UNCLASSIFIED

CURRICULUM

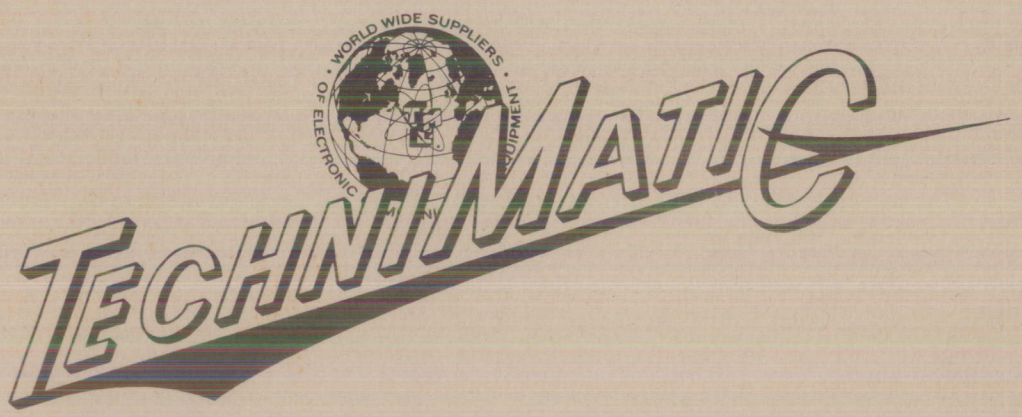
for

COURSE NUMBER SIX

AUTOMATED RECEIVER SYSTEM DDRR-5B1

with

PROGRAMMER RTPH-1
RECEIVER SELECTOR RTRS-216
REMOTE INDICATOR RTIH-1
PERFORATOR/READER RTKY



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y. OTTAWA, ONTARIO

Curriculum

for

Course Number Six

Automated Receiver System DDRR-531

with

Programmer RTPH-1
Remote Indicator RTIH-1
Receiver Selector RTRS-216
Perforator/Reader RTKY

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William P. Henneberry
Director of Training

I The purpose of this course is:

a. To provide military and civilian personnel who have a background in electronics (military: equivalent to electronic "A" school, civilian: equivalent to C.R.E.I. electronic course) with:
   1. Instruction on circuit theory of the DDRR-5B1 remote controlled receiver and its associated equipment; RTPH-1, RTIH-1 RTRS-216 and RTKY.
   2. Training in proper maintenance, alignment and repair procedures for the system.
   3. Instruction and laboratory work in location and correction of equipment failures.

b. Upon compleation of the course the successful student will be capable of, operation, properly aligning and performing corrective and operational maintenance of the system. He will be in all respects qualified to maintain the system in a satisfactory condition of Operational Readiness.

II General Information

This course consists of classroom and laboratory instruction. Classroom instruction consists of lectures on circuit theory and demonstrations on the equipment. Laboratory instruction consists of complete alignment and trouble shooting of circuits previously covered in lectures. A logical procedure for locating troubles by application of knowledge gained during the course is emphasized.

This course is of four weeks duration. Lectures and laboratory are broken up throughout the course. Safety precautions are stressed throughout the course.

III Allocation of Time

		No. Days
A. Fundamental Receiver DDR-5		
Lesson #1	General Orentation	¼
Lesson #2	HFI-1 IF Amplifier	1
Lesson #3	HNF-1 Variable Notch Filter	¼
Lesson #4	HFA-1 Detector and Audio Amp.	½
Lesson #5	DVM-4 Diversity Visual Monitor	¼
Lesson #6	AFC-3 Automatic Freq. Control	½
Lesson #7	HFS-1 Synthesizer	3½
Lesson #8	HFR-1 RF Tuner	1½
Lesson #9	HFP-1 Power Supply	¼
Lesson #10	Operation of System	½
Lesson #11	Interconnection of System	¼
Lesson #12	DDR-5A Checkout Procedure	¼
Lesson #13	DDR-5B Checkout Procedure	1
B. Automated Systems		
Lesson #1.	Introduction and Operation	½
Lesson #2	Logic and Circuits	2
Lesson #3	RTRS-216 Receiver Selector	½
Lesson #4	RTPH-1 Programmer	1
Lesson #5	RTMU-2 Converter (memory)	2
Lesson #6	RTTD-1 Decoder and Auto Controls	1
Lesson #7	RTMU-2 Converter (readback)	1
Lesson #8	RTIH-1 Remote Freq. Indicator	1
Lesson #9	RTKY Perforator/Reader	½
Lesson #10	Systems and Interconnections	½

First WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
0800 0915	Lesson #1 General Orientation	Lesson #7 (cont.) Theory of Basic Section	Lesson #7 (cont) Theory of HF section	Lesson #7 (cont) Alignment of HF section	Lesson #8 HFRR-1 Block diagram	
0930 1020		Alignment of basic section				
1030 1130	Lesson #7 HFSR-1 Synthesizer				Theory of Operation	
LUNCH						
1230 1320		Block of HF section	Theory of Phase detector	Trouble shooting HFSR-1	Alignment of HFRR-1	
1330 1420	Basic Block Diagram					
1440 1600			Theory of 250 Kc regen. divider			

Second WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
0800 0915	Lesson #8 (cont) HFRR-1 Alignment	Lesson #2 Alignment of HFIR-1	Lesson #4 HFAR-1 Block Diagram	Lesson #9 HFPR-1 Power Supply	Lesson #13 System Checkout of System	
0930 1020			Theory of Operation HFAR-1			
1030 1130		Lesson #6 AFC-3 Block Diagram	Alignment of HFAR-1	Lesson #3 HNF-1 Block Diagram		
LUNCH						
1230 1320	Lesson #2 HFIR-1 Block diagram	Theory of Operation AFC-3	Frequency Calibration with WWV or CHU	Theory of Operation and alignment HNF-1	Lesson #11 Interconnection of Systems	
1330 1420	Theory of Operation	Alignment AFC-3	Lesson #5 DVM-4 Block diagram	HAF-1 Passive Audio Filter		
1440 1600			Theory of Operation DVM-4 and Alignment	Lesson #13 Demonstration of System Checkout	Review	

Third WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
0800 0915	Lesson #1 Automated System Introduction	Lesson #2 (cont.)	Lesson #2 (cont.)	Lesson #4 (cont.)	Lesson #5 RTMU-2 (Memory) Converter	
0930 1020	↓	↓	↓	↓	↓	
1030 1130	DDRR-5B Operation ↓	↓	↓	↓	↓	
LUNCH						
1230 1320	Lesson #2 Logic and Circuits	↓	Lesson #3 RTRS-216 Receiver Selector	↓	↓	
1330 1420	↓	↓	↓	↓	↓	
1440 1600	↓	↓	Lesson #4 RTPH-1 Programmer	↓	↓	

Fourth WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
0800 0915	Lesson #5 (cont.) RTMU-2	Lesson #6 RTTD-1 Decoder	Lesson #7 RTMU-2 (readback) Converter	Lesson #8 RTIH-1 Remote Indicator	Lesson #9 RTKY Perforator Reader	
0930 1020	↓	↓	↓	↓	↓	
1030 1130	↓	Receiver Automated Controls	↓	↓	↓	
LUNCH						
1230 1320	↓	↓	↓	↓	Lesson #10 Systems and Interconnection	
1330 1420	↓	↓	↓	↓	↓	
1440 1600	↓	↓	↓	↓	↓	

IV Technical Manuals, Drawings and Materials

A. DDRR-5B1 Technical Manual
B. DDR-5BR, DDR-5BR-1 Manual
C. DDR-5B Technical Manual
D. RTRS-1 " "
E. RTPH-1 " "
F. RTKY " " "
G. RTIH-1 " "
H. RTRS-216 " " "
I. Technical Information for Remote control groups Manual
J. Trainee Handouts
K. Smooth Notebooks
L. Lined scratch pads.
M. Pencils and pens.

V. Training Aids

A. Chalk Board
B. Mock-up of switches
C. Simplified Drawings
D. Lesson Plan Guide

VI. Test Equipment or Equivalants

A.Frequency Counter H.P. MOD. 5246
B.Dual Trace Scope Tecktronic Mod. 545
C.RF Signal Generator Measurements Mod. 82
D.Daven Attenuator
E.Teletype Machine AN/FGC-24
F.VTVM H.P. Mod.410B
G.VOM Simpson Mod. 260
H.VTVM Ballintine Mod. 314
I.Special Tools TMC Kit #170
J.Printed circuit extender cards

Fundamental Receiver ODR-5B

Lesson #1 General Orentation

A. General Orentation
1. RF Tuner HRF-1
2. Synthesizer HFS-1
3. IF Amplifier HFI-1
4. Notch Filter HNF-1
5. Automatic Frequency Control AFC-3
6. Detector and Audio Unit HFA-1
7. Passive Audio Filter HAF-1
8. Diversity Visual Monitor DVM-4
9. Power Supply HFP-1
10. Other Units

Lesson #2 IF Amplifier HFI-1

A. General Discussion- Block Diagram
B. Second Converter and IF Amplifier
C. IF Amplifier Strips
D. AGC and Manual Gain Control
E. Interconnection
F. Alignment Procedures
G. Resistance Checks
H. Voltage Measurements (static)
I. Voltage Measurements (dynamic)

Lesson #3 Variable Notch Filter HNF-1

A. Principles of Operation
B. Example of Translations
C. Interconnection
D. Alignment
E. Resistance Checks
F. Voltage Measurements (static)

Lesson #4 Detector and Audio Amplifier HFA-1

A. General Discussion
B. Theory of Operation
1. Audio Amplifier Chain
2. Beat Frequency Oscillator
3. CW Mode of Operation
4. AM Mode of Operation
5. SSB Mode of Operation
6. Hum Balance Controls
C. Interconnections
D. Resistance Checks
E. Voltages (static)
F. Voltages (dynamic)
G. Alignment Procedures

Lesson #5 Diversity Visual Monitor DVM-4

A. General Description
B. Block Diagram
C. Discussion of Block Diagram
D. Theory of Operation
   1. Power Supply
   2. Sawtooth Oscillator
   3. Blanking Circuit
   4. Horizontal Amplifier
   5. Reactance Modulator and Sweep Oscillator
   6. Calibration Marker Oscillator and Mixer
   7. If Amplifier, Detector and Peak Limiter
   8. Vertical Deflection Circuits
E. Alignment and Test Procedures

Lesson #6 Automatic Frequency Control AFC-3

A. General Description
B. Theory of Operation
   1. IF Input and Carrier Amplifiers
   2. Carrier Level Meter
   3. RCC/Osc Selector Switch
   4. Phase Detector
   5. Relay Amplifier
   6. Drift Meter
   7. Automatic Gain Control
   8. Drift Alarm
   9. Memory or Delay
   10. Product Detector
   11. Converter Injection Oscillator
   12. Control Functions
C. Voltage Measurements (Dynamic)
D. Voltage Measurements (static)
E. Alignment Procedure

Lesson #7 Synthesizer HFS-1

A. General Description and Orentation
B. Principles of Operation
C. Detailed Discussion of Circuitry
   1. Breakdown of Circuits
   2. Simplified Schematics
   3. Blocking Oscillator
   4. Basic Phase Detector
   5. Basic Phantastron Didider
   6. 3100 Deck
   7. 3200 Deck
   8. 3300 Deck
   9. 3400 Deck
   10. 3500/3600 Decks
   11. 3700 Deck
   12. 3000 Circuits
D. Alignment, Testing amd Troubleshooting
E. Voltage Checks

Lesson #8 RF Tuner HFR-1

A. General Description
B. Detailed Discussion of Circuitry
   1. Input and RF Amplifier Chain
   2. First Mixer
   3. HFO and Isolation Amplifier
   4. IF and Noise Silencer Circuits
   5. Alignment Generator Circuits
   6. Sync Meter Amplifier
C. Alignment, Troubleshooting and Testing.

Lesson #9 Power Supply HFP-1

A. General
B. Fuse Location
C. DC Voltage Charts

Lesson #10 Operation of the System

A. Preliminary
B. Operation

Lesson #11 Interconnection

A. Introduction and Presentation

Lesson #12 DDR5A Checkout Procedure

A. Preliminary
B. Checkout Procedure
   1. Switch Positions
   2. Check of B+
   3. HFS-1
   4. AFC-3
   5. HFI-1
   6. AGC Decay
   7. HFA-1
   8. HAF-1
   9. Sensitivity and AGC
  10. Signal plus Noise/ Noise Test
  11. Final Noise Silencer Check
  12. Two Tone Test
  13. HNF-1
  14 Thru 23 Receiver #2
  24. DVM-4
  25. AGC Combined

Lesson #13 DDR-5B Checkout Procedure

A. Preliminary
B. Checkout Procedure
   1. Switch Positions
   2. Check of B+
   3. HFS-1
   4. AFC-3
   5. HFI-1
   6. AGC Decay
   7. HFA-1
   8. HAF-1
   9. Sensitivity and AGC Check
   10. Signal plus Noise/ Noise Test
   11. Final Noise Silencer Check
   12. Two Tone Test
   13. HNF-1
   14. Maintenance Checkoff Sheets.

Automated Systems

Lesson #1 Introduction

1. Nomenclatures
2. Specifications
3. Operation of
   a. RTRS-216
   b. RTPH-1
   c. RTKY

Lesson #2 Basic Logic Circuits

1. Basic transistors
2. TTY code & system
3. Circuit symbols
4. Logic circuits
   a. NW-104 NAND gate
   b. NW-105 Inverters
   c. NW-107 Flip-flops
   d. NW-108 And gate
   e. NW-109 Buffer amp.
   f. NW-110 Relay driver
   g. NW-111 One shot MV
   h. NW-112 + emitter fol.
   i. NW-113 Clock gem.
   j. NW-114 Level trigger
   k. NW-116 Clock gen.
   l. NW-118 Comp. Emit. Fol.
   m. NW-119 NOR gate
   n. NW-120 Double Emitter Fol.
   o. NW-121 OR gate
   p. Memory core module

Lesson #3 RTRS-216 Receiver Selector

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Block Diagram

2. Circuit Theory
   a. Simplified switchs
   b. Theory of logic operation

3. Operation of Unit

4. Alignment Procedures

5. Corrective and Preventive Maintenance

Lesson #4 RTPH-1 Programmer

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Block Diagram

2. Circuit Theory
   a. Keyboard circuits
   b. Relay Circuits
   c. Theory of Logic operation

3. Operation of Unit

4. Alignment Procedure

5. Corrective and Preventive Maintenance

Lesson #5 RTMU-2 Converter (memory)

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Block Diagram

2. Circuit Theory
   Theory of Logic Operation

3. Alignment Procedure

4. Corrective and preventive Maintenance

Lesson #6 RTTD-1 Decoder

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Block Diagram

2. Circuit Theory
   a. Relay Sequence
   b. Theory of Operation

3. Test Procedure

4. Receiver Automated Controls
   a. Basic Switch Operation
   b. HFBR Controls
   c. HFSR Controls
   d. HFIR Controls
   e. HFAR Controls
   f. AFC-3 Controls
   g. Miscellaneous Units
   h. Systems Operation

Lesson #7 RTMU-2 Converter (readback)

1. General Orentation
   Block Diagram

2. Circuit Theory
   Theory of Logic Operation

3. Alignment and Test Procedures

4. Corrective and Preventive Maintenance

Lesson #8 RTIR-1 Remote Indicator

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Readback Logic Code
   d. Block Diagram

2. Circuit Theory

   a. Timing Charts
   b. Theory of Logic Operation

3. Alignment and Test Procedure

4. Corrective and Preventive Maintenance

Lesson #9 RTKY Perforator/Reader

1. General Orentation
   a. General Description
   b. Technical Specifications
   c. Mechanical Construction

2. Circuit Theory

3. Operation

4. Corrective and Preventive Maintenance

Lesson #10 Systems and Interconnections

1. General Orentation
   a. General Descriptions
   b. Technical Capabilities
   c. Block Diagrams
   d. Wiring Details
   e. Modification Kits.