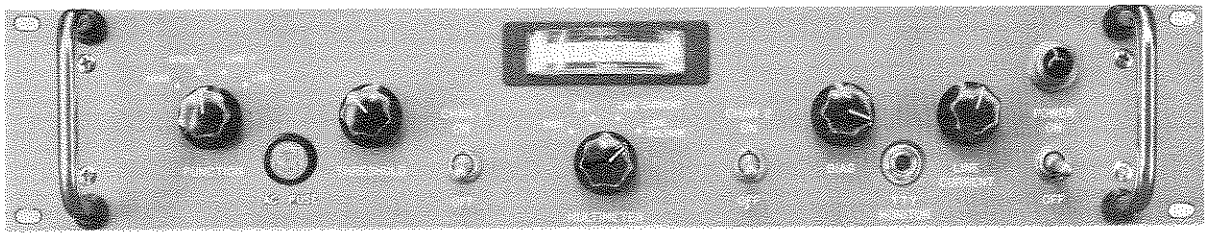
TECHNICAL BULLETIN NUMBER 4008A

Solid State Frequency Shift Converter
TMC Model CFA-2



- Completely transistorized
- Unique tuning meter
- Automatic MARK-HOLD feature
- Automatic compensation for drift

Model CFA-2 is a completely new solid-state (fully transistorized) frequency shift converter that provides diversity or single receiver conversion of audio frequency shifted tones to DC pulses to operate teletypewriter equipment.

This new converter requires only 12 watts of power for operation and is self-contained on a 3½" high standard 19" rack mounted chassis. Every attempt has been made to make the unit simple in operation with a long, trouble-free life. For example, the front panel meter not only indicates proper center frequency operation, but also the amount AND direction of drift of the transmitter or receiver, should it occur. Automatic compensation for up to 150% of the total shift provides perfectly readable copy in the event of such drifting. The built-in multimeter allows tuning of one channel to a new frequency while maintaining the other channel for active reception.

The following features are also provided:

1. By simple change of switched discriminator networks, frequency shifts of 20 to 850 cycles are accommodated.
2. Wide band limiter stages and 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.

3. The CFA-2 exploits every advantage inherent in frequency modulation systems. Tests indicate that the limiter and de-emphasis networks remove all traces of amplitude variations due to noise.
4. 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-2 will continue to operate efficiently over a ±750 cps drift range when an 850 cps shift is being used.
5. A bias correction control enables the operator to compensate for fixed "marking" or "spacing" bias of the received signal.
6. A threshold control minimizes the effect of noise during standby "marking" conditions.
7. An automatic Mark-hold feature places the output circuit in "marking" condition during signal drop-outs.
8. A "high/low" speed switch permits adjustment for normal teleprinter speeds or high-speed multiplex signals.
9. A meter switch allows the same meter to be used to monitor loop current, loop voltage, channel 1 and channel 2 signal activity and operating voltages.
10. Where adjacent channel or in-band interference make reception difficult, Model SFP-2 Filter Panel (see OPTIONS/ACCESSORIES) may be used to filter the input to the CFA-2 to improve teletype reception (850 cps shift) 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.

TECHNICAL SPECIFICATIONS, TMC MODEL CFA

INPUT IMPEDANCE:	600 ohms nominal.
INPUT LEVEL:	−30 to +30 dbm.
INPUT LIMITING:	Between 50 and 60 db in each channel.
INPUT FREQUENCY DRIFT LIMITS:	1½ times maximum shift.
INPUT FREQUENCY SHIFT LIMITS AND KEYING SPEEDS:	Selection of one of the following: (by switched-in discriminator networks)

400-850 cycles shift, 120 to 600 words per minute (75 to 450 bauds) in high speed position. Up to 120 words per minute in low-speed position.

200-400 cps shift, up to 120 words per minute.

20-200 cps shift, up to 120 words per minute.

CENTER FREQUENCIES:	Center Frequency operation of 1000, 2000, or 2550 cycles on a switch basis is available as standard equipment. Other center frequencies are available at a slight increase in cost.
OUTPUT CIRCUIT:	Neutral, either side grounded or floating. Output transistor will key 10 to 75 ma into 2000 ohm TTY loop. (For external TTY battery, see OPTIONS/ ACCESSORIES)
TUNING INDICATOR:	2½" × ½" combined zero-center tuning meter and multimeter.
FRONT PANEL CONTROLS:	Threshold Primary Power Switch Channel #1 ON/OFF Switch Channel #2 ON/OFF Switch Function (Mark, Space, Line+, Line−) Line Current Adjustment Control Multimeter Switch Bias AC Line Fuse
OPERATING POWER:	115/230 v, ±10%, 47 to 400 cps single phase approximately 12 watts.
INSTALLATION DATA:	SIZE: 3½" high × 19" wide × 16" deep. WEIGHT: 25 lbs.
ENVIRONMENTAL CONDITIONS:	Designed to operate in any ambient temperature between 0° C and 50° C, and any value of humidity up to 90%.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

OPTIONS/ACCESSORIES: (Priced Separately.)

1. MODEL PSPA-1: (Single Loop TTY Battery)	Solid state power supply providing up to 75 milliamperes of current at a DC voltage not exceeding 150 volts is available. The power supply is mounted on a 3½" × 19" panel, 12" deep.
2. MODEL PSPB-1: (Dual Loop TTY Battery)	A dual supply each section the same as PSPA-1 above. Mounted on a 3½" × 19" panel, 12" deep.

NOTE: Output current keying can be either positive or negative in relation to ground and each of the units is provided with a meter to monitor the output circuit.

Solid State Frequency Shift Converter

3. FILTER PANEL: MODEL SFP-2	A filter panel to eliminate unwanted signals at the input to the converter is available and its technical specifications are as follows:
INPUT AND 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 45 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)	SIZE: 3½" high × 19" wide × 7" deep. 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.
POWER:	None Required.
MONITORING:	Front panel phone jacks in each channel.