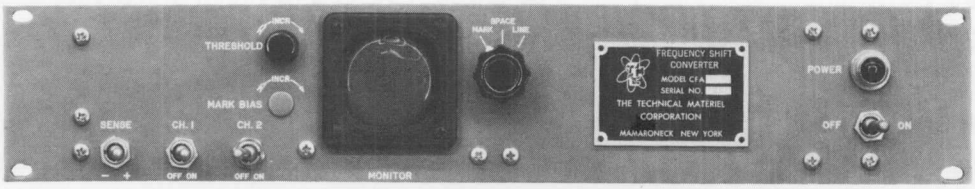
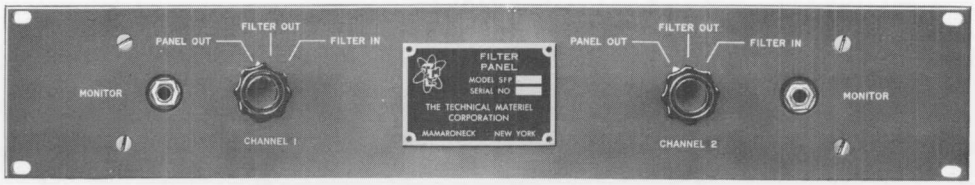
TECHNICAL BULLETIN NUMBER 4008

Frequency Shift Converters
TMC Models CFA-1
CFA-1L
CFA-1LB
CV-763/URR

Filter Panel
TMC Model SFP-2



MODEL CFA-1 FREQUENCY SHIFT CONVERTER



MODEL SFP-2 FILTER PANEL

Model CFA Series Frequency Shift Converters are designed to convert "mark" and "space" audio tones from diversity or single receiver outputs in radio-teletype frequency shift receiving systems into DC pulses capable of operating a teleprinter, tape recorder, or any other device requiring make and break signals. The CFA models contain comparison circuitry to select the better of two signals in diversity, or they may be used to convert a single receiver output into DC signals.

Model CFA-1 accepts frequency shifts up to 1000 cps, providing optimum performance at the standard shift of 850 cps. The CFA-1 will continue to provide uninterrupted output with circuit drift of $\pm$ 750 cps.

Where adjacent channel or in band interference makes reception difficult, Model SFP-2 Filter Panel may be used on the input to the CFA-1 to improve teletype reception by providing discrete band acceptance only to the "mark" and "space" tones, eliminating all other signals. Under actual operating conditions, the addition of the Model SFP-2 to any standard frequency shift converter will provide substantial improvement over identical circuits not using the SFP-2. Tests conducted on operating equipment have shown up to 95% decrease in errors.

Models CFA-1L and CFA-1LB are modified versions of the Model CFA-1 and are designed to operate on narrower shifts used primarily in the LF and VLF ranges.

Models CFA and SFP-2 are designed to provide maximum circuit efficiency with a minimum of operator effort and skill. Particular attention was given to the mechanical layout of the equipment to provide a small, compact, and rugged unit, with all components easily accessible for maintenance.

The CFA Series Converters incorporate the following features:

1.) Wide band limiter stages and newly designed discriminator circuits with superior transient response minimize the possibility of discriminator "ringing" common in other types of similar equipment under certain conditions of selective fading.

2.) The CFA exploits every advantage inherent in frequency modulation systems. Tests indicate that the limiter stages and de-emphasis networks remove all traces of amplitude due to noise.

3.) The application of DC clamping and a two stage memory circuit provide automatic centering of the discriminator to eliminate the effects of the received carrier drifting up to 1500 cps. The CFA-1 will continue to operate efficiently over a ± 750 cps drift range when an 850 cps shift is being used.

4.) A bias correction control enables the operator to compensate for fixed "marking" or "spacing" bias of the received signal.

5.) A threshold control minimizes the effect of noise during standby "marking" conditions.

6.) An automatic mark-hold feature places the output circuit in "marking" condition during signal drop-outs.

7.) A "High/Low" speed switch permits adjustment for normal teleprinter speeds or high speed multiplex signals.

8.) In order to facilitate receiver tuning, a cathode ray tube visual monitor is so connected as to permit extremely simple and rapid "setting-up" on the signal being tuned. By observation of the visual monitor, the operator will know, not only when he is precisely at the discriminator center, but also in which direction signal drift has occurred.

TECHNICAL SPECIFICATIONS, TMC MODEL CFA

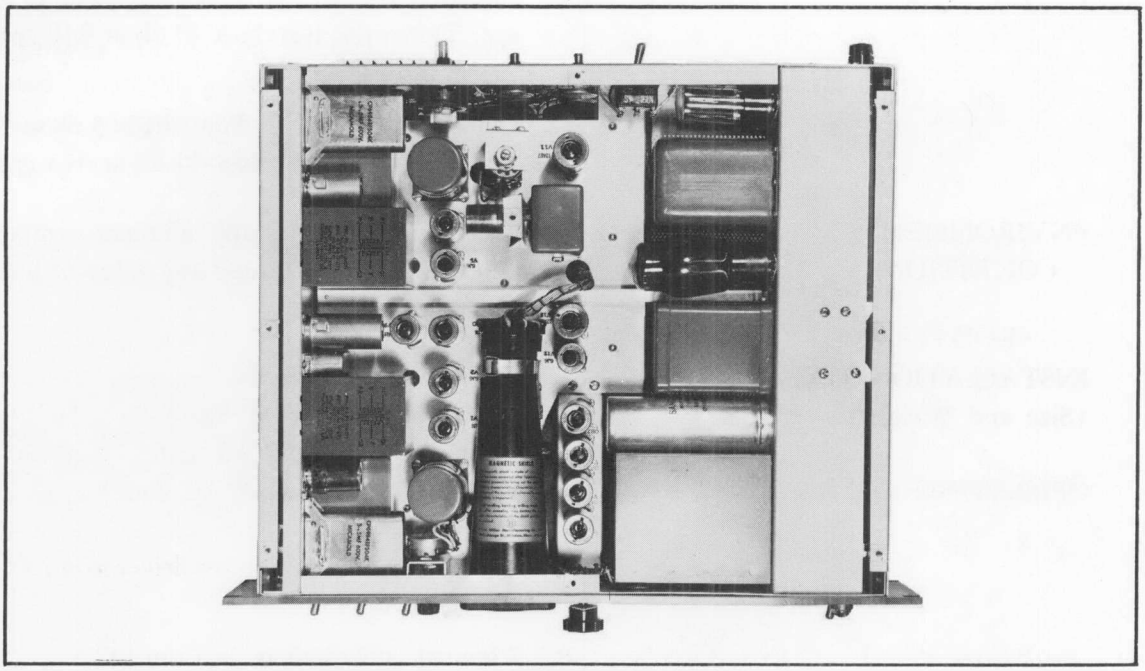
INPUT IMPEDANCE:	600 ohms.	
INPUT LEVEL:	−30 to +30 dbm.	
INPUT LIMITING:	Between 50 and 60 db in each channel.	
INPUT FREQUENCY SHIFT LIMITS:	CFA-1	Up to 1000 cycles shift anywhere in the audio spectrum with center frequency as low as 2000 cycles or as high as 3000 cycles.
	CFA-1L	Up to 400 cycles shift optimized at 200 cps with a center frequency of 2550 cps.
	CFA-1LB	Up to 200 cycles shift optimized at 40 cps with a center frequency of 2700 cps.

INPUT FREQUENCY DRIFT LIMITS:	1½ times maximum shift (CFA-1, 1500 cps; CFA-1L, 600 cps; CFA-1LB, 300 cps).
KEYING SPEEDS:	CFA-1 100 to 600 words per minute (75 to 450 bauds) in high speed position. Up to 100 words per minute in low speed position. CFA-1L Up to 100 words per minute. CFA-1LB Up to 100 words per minute.
OUTPUT CIRCUIT:	Neutral, either side grounded or floating. 35 to 70 ma into 2000 ohm load with external battery similar to TMC Model PSP Power Supply. Smaller currents into higher load impedances.
TUNING INDICATOR:	2" cathode ray tube.
FRONT PANEL CONTROLS:	Threshold Primary Power Switch Channel #1 On/Off Switch Channel #2 On/Off Switch Test Switch (Mark, Space, Line) Sense Switch Mark Bias Control (screwdriver control)
REAR PANEL CONTROLS:	Monitor Scope Intensity Control Monitor Scope Focus Control Monitor Scope Controls Line Current Adjustment Control Speed Switch (only on CFA-1)
POWER REQUIREMENTS:	115/230v, ± 10%, 50/60 cycles, single phase 80 watts.
INSTALLATION DATA: (Size and Weight)	3½" h x 19" w x 16" d, including all rear panel controls. Weight: 31 lbs.
ENVIRONMENTAL CONDITIONS:	Designed to operate in any ambient temperature between 0° C and 50° C, and any value of humidity up to 95%.

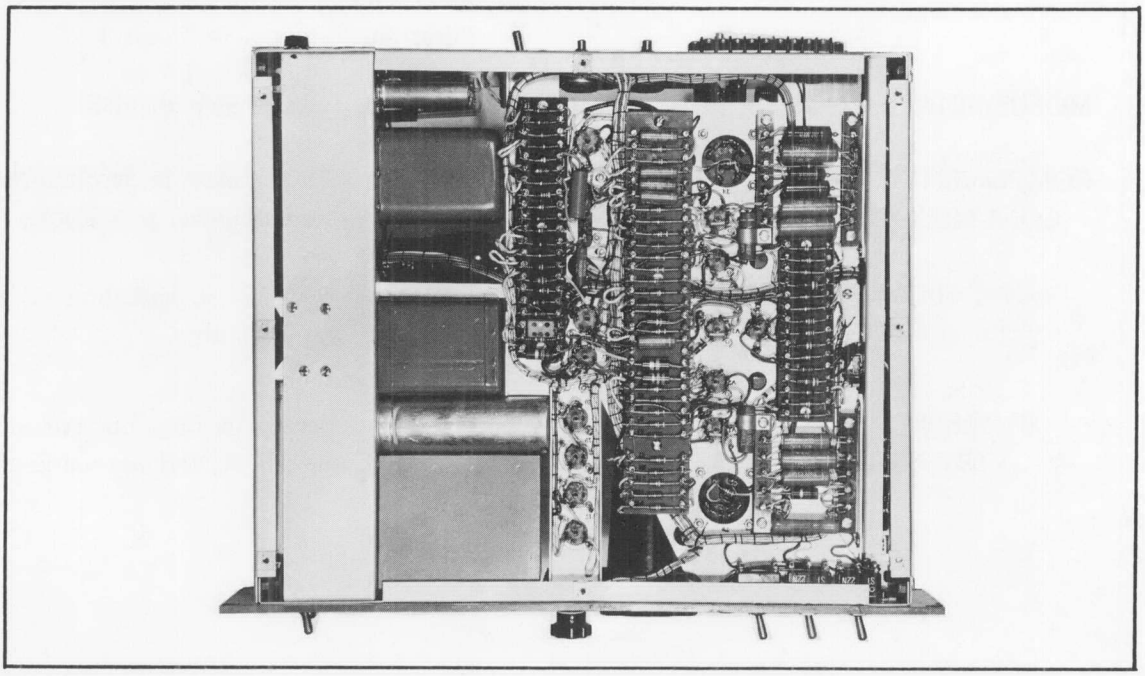
TECHNICAL SPECIFICATIONS, TMC MODEL SFP-2

INPUT IMPEDANCE:	600 ohms.
OUTPUT IMPEDANCE:	600 ohms.
INSERTION LOSS:	Less than 7 db.
BANDWIDTH:	A. Space Filters: Centered at 2125 cps. Flat within 3 db to ± 100 cps. Down not less than 40 db at 340 cps. B. Mark Filters: Centered at 2975 cps. Flat within 3 db to ± 125 cps. Down not less than 45 db at 475 cps.
ENVIRONMENTAL CONDITIONS:	Designed to operate in any ambient temperature between 0° C and 50° C, and any value of humidity up to 95%.
INSTALLATION DATA: (Size and Weight)	3½" h x 19" w x 7" d. Weight: 9¾ lbs.
OPERATING CONTROLS:	A. Channel #1 Switch. 1. Panel Out. 2. Filter Out. 3. Filter In. B. Channel #2 Switch. 1. Panel Out. 2. Filter Out. 3. Filter In.
MONITORING:	Front panel phone jacks in each channel.
COMPONENTS AND CONSTRUCTION:	All equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.

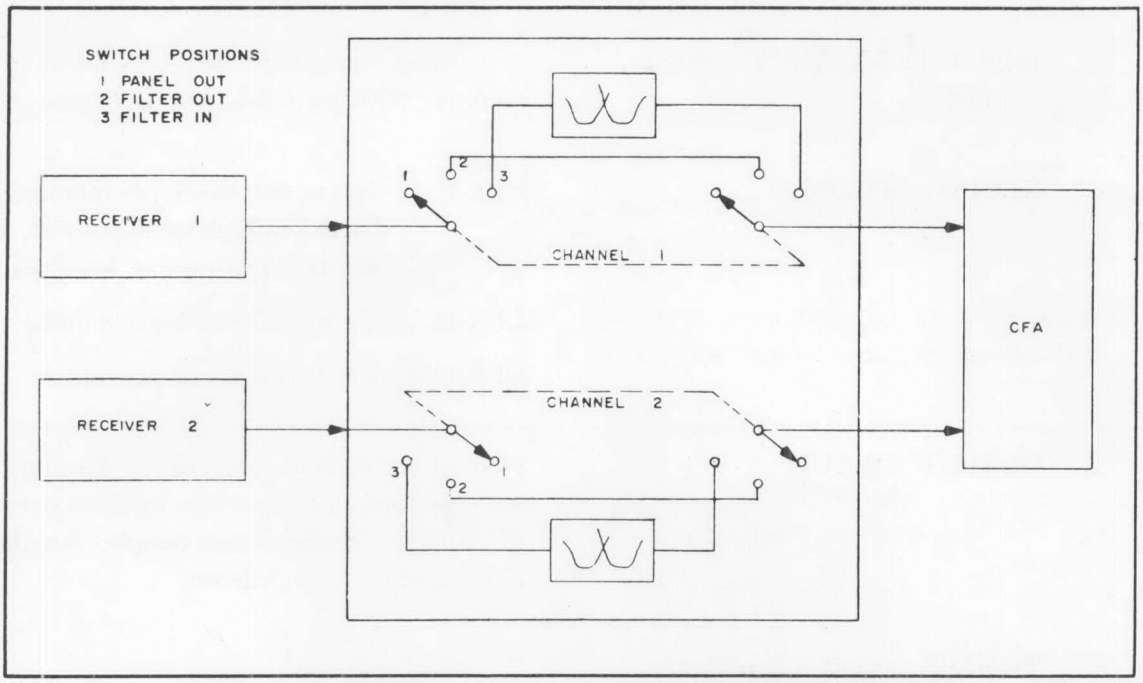
NOMENCLATURE:	CFA-1 CV-763/URR
SHIPPING WEIGHTS & DIMENSIONS:	1 carton, domestic pack, approximately 38 lbs. 23¼" x 21¼" x 7½". 1 case, export pack, approximately 80 lbs. 31¼" x 29¼" x 15½".
COMPONENTS AND CONSTRUCTION	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.



MODEL CFA-1 TOP VIEW, COVER REMOVED



MODEL CFA-1 BOTTOM VIEW, COVER REMOVED



FUNCTIONAL BLOCK DIAGRAM, MODEL SFP-2

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