as for push-button tuning instructions in paragraph 3-2a. Then set PUNCH READER POWER switch to OFF, and push RTRS-1 NO PUNCH button.

d. AFC ADJUSTMENT. - When using the AFC feature, sometimes it is necessary, as indicated by a slow, wavering tone in the audio output, that the AFC unit has not "locked onto" the carrier. It may then be necessary to change the .1kc

control position to 1 unit higher or lower, before signal steadies. To do this, press the RTRS-1 "1" or "2" button, the AFC button, the OFF button, then the .1KC button, the new position button, the CHA IFBW button, the AFC button, the ON button, then the TUNE button.

3-3. PRE-PROGRAMMED TUNING

a. PRE-PROGRAMMING ON TAPE OR CARD. - Insert the tape or card into the RTKY-1 Perforator-Reader as described in the RTKY-1 Technical Manual. Set the RTPA-1 operation switch to TAPE PUNCH and set the PUNCH READER POWER switch to ON. Push the RTRS-1 PUNCH button. Proceed as for manual push-button tuning, first pressing the RTRS-1 "1" or "2" button, then the message buttons, then the TUNE button. Set the PUNCH READER POWER switch to OFF and push RTRS-1 NO PUNCH button.

b. TAPE TUNING. - Set the RTPA-1 operation switch to TAPE READER and push the RTRS-1 PUNCH button. Set the RTPA-1 PUNCH READER POWER switch to ON. Insert the tape or card into the RTKY-1 Perforator-Reader as described in the RTKY-1 Technical Manual. Observe the RTIA-1 monitor panel; insertion of the tape or card will send the message. The RTIA-1 indicators will come up with the pre-programmed control settings. If there are a series of messages on the tape or card, press the RTPA-1 TAPE READ button to send each successive message. If there is a timer (plugged into the RTPA-1 TIMER jack) employed to send a series of messages, the timer will energize each message transmission.

3-4. DIVERSITY TUNING

To operate both receivers in space diversity, tune both receivers with identical messages. To operate both receivers in frequency diversity, tune each receiver with an identical message except for the frequency figure. Both receivers may be operated independently in non-diversity, if desired.