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# PRELIMINARY

PRELIMINARY

TECHNICAL MANUAL

for

GENERAL PURPOSE RECEIVER

MODEL DDR-7A


THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

# TECHNICAL MANUAL

for

# GENERAL PURPOSE RECEIVER

# MODEL DDR-7A

# SYSTEM

The Technical Materiel Corporation

Mamaroneck, N.Y. Ottawa, Ontario

# GENERAL PURPOSE RECEIVER, MODEL DDR-7A

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This manual is compiled of the following modular manuals:

# DDR-7A SYSTEM DESCRIPTION

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## LIST OF ILLUSTRATIONS

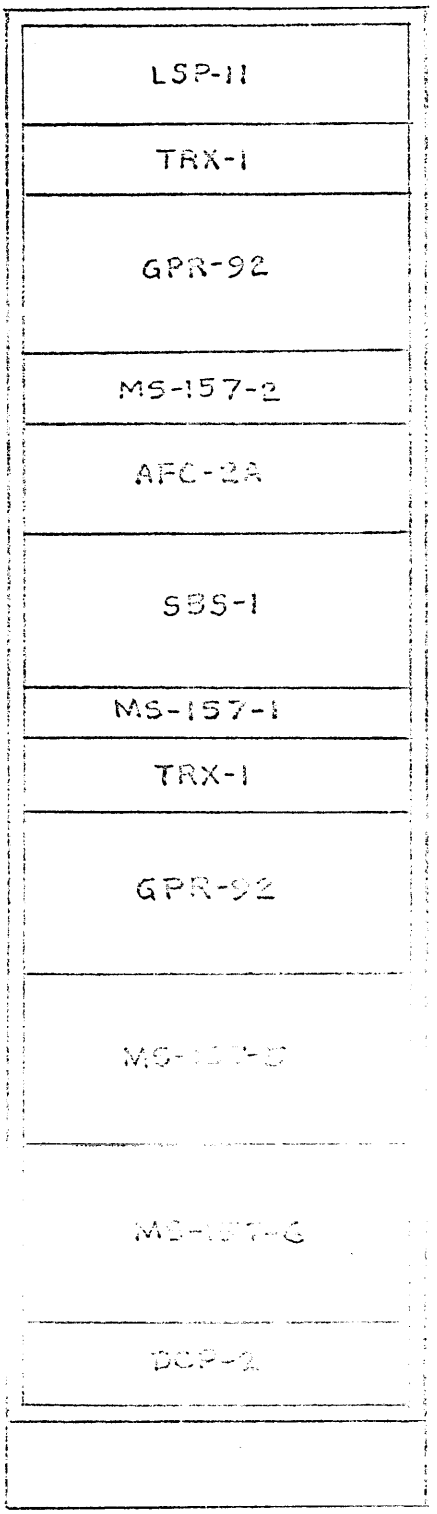



Figure I-1-1. General Purpose Receiver, Model DDR-7A

SECTION 1

GENERAL DESCRIPTION

## I-1-1. FUNCTION

Model DDR-7A, General Purpose Receiver, receives AM, SSB, ISB, CW, MCW and FSK transmission. Reception mode is selected by front panel controls. The input frequency range is 0.54- to 31.5-mc in six bands. Output provisions include two speakers, two 600-ohm audio output connections, and one headset jack. An added facility is an additional receiver (GPR-92) and precision oscillator (TRX-1) which may be switched in quickly in case of emergency.

Tuning is provided with full electrical/mechanical bandspread. Upper and/or lower sidebands may be selected for SSB or ISB reception with partial or suppressed carrier. For SSB and ISB modes of reception with carrier suppression up to 30-db, automatic frequency control (AFC) compensation is available. The AFC circuit "locks" onto the carrier and compensates for frequency drift originating in the transmitter and/or receiver, producing audio output accurate to within 1 cps.

Referring to figure I-1-1 and reading from top to bottom, the DDR-7A is made up of the following modular units:

LSP-11 Loudspeaker Panel
TRX-1 Crystal Oscillator
GPR-92 Receiver
*AFC-2A Automatic Frequency Control
*SBS-1 Sideband Selector
TRX-1 Crystal Oscillator (standby)
GPR-92 Receiver (standby)
DCP-2 Power Control Panel

* Part of SBC-1 Sideband Converter

The GPR-92 is used for tuning in the r-f stage and amplifying the r-f and i-f stages. TRX-1 Crystal Oscillator supplies the GPR-92 with crystal-controlled HFO and IFO. The i-f stage from the GPR-92 is routed to the SBS-1 Sideband Selector which is used to select upper and/or lower sideband, both sidebands and carrier (AM and MCW), or carrier (CW). The AFC-2A taps off a portion of the carrier frequency in the SBS-1 and feeds it back in a corrected frequency to compensate for transmitter/receiver drift. The next two units, GPR-92 and TRX-1, are standby units for emergency operation. The DCP-2 Power Control Panel supplies power to the system.

## I-1-2. ELECTRICAL CHARACTERISTICS

**Frequency range:** 0.54 - 31.5 megacycles in six bands:

| Band | Range (mc) |
|---|---|
| 1 | .54 - 1.4 |
| 2 | 1.4 - 3.3 |
| 3 | 3.3 - 5.6 |
| 4 | 5.6 - 9.5 |
| 5 | 9.5 - 17.5 |
| 6 | 17.3- 32.3 |

**Types of reception:** AM, SSB, ISB, CW and FSK

**Antenna Input:** Connection for 70-ohm unbalanced transmission line.

**Audio output connections:**
A. High Level: Two 0- to 1-watt balanced 600-ohm audio channels.
B. Low Level: Two 0- to 1-mw balanced 600-ohm audio channels.

**AFC characteristics:** Will synchronize with a 20-db (max) suppressed carrier with a max drift rate of ± 10 cps/second, through a max drift range of 1-kc.

**AFC accuracy:** Less than 1-cycle error in audio output.

| | |
|---|---|
| AFC drift alarm: | Drift alarm light and meter indicates carrier error in approaching 750 cps. |
| AFC fade alarm: | Fade alarm light and meter indicates carrier interruption or fade. |
| Audio response: | 100- to 22,000-cps within $\pm$ 1.5 db. |
| Sideband bandwidths: | 250- to 7500-cps within $\pm$ 1.5 db.<br>250- to 3300-cps within $\pm$ 1.5 db |
| Unwanted sideband rejection: | At least 60 db |

## SECTION 2

## INSTALLATION

### I-2-1. INITIAL INSPECTION

Unpack the equipment carefully. Inspect all packing material for parts which may have been shipped as "loose items." With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

### I-2-2. ASSEMBLY OF RECEIVER

Refer to Figure I-1-1 for locations of modular units and blank panels in the rack. Follow this general procedure for installing slide-mounted units:

(1) Set the unit in position on the tracks.

(2) Slide the unit on the tracks until the release button catches.

(3) Press the release buttons and push the unit into the rack until the release buttons engage in the holes in the equipment.

(4) When all units have been installed and cabled, press the release buttons and push the unit into the rack.

Install interconnecting cables in accordance with Figure I-2-1.

REDUCE TO 13-1/8

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK
WIRING DIAGRAM, DDR-7A | CK-627

LSP-11

1 2 3 4

TB 701

1 2 6 7

AX-416

TRX-1

IFO

EXT HFO

HFO

BFO

J701

P701

P/O TRX-1

1 (CA-748) 2 3

GPR-92

BFO IN

HFO IN

ANT

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

IF OUT 1

IF OUT 2

IFO IN

J702

P702

P/O GPR-92

3 2 (CA-748) 5 13 (CA-747) 1

AFC

J703

P703

P/O SBS

J5001

J5000

J5002

J5003

12 11 14 10

(CA-747)

SBS

14

J704

P704

P/O TRX-1

J6800

J6802

J6804

J6806

J6801

J6803

J6805

E6800

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

TB-702

1 2 3 4 5 6 7 8 9

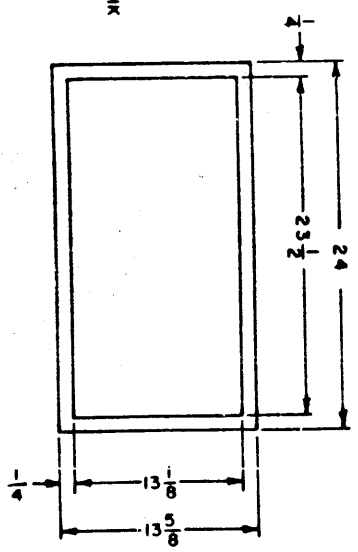
(CA-747) 13 10 11 12

J705

P705

LAMINATING DETAIL

MAT'L:
VINYL PLASTIC .015 THK

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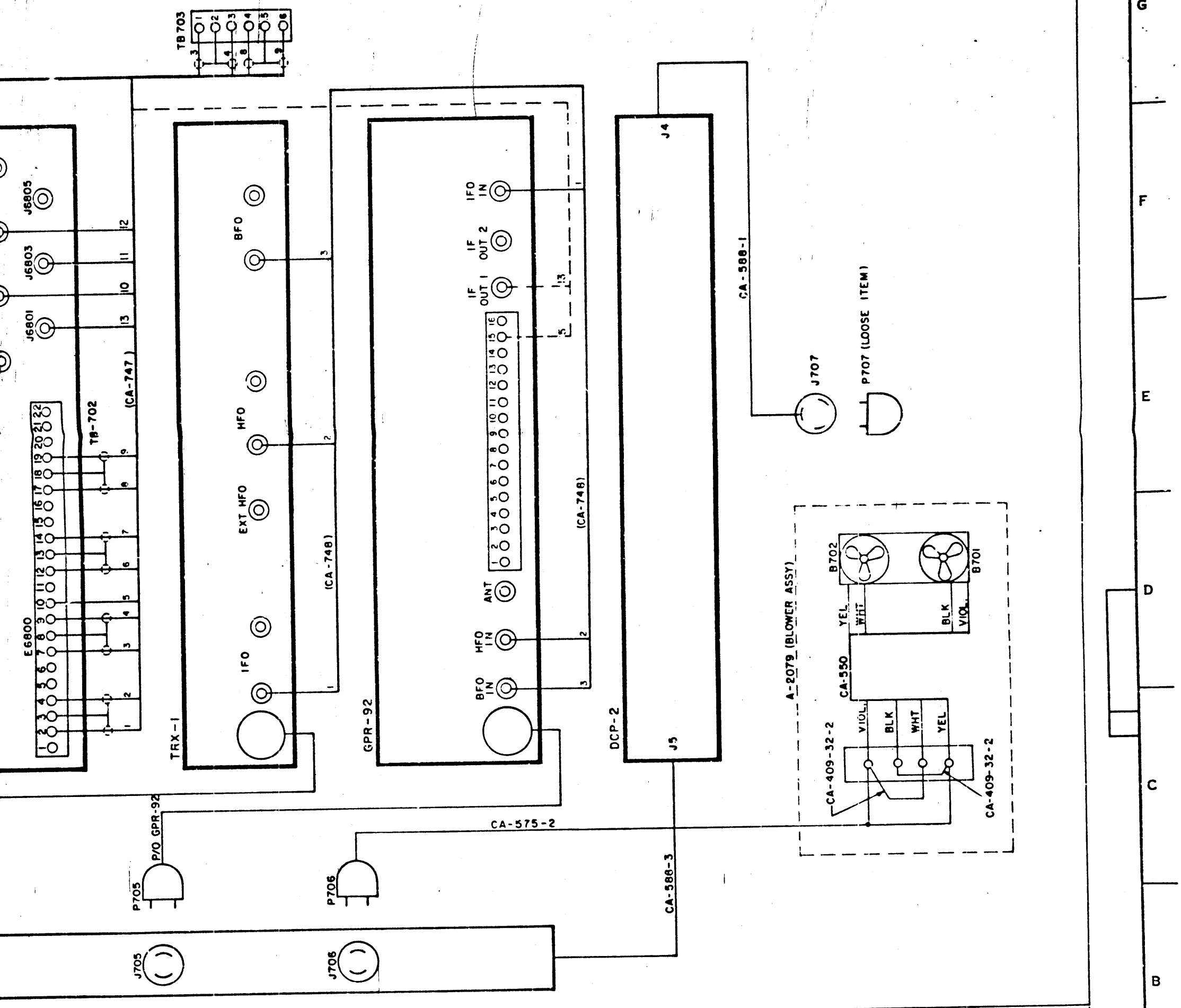


REDUCE TO 23-1/2

SEP 6 - 1963

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NOTES

DDR-7A

| QTY/UNIT | MODEL DESIGNATION | ASS'Y. NO. |
|---|---|---|
| SCALE | CODE | |

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| REQ'D | ITEM | PART NUMBER | DESCRIPTION | SYMBOL |
|---|---|---|---|---|
| STROMER | | LIST OF MATERIAL | | |

MATERIAL

PINION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

DECIMALS: X ± .09, .XX ± .01, .XXX ± .005
TOLERANCES
FRACTIONS ± 1/64
ANGLES ± 0° 30'

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

TITLE
WIRING DIAGRAM, DDR-7A

| | NAME | DATE |
|---|---|---|
| DRAWN | T. RAMIREZ | 3/6/63 |
| CHECKED | | 3/6/63 |
| ENGR. APPR. | | 3-7-63 |
| MFG. APPR. | | 3-18-63 |
| FINAL APPROVAL | | DATE |

CK-627

REV. LTR

SECTION 3

OPERATOR'S SECTION

## I-3-1. INTRODUCTION

The DDR-7A offers a variety of tuning methods to the operator. The GPR-92 Receiver may be used by itself to tune-in a CW or MCW signal. The TRX-1 Crystal Oscillator may be added to furnish oven-mounted crystal-controlled HFO, IFO and BFO, if desired. For SS Band ISB, the SBS-1 Sideband Selector selects upper and/or lower sidebands and routes them to audio output channels A and/or B. Channel A output is connected to the left speaker in LSP-11 speaker panel; Channel B is connected to the right speaker. SBS-1 Channel A and B 600-ohm HIGH or LOW level outputs are also available. In addition, the AFC-2A Automatic Frequency Control unit may be switched in to compensate for transmitter/receiver drift with carrier suppressed down to 30 db. For AM reception, two methods may be used. The first is to use the SBS-1 Sideband Selector for conventional diode detection of the entire modulated envelope (carrier and both sidebands.) In this case the output is routed to both speakers. The second method is to use the SBS-1 to select either upper or lower sideband from the AM signal and route it through channel A or B output and speaker. In the latter method, the AFC-2A may be used to control transmitter/receiver drift. A "cleaner" CW signal may sometimes be received by using the SBS-1; in this case the TRX-1 BFO cannot be used. MCW may be tuned in by two methods, using the SBS-1, in the same manner as AM, i.e.: detecting from the modulated envelope or selecting one sideband tone. FSK may be tuned in by any of the methods used for CW except that the receiver is tuned for the center frequency. The AFC-2A cannot be used for CW

reception. Operation procedure, as described in paragraph I-3-2, gives a brief outline of sequence of modular component tuning for the above methods.

I-3-2. OPERATION PROCEDURE

a. GENERAL - In all modes of reception (with full, partial or suppressed carrier) the GPR-92 is first tuned to the carrier frequency. In the case of FSK, it is tuned to the center frequency.

b. CW RECEPTION -

(1) Using GPR-92 Alone. - Set SBS-1 POWER switch to STANDBY. Set TRX-1 HFO and BFO controls to OFF. Refer to GPR-92 Manual for tuning in CW signal. Use GPR-92 PHONES jack output and BFO PITCH control to vary tone, if desired.

(2) Using GPR-92 and TRX-1. - Set SBS-1 POWER switch to STANDBY. Refer to TRX-1 manual and set HFO switch for carrier frequency and BFO switch to A or B. Refer to GPR-92 Manual for tuning in CW signal with external HFO, IFO and BFO. Use GPR-92 PHONES jack output. BFO PITCH control on GPR-92 is inoperative.

(3) Using GPR-92, TRX-1 and SBS-1. - Refer to TRX-1 manual and set HFO switch for carrier frequency and BFO switch to A or B position. Refer to GPR-92 Manual for tuning CW signals with external HFO, IFO and BFO. Refer to SBS-1 manual for tuning CW signals. Use SBS-1 PHONES output. BFO PITCH control on GPR-92 is inoperative.

c. MCW RECEPTION -

(1) Using GPR-92 Alone. - Set SBS-1 POWER switch to STANDBY. Set TRX-1 HFO and BFO switches to OFF. Refer to GPR-92 Manual for tuning in AM signal. Use GPR-92 PHONES jack output.

(2) Using GPR-92 and TRX-1. - Set SBS-1 POWER switch to STANDBY. Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency

and TRX-1 BFO switch to OFF. Refer to GPR-92 Manual for tuning in AM with external HFO and IFO. Use GPR-92 PHONES jack output.

(3) Using GPR-92, TRX-1 and SBS-1, AM Detection. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and TRX-1 BFO switch to OFF. Refer to GPR-92 Manual for tuning in AM with external HFO and IFO. Refer to SBS-1 Manual for tuning in AM signals. Signal will come out on both speakers.

(4) Using GPR-92, TRX-1 and SBS-1, Sideband Detection. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and TRX-1 BFO switch to OFF. Refer to GPR-92 Manual for tuning in AM with external HFO and IFO. Refer to SBS-1 Manual for tuning in SSB signals. Signal may be brought out on Channel A or B speaker or output.

d. SSB RECEPTION

(1) Using GPR-92, TRX-1, SBS-1 and AFC-2A. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and BFO switch to OFF. Refer to GPR-92 Manual for tuning in SSB with external HFO and IFO. Refer to SBS-1 Manual for tuning in SSB signals. Signal may be brought out on Channel A or B speaker or output. If desired, AFC may be employed; refer to SBC-1 Manual for setting SBS-1 and AFC-2A controls for AFC.

e. ISB RECEPTION

(1) Using GPR-92, TRX-1, SBS-1 and AFC-2A. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and BFO switch to OFF. Refer to GPR-92 Manual for tuning SSB with external HFO and IFO. Refer to SBS-1 Manual for tuning in ISB signals. Signals will come out on Channels A and B outputs. If desired, AFC may be employed; refer to

SBC-1 Manual for setting SBS-1 and AFC-2A controls for AFC.

f. AM RECEPTION

(1) Using GPR-92, TRX-1 and SBS-1, AM Detection. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and BFO switch to OFF. Refer to GPR-92 Manual for tuning AM with external HFO and IFO. Refer to SBS-1 Manual for tuning in AM signals. Signal will come out on Channels A and B outputs or speakers.

(2) Using GPR-92, TRX-1 and SBS-1, Sideband Detection. - Refer to TRX-1 Manual and set TRX-1 HFO switch for carrier frequency and BFO switch to OFF. Refer to GPR-92 Manual for tuning SSB with external HFO and IFO. Refer to SBS-1 Manual for tuning in SSB signals and tune SBS-1 for upper or lower sideband (whichever gives the clearest signal.) Signal can be switched to come out on Channel A or B speaker or output. If desired, AFC may be employed; refer to SBC-1 Manual for setting SBS-1 and AFC-2A controls for AFC.

g. FSK RECEPTION

(1) Using GPR-92 and TRX-1. - Set SBS-1 POWER switch to STANDBY. Set TRX-1 HFO switch for center frequency and TRX-1 BFO switch to OFF. Refer to GPR-92 Manual for tuning in CW with external HFO and IFO. Adjust BFO pitch to bring in mark and space signals, using GPR-92 PHONES output as monitor.

(2) Using GPR-92, TRX-1 and SSB-1. - Set TRX-1 HFO switch for center frequency and TRX-1 BFO switch to OFF. Refer to GPR-92 Manual for tuning in CW with external HFO and IFO. Refer to SBS-1 Manual for tuning for SSB with suppressed carrier. Signal can be switched to come out on Channel A or B output.