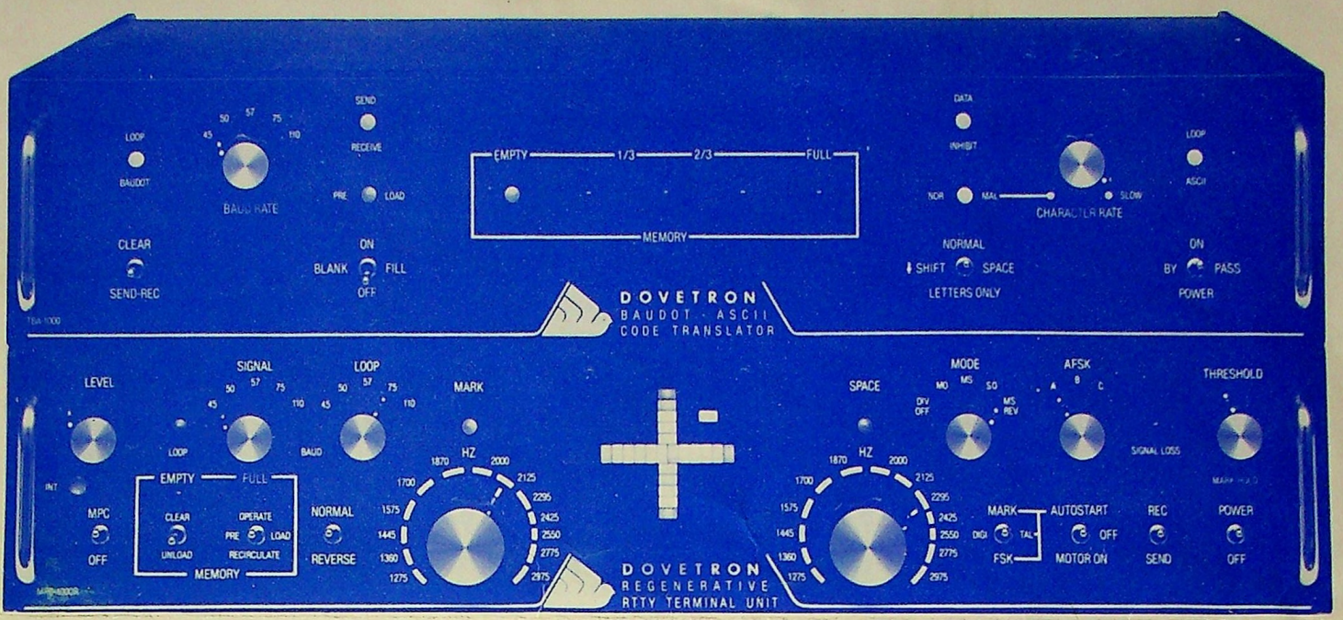
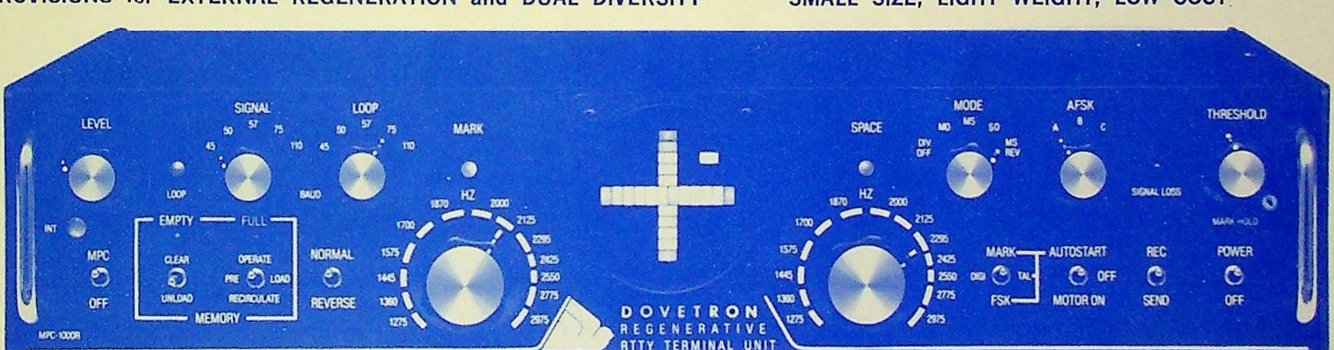


DOVETRON MPC-1000

MULTIPATH-DIVERSITY RTTY TERMINAL UNIT

FEATURES

- IN-BAND DIVERSITY OPERATION (automatic mark-only or space-only)
- CONTINUOUSLY VARIABLE MARK and SPACE CHANNELS (1200 to 3300 Hz.)
- NOISE COMBINING and CANCELLATION CIRCUITRY
- INTEGRATED CIRCUIT ACTIVE FILTERS (no toroids)
- OPTIMUM BANDWIDTH FILTERS FOR 45 to 75 BAUD OPERATON
- LED MARK and SPACE CHANNEL FILTER INDICATORS
- PHASE CONTINUOUS, SINE WAVE AFSK TONE GENERATOR
- CONTINUOUSLY VARIABLE MARK and SPACE AFSK TONES
- FSK VOLTAGE LEVEL OUTPUTS (EIA RS232C and MIL STD 188C)
- CW ID PROVISIONS FOR AFSK and FSK OUTPUTS
- MANUAL MARK-ONLY or SPACE-ONLY OPERATION
- AUTOMATIC MARK-HOLD, ANTI-SPACE and ANTI-CW
- ANTI MARK-FADE for SLOW SPEED OPERATION
- ADJUSTABLE INTERNAL 130 VOLT LOOP SUPPLY
- PROVISIONS for EXTERNAL REGENERATION and DUAL DIVERSITY
- MULTIPATH CORRECTOR™ CIRCUITRY
- BUILT-IN 2 INCH CRT CROSS DISPLAY
- MARK or FSK AUTOSTART
- CRT DOT DEFLECTION CIRCUITRY
- LED SIGNAL LOSS INDICATOR
- LED LOOP KEYER INDICATOR
- INTERNAL "RY" GENERATOR
- INTERNAL TERMINAL UNIT SELF-TEST
- VARIABLE THRESHOLD CONTROL
- AUTOMATIC POWER SUPPLY PROTECTION
- REMOTE CONTROL including LOCK ON TRANSMIT
- TABLE TOP or RACK MOUNTING OPTION
- 110/220 VOLT, 50 to 400 Hz. OPERATION
- SMALL SIZE, LIGHT WEIGHT, LOW COST



MPC-1000R REGENERATIVE

The **DOVETRON MPC-1000 MULTIPATH-DIVERSITY RTTY TERMINAL UNIT** is the amateur-commercial version of a high performance militarized signal data converter designed to cope with the anamolies of HF multipath propagation.

Basically, the MPC-1000 consists of two identical low frequency solid state receivers, whose outputs drive a **MULTIPATH CORRECTOR™** circuit, which in turn, drives a high level keyer that outputs directly to a teleprinter.

Either receiver can be tuned to any mark or space tone between 1200 and 3300 Hz.

True In-Band **DIVERSITY** operation is achieved during selective fading since the **MULTIPATH CORRECTOR™** circuit will operate from single channel data as well. Either channel can be operator-inhibited for mark-only (MO) or space-only (SO) copy in the advent of heavy interference in either channel.

All filtering is accomplished with computer designed active filters utilizing integrated circuit op-amps. No toroids or matching transformers are required. A total of 43 identical linear **IC**s are used in the analog circuits. The **MULTIPATH CORRECTOR™** circuit consists of four identical digital C-Mos devices.

AC coupling of the assessor circuits between the two receivers and the **MPC** circuitry permits error free copy with a continuous interferring tone in either channel. No internal or external clocks are required for the **MPC**, since it is by design, a synchronous regenerator automatically operating at the same baud rate as the incoming signal.

The MPC-1000 itself is optimized for 45 to 75 baud operation.

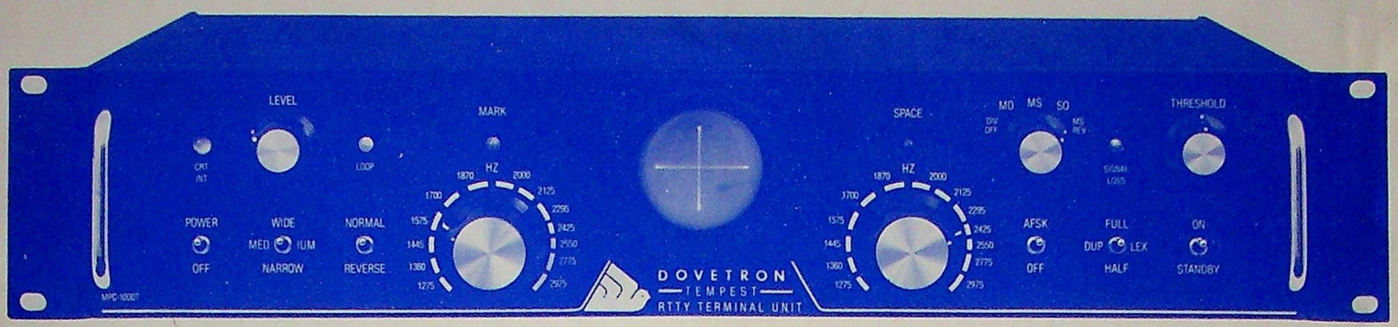
A dual autostart circuit permits operator selection of **MARK** or **FSK** autostart. In **MARK**, the teleprinter is turned on by a marking carrier and time-out is 20 seconds. This mode is useful for fast break-in and autostart net operations. The **FSK** mode autostarts upon receipt of a **RTTY** signal with mark-space transitions and times out in 60 seconds. This mode is intended for monitoring commercial stations that mark for long periods of time. Neither mode responds to a continuously spacing carrier.

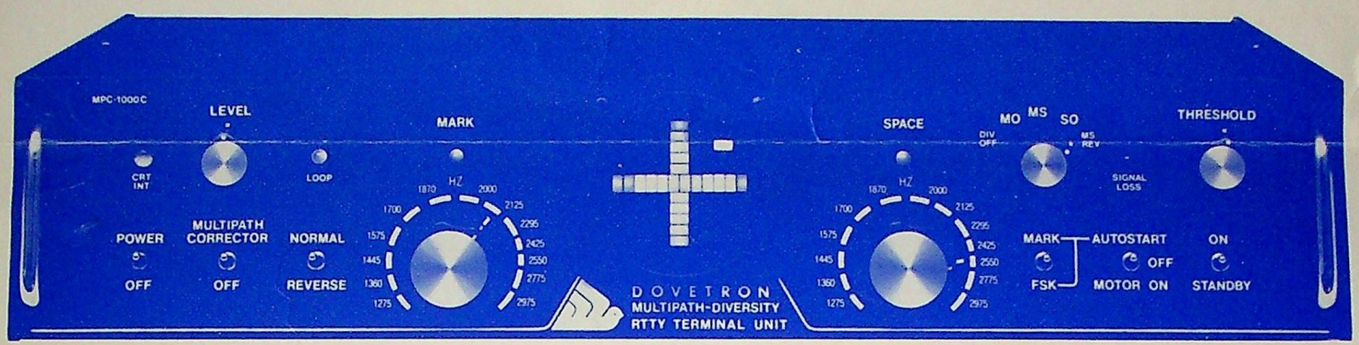
In addition to the automatic **MARK-HOLD, ANTI-SPACE** and **ANTI-CW** functions, the **MPC-1000** also incorporates an anti-**MARK-FADE (AMF)** circuit, a **SIGNAL LOSS** circuit, a **RY** generator **(MS-REV)** mode and a 2" **CRT** cross display.

The **AMF** circuit prevents fast fades on the long marks of keyboard speed signals from initiating erroneous start pulses.

The **SIGNAL LOSS** circuit drives a front panel **LED** that indicates when the **TU** has gone to **MARK-HOLD** without a marking carrier. This information is also buffered to the rear panel for use as a system alarm or control signal. The **SIGNAL LOSS LED** is also a visual indication of the proper setting of the front panel **THRESHOLD** control under noisy or weak signal conditions.

A second front panel **LED** indicates the status of the loop keyer, and provides a visual indication that the high level loop and the **AFSK/FSK** outputs are being keyed by the **TU** during receive and by the keyboard during transmit.





Two additional front panel **LEDs** monitor the status of the two channel filters.

The **AFSK** tone generator is a 16-pin monolithic device that produces phase continuous, sine wave **AFSK** tones at a 150mv level at the rear panel. The mark and space tone frequencies are independently adjustable by rear panel lock-pots.

In the **MS-REV** mode, the **AFSK** tone generator is keyed by an internal square wave generator and the resultant mark-space tones are routed to the input of the **MPC-1000.** This provides a fast and accurate method of adjusting the mark and space tones, using the **CRT** cross display and the calibrated front panel **VFOs**. It also provides a rapid self-check of the entire terminal unit. When adjusted for the desired baud rate, the high level keyer, the **AFSK** generator and the **FSK** lines will output a continuous string of **RYs**, which can be used for circuit adjustment, machine maintenance and reinking, etc.

The internal 2″ CRT provides a "thin" cross display as evidenced by the unretouched picture of the **MPC-1000** copying a string of **RYs** from the **AFSK** tone generator at 170 Hz. shift and 45.45 baud.

The channel separation and bandwidth characteristics of the channel filters as seen on the **CRT** is the same as presented by the filters to the following stages of the TU.

A dot deflection circuit prevents a CRT screen burn in the absence of a signal or noise, and is also used to display the slow flat fades of weak **RTTY** signals. Used in conjunction with the **SIGNAL LOSS** indicator and the **THRESHOLD** control, optimum threshold levels are easily set for copy of weak signals near the noise threshold.

Pressing the front panel **TEST** button allows the **CRT** to be used to adjust the 130 volt internal loop supply to 60 milliamperes.

Two **FSK** voltage level outputs are buffered to the rear panel and provide ±12 volts, **S/M (EIA RS232C)** and ±6 volts, M/S (Mil Std 188C). Since these outputs are inverted in respect to each other, the operator has the choice of either polarity for Mark to maintain right side up operation.

Additional rear panel connectors make provision for use of an external scope, an external asynchronous regenerator, remote control of the transmitter and receiver from the **TU,** remote control of the **TU** from external switching, **CW ID** of both the **AFSK** and **FSK** outputs, and dual diversity (space, frequency and polarity) operation of two or more **MPC-1000** terminal units. The **DIV-OFF** mode permits normal operation of dual diversity pairs without disconnecting the interconnecting patch cables. One of the remote lines is a **LOCK** line, and when grounded externally, locks the teleprinter's motor on, puts the TU into Standby and locks the high level loop keyer, so only an external device can key the loop and the **AFSK/FSK** circuits.

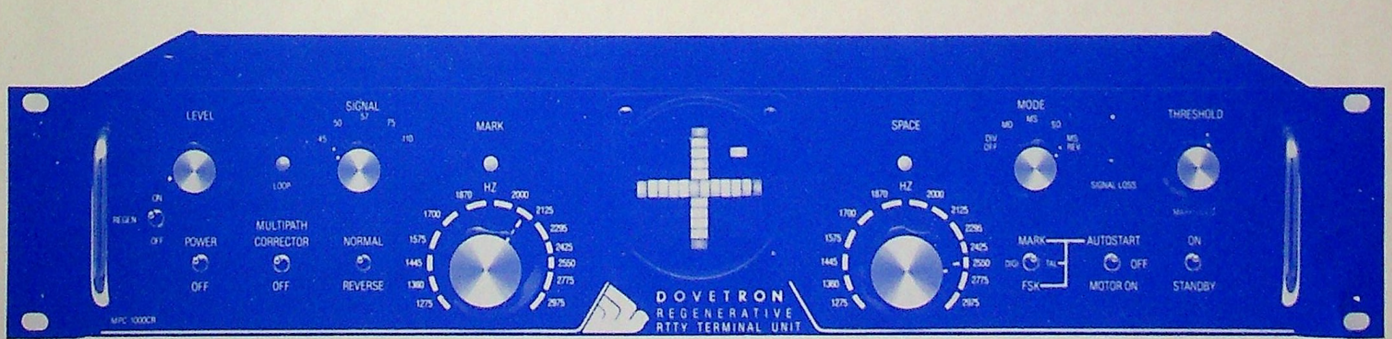
The external **REGEN** connectors may be used for crypto, code conversion, regeneration or speed changing peripherals. The popular **Uart-FIFO** combinations interface without modification of their input and output circuits.

The high level loop output is available thru two insulated Nylon jacks. One is wired for a two way plug and the other for a stereo-type three way plug. Two way plugs may be used in either jack. The loop is fused at the rear panel with a 100 milliampere fuse. The loop adjustment potentiometer is adjustable over the range of 55 to 85 milliamperes into the standard 65 OHM teleprinter load.

The **MPC-1000** is normally supplied wired for 110 volt, 50 to 400 Hz. mains. A simple jumper change internally converts the unit for 220 volt operation. Package size is 17″ wide, 3.5″ high and 9″ deep. Available in either a table top package or for standard 19″ rackmount (please specify at time of order), net weight is 11 pounds. Packed for shipping, weight is 15 pounds.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON P. O. BOX 267
627 Fremont Avenue
South Pasadena, Calif. 91030
213-682-3705



MPC-1000CR & MPC-1000CR/DK

SSD-100 SOLID STATE CROSS DISPLAY

OPERATING INSTRUCTIONS

CALIBRATION

Calibration of the SSD-100 Display is accomplished by setting the two gain pots at the top edge of the SSD-100 board (R17 and R18).

The Mark Gain pot (R17) is near the front panel MARK VFO and the Space Gain pot (R18) is near the front panel SPACE VFO.

The Intensity Threshold pot (R11) is mounted halfway down the left side of the SSD-100 board.

Turn ON the MPC Series terminal unit, set the Mode switch to MS-REV and set the LEVEL control to 12 o'clock.

Tune in the Mark and Space tones from the AFSK tone keyer, using both the SSD-100 display and the individual Mark and Space LEDs mounted directly above the VFOs.

With both channels peaked for maximum amplitude, set the Mark and Space Gain pots so that seven (7) LEDs on each side of the center pair (apex) are fully lit.

After a five minute warm-up, check the gain pots again. The display driver circuitry has a high degree of hysterisis and the gain in each channel may be set so that the seventh LED is "hard-on" and the eighth LED is fully off.

Set the Intensity Threshold potentiometer (R11) at mid-scale.

Block the ambient light flow to the photocell in the lower left quadrant of the display. (Use your thumb.) The light output of the display should drop to about half of the normal intensity. If not, adjust R11 so that this action occurs smoothly.

OPERATION AND INTERPRETATION

The incoming Mark signal is displayed on the horizontal line of LEDs and the space channel is displayed vertically.

The two LEDs (DS1 and DS2) at the apex of the cross are connected to the terminal unit's Signal Loss circuit.

When the two incoming tones are tuned-in properly, these two center LEDs will light, forming a complete cross.

If the terminal unit is incorrectly tuned, such as both channels tuned to the same tone, a cross will be displayed, but the center LEDs will not light, and a separate LED in the lower right-hand quadrant (DS5) will light, indicating that the terminal unit has automatically gone into Markhold.

This separate LED also lights when the terminal unit is switched to Standby (MPC-1000C) or Send (MPC-1000CR and MPC-1000R).

If the terminal unit is tuned to a steady Marking signal, the LEDs at the center of the cross will not light if the "sense" of the terminal unit is upside down. Reversing the NORMAL-REVERSE switch will cause the LEDs to light; filling in the line of lit LEDs.

A second separate LED (DS4) in the upper right quadrant monitors the high level loop supply and duplicates the indication from the front panel LOOP LED. This LED has been included in the SSD-100 display for operator convenience.

The SSD-100 also includes a unique Multipath Distortion Indicator (MDI) in the upper left quadrant. This LED (DS3) flashes in the presence of time or frequency dispersive multipath distortion. Its operation can be checked by tuning both channels of the terminal unit to the same incoming tone. The intersymbol interference generated by the RY Generator (MS-REV) will also flash this MDI LED.

The Multipath Distortion Indicator circuit consists of U3, Q2, DS3 and their associated components. To understand the validity of the MDI, it must be explained that terminal units generally use non-identical channel filters in the Mark and Space channels. For this reason, both filters exhibit their own characteristic group-response, time-delay, overshoot, ringing, etc. These non-identical filters have a tendency to distort the mark and Space channel signals unequally. The channel filters in the MPC Series terminal units are identical Bessel Function filters. Their Bessel characteristic makes them very "tame" in the presence of pulse signals (RTTY pulses in particular) and prevents ringing and overshooting.

Since they are identical, any distortion added to one channel is also added to the other channel.

The MDI monitors the output of the two channel filters. One channel is inputted to pin 8 of U3. The other channel is inputted to pin 9 of U3. This integrated circuit is a two-input NAND gate. If both channels contain amplitude energy simultaneously, the output of U3 (pin 10) goes LOW, i.e., zero. This is the normal function of a two-input NAND gate. This LOW is applied to three more NAND gates that are connected as inverters, whose outputs immediately go HIGH and drive Q2 into conduction. When Q2 conducts, the MDI (DS3) is turned on.

In this way, whenever the Mark and Space channels simultaneously

contain a significant amount of amplitude energy, the MDI will flash. By definition, time and frequency dispersive multipath distortion will flash the MDI.

The voltage dividers (R23/R25 and R24/R26) have been selected to "Flash" the MDI whenever pulse overlap at 45 to 75 bauds exceeds ten percent.

Since 10% bias distortion does not generally increase the error rate, it is best to operate the MPC Series terminal unit with the Multipath Corrector turned off. If the MDI starts to flash, turn the MPC on.

Mark II versions of the MPC Series terminal units and the MPC-1000T TEMPEST terminal unit contain the BBP-100 Binary Bit Processor with automatic multipath correction. Flashing of the Multipath Distortion Indicator (MDI) at DS3 alerts the operator to pulse stretching and suggests a change in frequency or antenna combinations.

VARIATIONS

Provisions have been made for attaching an external intensity control to the SSD-100 (Mark II) at E-Point E1. Resistors R3 and R8 have not been installed, but locations have been provided that would provide part of an external intensity control circuit.

Resistors R21 and R22 are 15 ohm resistors and serve as jumpers.

They have been provided to permit flexibility in implementing the SSD-100 Solid State Display into other than MPC Series terminal units.

SSD-100 SOLID STATE CROSS DISPLAY

INSTALLATION INSTRUCTIONS

FACTORY INSTALLATION OF SSD-100

When an SSD-100 Solid State Cross Display is to be installed in a Dovetron MPC Series Terminal Unit, the following components are not installed on the MPC Main Board A75100-E:

F3, F3 Fuse Clips, C63, C64, C65, C66, C67, CR44(4), CR45, CR46, R173, R174, R175, R176, R177, R178, R179A, R179B, R180, R181, R182, R183, R184, R185, R186A, R186B, R187, R188, R190, R191, R192, R193, R194 and R195.

The photocell socket/leads assembly is not installed.

The CRT socket and cable assembly are not installed.

R114 (originally 1K) is changed to 68 ohms, 1/4 watt, 5%.
R170 (originally 33 ohms) is changed to 120 ohms, 1/4 watt, 5%.
R222 (originally 62K) is changed to 120 ohms, 1/4 watt, 5%.

The yellow wire connected to the cathode of the LOOP LED is moved from E34 to E47.

A jumper wire is installed between CRT-10 feed-thru and ground.

Z37 (originally µ741CP) op-amp is changed to TI TL081CP.

The 8 pin plug-in cable assembly that connects the SSD-100 to the MPC main board is connected to various E-Points and feed-thru holes on the main board per the Installation Chart on SSD-100 Assembly/Schematic Print 75307.

FIELD RETROFIT INSTALLATION OF THE SSD-100K

The SSD-100K retrofit kit consists of an SSD-100 Display Assembly, an SSD Bezel with optical filter, an 8 pin interconnecting cable, 3 replacement resistors, an op-amp (TL081CP), and the necessary hardware to mount the SSD-100 in place of the original CRT assembly.

Since simple modifications are normally more successful than complex ones, only those components that would interfere with the operation of the SSD-100 are removed. Excess components may be removed.

1) Remove and discard the CRT bezel, the mounting screws, the CRT shield, the CRT tube and the CRT socket assembly. When removing the CRT socket assembly, clean out the holes at points 1, 10 & 11.

2) Remove and discard the high voltage diodes at CR45 and CR46. This effectively removes high voltage from the CRT's original high voltage power supply.

3) Remove the F3 fuse located on the bottom side of the MPC main board.

4) The high voltage filter capacitors C66 and C67 may be removed. Save C66 (40 Mfd, 350 VDC) as a spare for loop supply filter capacitor C60.

5) Remove 1K (R114) to the right of Z37 and replace with 68 ohms.

6) Remove 33 ohms (R170) near pin 8 of Z43 (XR2206C) tone keyer and replace with 120 ohms.

7) Remove 62K (R222) in left front corner of main board and replace with 120 ohms.

8) Remove photocell socket/leads assembly by disconnecting the two leads from E47 and E48. Clean out E47.

9) Move the yellow wire from LOOP LED from E34 to E47.

10) Connect jumper wire from CRT E10 to ground feed-thru marked (-). This ground is also at the anode end of CR53.

11) Remove (μ741CP) and replace with Texas Instruments TL081CP (Z37).

12) The 2N3439 transistors (Q10, Q11 & Q12) may be left in their sockets. They will spare the Q7 loop keyer, Q5 and Q6 on the main board and Q1 and Q2 on the SSD-100 Display assembly.

13) Remove the disc capacitors (.01) at C63 and C64.

14) Install the 8 wire interconnecting cable per Cable Installation chart on SSD-100 Assembly/Schematic print 75307.

The 8 wire cable has standard EIA color coding: Pin 1 = brown, pin 2 = red, pin 3 = orange, pin 4 = yellow, pin 5 = green, pin 6 = blue, pin 7 = violet and pin 8 = gray.

Secure the cable (2 inches from connector end) with the cable clamp supplied at the main board mounting screw at the front edge. Dress the cable to run directly down the center line of the terminal unit.

1) MPC +V at TP9, which is located between TP10 and CR60.

2) MPC jumper location C, just to the rear of CR60, and to the left of locations A and B.

3) Junction of R214 and R215. R214 is not normally installed. Connect wire to the front-most feed-thru of R214. This

location is to the left of Q13 and about 1 inch from the front edge of the main board.

4) MPC Ground at TP8, which is just to the left of the large white capacitor (1.0J100) C55.

5) CRT Filament Line 1, located behind the FOCUS potentiometer, R193.

6) CRT Filament Line 11, located behind the ASTIG potentiometer, R194.

7) Space Channel. Locate the old C64 location. Follow the trace from C64 to the left and locate feed-thru on this trace at the center-line of the terminal unit.

8) Mark Channel. Locate the old C63 location. The proper location for wire 8 is the feed-thru directly behind the feed-thru used in the previous step.

MECHANICAL INSTALLATION OF MARK II SSD DISPLAY AND BEZEL ASSEMBLIES

The bezel and the four bolts are installed from the front panel of the terminal unit. Looking at the terminal unit from the front, install a short bolt in the upper-right and lower-left corners. Secure with one of the 6/32 nuts.

Install the long bolts in the lower-right and upper-left corners. Slip a 1/2 inch metal spacer on each bolt and secure with a 6/32 nut.

This arrangement permits the SSD-100 display board to be cocked at an angle during installation, simplifying display insertion and removal.

Be careful not to pinch any of the local wires between the bolts and SSD board.

Secure the SSD-100 board in place with the two remaining 6/32 nuts.

ELECTRICAL INSTALLATION OF THE SSD-100 DISPLAY

The connector on the end of the 8 wire cable plugs into the SSD-J1 socket, which is located at the lower center rear of the SSD board.

The notched corner on the connector shell indicates Pin 1.

The cable is installed properly when this notched corner (Pin 1) is closest to the power diode CR3. This diode is easily recognized, since it is one of the three diodes and a resistor installed directly above the lower left mounting hole.

If a plastic cable clamp has been supplied with the SSD-100K kit, it may be used to secure the SSD cable at the front center edge of the main board.

This completes the modification of the terminal unit, and the electrical and mechanical installation of the SSD-100 Solid State Display.

If the original CRT adjustment potentiometers have been left on the main board, set them for Mid-scale and forget. Refer to the SSD-100 Operating Instructions for the proper calibration procedure for the Mark Gain, Space Gain and Intensity Threshold pots.

REMOTE CRT DISPLAY

The MPC-1000C and MPC-1000CR have both Remote Scope Display and Dual-Diversity connectors on the rear panel.

The MPC-1000CR/DK and MPC-1000R (above Serial R050) have only Dual-Diversity connectors at the rear panel. These Diversity connectors are connected Mark J3 to E54 and Space J2 to E53. For remote oscilloscope operation, move the orange wire from E53 to E51. Move the yellow wire at E54 to E52. These E-Points are located at the left rear corner of the MPC main board.

SSD-100 LOOP LED INTENSITY

Light Emitting Diodes (LEDs) act somewhat like zener diodes, but their zener voltages are not precise.

The LOOP LED (SSD-DS4) is paralleled across the front panel LOOP LED (MPC-DS1).

If one of the LEDs has a significantly lower zenering point than the other, the second LED will not light, or at best, will operate with a very low light level output.

In the case that the SSD-DS4 LED does not light, but the front panel LED does light, put a 120 ohm, 1/4 watt resistor in series with the front panel LED (MPC-DS1).

At Dovetron, this resistor is added by moving the yellow wire on the anode of MPC-DS1 from E-Point 34 to E-Point 47 and installing the 120 ohm resistor in location R222. (If this location contains a 62K resistor, which was part of the CRT photocell circuit, remove it and discard it). Locate CRT Pin 10 on the mainboard. This location is directly in front of diode CR47. Connect a wire between CRT Pin 10 and Ground. A convenient ground location is the mounting feedthru for the anode end of zener diode CR53, which is directly to the right of C65 and in front of CRT INTENSITY pot R195.

If the front panel MPC-DS1 LED does not light, and the SSD-DS4 does light, add the 120 ohm resistor in series with the SSD-DS4 LED. This is easily accomplished by removing the SSD-100 display assembly and installing the 120 ohm resistor at location SSD-R21, which is just above the LM3914 at location U1, replacing the jumper wire.

When re-installing the SSD-100, be sure that pin 1 of the 8 wire connecting cable is toward the center of the SSD-100 board. Pin 1 is identified with a "notched" corner on the top of the cable connector.

DOVETRON TID-100 TELEPRINTER IDENTIFIER

The TID-100 Teleprinter Identifier is a 5.0" X 3.5" printed circuit board assembly that is designed to mount inside of all MPC Series Rtty Terminal Units.

Although intended to be used as a Morse CW IDer, it may be programmed to output either Baudot or ASCII teleprinter codes.

When outputting a teleprinter code, the free-running clock is easily adjusted to the appropriate baud rate.

The TID-100 consists of four socket-mounted CMOS devices and a 128 bit diode-programmable matrix. The matrix is designed so that the programming diodes lay flat on the printed circuit board, making installation and code reading very easy.

Two LEDs on the board monitor the status of the internal counter circuit and the outputted code. The latter permits visual verification of the code during matrix programming.

When installed in an MPC-1000C or MPC-1000CR, a second transistor keyer displays the transmitted code sequence on the front panel Signal Loss LED.

When installed in an MPC-1000R, the code sequence is displayed on front panel Memory Empty LED. If the Phasing Pulse mode of the TSR-500D is enabled, when the TID-100 is identifying, it automatically interrupts the "diddle" signal which would otherwise interfere with the identification code that was being transmitted.

When installed with a KOS-100 Keyboard-Operate-Send assembly, the TID-100 interfaces to the KOS via a 16 pin header and mounts directly on the KOS assembly.

In this application, when the KOS-100 enables the TID-100, the MPC-1000R terminal unit is switched into Preload, which permits data to be entered into the terminal unit while the TID-100 is "identifying".

At the end of the identification cycle, the terminal unit is switched from Preload to Operate, and the preloaded contents of the Memory Section is transmitted.

If a CW ID command is initiated by the keyboard BREAK button while the Memory Section contains data, the "start" latch in the KOS-100 is held-off until the Memory Section empties, i.e., at the end of the transmission.

Power requirement of the TID-100 is one mil Standby and seven mils in Transmit.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

AMATEUR PRICE LIST

August 1979

627 FREMONT AVE.
SOUTH PASADENA, CALIFORNIA 91030
213-682-3705

Amateur Radio Operators may purchase the following Dovetron RTTY Terminal Units at a substantial discount. All amateur orders must be accompanied by a call sign that is verifiable in the Amateur Radio Callbook, or by a QSL card. Terms of sales are PAYMENT WITH ORDER. All prices, unless noted "PP" are FOB South Pasadena. MASTERCHARGE orders are accepted. Deliveries are made on a First-In, First-Out basis, are intermixed with commercial orders, and vary from STOCK to 90 days after receipt of order.

MPC-1000C	Multipath-Diversity RTTY Terminal Unit:	$645.00
MPC-1000CR TSR-200D	Signal Regeneration, Speed Conversion & Digital Autostart:	$745.00
MPC-1000R (II) BASIC-R	Expandable BASIC-R with Tri-Tone AFSK:	$745.00
MPC-1000R (II) TSR-200D	Signal Regeneration, Speed Conversion, Digital Autostart and Tri-Tone AFSK:	$895.00
MPC-1000R (II) TSR-500D DAS-100	Signal Regeneration, Speed Conversion, 200 Character Memory, Word Correction, Var. Char. Rate, TD Inhibit, Blank/LTRS Diddle and Digital Autostart:	$995.00
MPC-1000R (II) FULL HOUSE	Same as above, plus KOS-100 Keyboard Operated Send and TID-100 Station IDer:	$1095.00

All MPC Series terminal units are supplied with the SSD-100 Solid State Cross Display. All Mark II MPC-1000R units contain a BBP-100 Binary Bit Processor with selectable bandwidth and automatic hysterisis multi-path correction.

BAL-100	Balanced transformer coupled AFSK output option:	$ 25.00 PP
BBP-100K	Binary Bit Processor retrofit kit with switch:	$148.00 PP
KOS-100K	Keyboard Operated Send retrofit kit:	$ 50.00 PP
DAS-100	Digital Autostart Module for TSR-500D:	$ 40.00 PP
SBR-100	Selectable Baud Rate module for TSRs and TBA:	$ 50.00 PP
SCL-100	Selective Calling Option:	$ 95.00 PP
SSD-100K	Solid State Cross Display retrofit kit:	$125.00 PP
TID-100	Station Identifier. Specify CW, Baudot or ASCII:	$ 50.00 PP
TSR-200D	Sig. Regeneration, Speed Conv. & Dig. Autostart:	$150.00 PP
TSR-500D	Dual UART S/R, S/C, 200 Char. Memory & Word Corr:	$350.00 PP

TBA-1000	Baudot-ASCII/ASCII-Baudot Code Translator:	$395.00
	Input-Output (Neutral) Bypass Option:	$ 50.00

Shipping-Insurance (MPC and TBA), CONUS & Hawaii via UPS Blue:	$ 20.00

Specify tabletop or rackmount, 115 or 230 VAC mains, Baud Rates, AFSK tone frequencies, loop currents and required options.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

MAILING ADDRESS, BOX 267, SOUTH PASADENA, CALIFORNIA 91030

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COMMERCIAL PRICE LIST

JULY 1979

627 FREMONT AVE.
SOUTH PASADENA, CALIFORNIA 91030
213-682-3705

MPC-1000C	Single Tone-Pair AFSK Tone Keyer & Neutral Loop:	$ 995.00
MPC-1000CR TSR-200D	Signal Regeneration, Speed Conv. & Digital Auto-start. Single Tone-Pair AFSK & Neutral Loop:	$1,295.00
MPC-1000C/DK	Dual-Keyer (polar/neutral) version of MPC-1000C:	$1,295.00
MPC-1000CR/DK	Dual-Keyer (polar/neutral) version of MPC-1000CR:	$1,495.00
MPC-1000R BASIC-R	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Expandable with TSR-200D or TSR-500D/DAS-100:	$1,195.00
MPC-1000R TSR-200D	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Sig. Regeneration, Speed Conv. & Dig. Autostart:	$1,495.00
MPC-1000R TSR-500D DAS-100	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Sig. Regeneration, Speed Conv. & Dig. Autostart. 200 Character Buffer Memory and Word Correction:	$1,695.00
The above terminal units contain the SSD-100 Solid State Cross Display.	The CRT Cross Display is available on special order:	$ 100.00

MPC-1000T TEMPEST	The TEMPEST MPC-1000T is intended for low EMI, secure communications and contains a CRT Display, Automatic Multipath Corrector and the BBP-100 Binary Bit Processor with Selectable Bandwidths up to 150 Baud. Wider B/Ws are available. Outputs are MIL 188C, EIA RS232C and AFSK Ø dbm. Keyboard entry is ±5 to ±100 V polar:	$1,495.00
MPC-1000T/CR TSR-200D TEMPEST	The CR version of the TEMPEST MPC-1000T provides Signal Regeneration and Speed Conversion. A pre-programmed, non-standard Baud rate may be selected from the front panel. Digital Autostart is available at rear panel:	$1,745.00

OPTIONS FOR MPC-SERIES TERMINAL UNITS

BAL-100	Isolated/Balanced AFSK Tone Keyer Output for C, CR & R:	$ 25.00
BBP-100	Binary Bit Processor with auto MPC & Selectable Bandwidth:	$ 100.00
BBP-100K	Retrofit Kit for field installation of BBP-100:	$ 145.00
DAS-100	Digital Autostart Module for use with TSR-500D:	$ 60.00
HVP-100	Provides ±80 Volt polar operation of C/DK and CR/DK:	$ 50.00
KOS-100	Keyboard-Operated-Send with Auto Tone Monitor:	$ 75.00
KOS-100K	Retrofit Kit for field installation of KOS-100:	$ 100.00
PKC-100	Provides high level polar keyer for MPC-1000C, CR & R:	$ 200.00
SCL-100	Selective Calling Module for MPC-1000R/TSR-500D:	$ 100.00
SSD-100K	Retrofit Kit for field installation of SSD-100 Display:	$ 95.00
TSR-200D	Signal Regen., Speed Conv. & Digital Autostart assembly:	$ 250.00
TSR-200DS	Selective Calling version of TSR-200D Sig. Regenerator:	$ 350.00
TSR-500D	Signal Regen., Speed Conv. & 200 Character Memory:	$ 400.00

TBA-1000	BAUDOT-ASCII CODE TRANSLATOR with 192 Char. Buffer:	$ 495.00
TBA-1000B	BAUDOT-ASCII CODE TRANSLATOR with Buffer & Bypass Opt:	$ 545.00

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DOVETRON

ADDITIONAL FEATURES - E-Series

The latest E-Series represents six years of development and refinement and include the following additional features:

SOLID STATE CROSS DISPLAY The SSD-100 Display consists of a plug-in module with a cross pattern of light emitting diodes. Additional LEDs in three quadrants of the cross display indicate Multipath Distortion, loop current and Signal Loss. A photocell in the fourth quadrant automatically controls the light intensity of the display.

AUTOMATIC THRESHOLD LEVEL Upon acquisition of an incoming signal, an electronic tracking circuit sets the threshold level of the terminal unit, permitting "deep-tracking" during flat fades into the noise. A similar circuit compensates for signal-power loss when operating in single channel (Mark only or Space only) modes.

KEYBOARD ACTUATED AUTOSTART Depressing the BREAK button at the local keyboard actuates the FSK Autostart circuit, turning on the local teleprinter's motor and permitting retrieval of messages left in the typing unit during unattended operation.

AUTOSTART DELAYED TIMEOUT FSK Autostart time-out is automatically inhibited during data entry and provides a 20 second time-out period after the last character is sent, providing adequate time for station identification procedures.

INPUT AMPLIFIER PROTECTION High speed diodes protect against high voltage transients generated by external audio switching circuits and comm-center patch panels.

TONE KEYER OUTPUT A Ø dbm transformer-coupled AFSK output option is available on special order (Standard in C/DK and CR/DK units).

ADJUSTABLE HIGH LEVEL NEUTRAL LOOP Internal strapping provides either 40/60 or 20 mil 120 VDC neutral loop operation.

POLAR KEYER OPTIONS The DK series offers both Polar and Neutral high level keyers. Polar voltages are ±48, ±50, ±60 and ±80. Polar currents available are 20, 40 or 60 mils. Other levels are available on special order. The PKC-100 Polar Keyer option provides high level polar keying in the C and R Series.

GOLD PLATED SOCKETS All integrated circuits and transistors are socket mounted in side wipe sockets for ease of maintenance and service.

KEYBOARD OPERATED SEND The KOS-100 option permits Send/Receive control of the terminal unit and peripheral transmitters and receivers from the keyboard of the local teleprinter.

SELECTIVE CALLING The SCL-100 Sel-Cal option may be plugged into the TSR-500D and provides four character turn-on and turn-off of local teleprinter.

DIGITAL AUTOSTART The DAS-100 Digital Autostart option provides a character recognition, speed determining form of autostart that is not actuated by non-RTTY interfering signals.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000R MARK II

The latest addition to the Dovetron E-Series is the MARK II version of the ubiquitous MPC-1000R Regenerative RTTY Terminal Unit.

The MARK II is the logical combination of the MPC-1000R and the BBP-100 Binary Bit Processor.

The BBP-100 provides three functions:

1) High performance axis restoration,
2) Selectable Bandwidth, and
3) Hysterisis Multipath Correction.

The combination of these three functions permit operation very close to the theoretical error-rate curve.

Axis restoration is accomplished with a "track and hold" logic circuit that permits accurate zero-crossing determinations on very weak and poor quality signals.

The selectable bandwidth feature permits optimization of the SNR of the terminal unit to the baud rate of the incoming signal.

A three position front panel switch permits operator selection of one of three active bandwidth modules on the BBP-100 assembly. Two additional bandwidth modules are stored in passive sockets.

The active bandwidths are 45.45, 50.0 and 74.2/75.0 baud. The passive bandwidths are 56.88 and 110 Baud. Other bandwidth combinations are available on request.

The design of the bandwidth switching circuit is such that a new bandwidth may be selected during signal reception without introducing errors from switching transients or circuit response time.

The hysterisis-controlled Multipath Corrector circuit is fully automatic and corrects for bias distortion created by time/frequency dispersive multipath distortion.

In addition to the inclusion of the BBP-100, the front panel Mark and Space VFOs have been extended in range to include the commercial tone pair 1070 Hz - 1270 Hz.

A fifth position (marked SBR) on the Signal Speed Select switch normally selects the proper clock frequency for 110 baud (100 WPM) ASCII operation. When an SBR-100 Selectable Baud Rate module is installed on the TSR-500D board, a preset "privacy" Baudot baud rate may be selected. The SBR-100 also permits other than 110 baud ASCII operation.

The original DIGITAL position of the Autostart Select switch has been re-labeled SCL-DAS and provides control of the SCL-100 Selective Calling option and/or the DAS-100 Digital Autostart module.

A 115/230 VAC mains select switch is mounted internally at the rear panel for rapid mains interface.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON MPC-1000R REGENERATIVE RTTY TERMINAL UNIT

MPC-1000R/BASIC ** MPC-1000R/TSR-200D ** MPC-1000R/TSR-500D

The BASIC MPC-1000R is an expandable version of the MPC-1000C with a TMS-100 Tri-Mode AFSK Tone Selector, which provides three separate sets of front panel selectable AFSK Mark-Space tone pairs for the Phase-Continuous Tone Keyer.

The Standard range of these tone pairs is 1175 Hz. to 3200 Hz. One tone pair may be extended lower in frequency by adding two resistors to the TMS-100 Assembly.

When supplied as a BASIC-R, the internal TSR cables are secured in a TSR Adapter assembly. The front panel Speed Switches and Memory Controls are non-functional. MARK & FSK Autostart are standard.

A TSR-200D Teleprinter Speed Converter-Signal Regenerator Assembly may be mounted above the TSR Adapter and interconnected with a single short cable. In this configuration (MPC-1000R/TSR-200D), the front panel Speed switches select both the signalling baud rate and the output baud rate to the local teleprinter. The Memory Controls are non-functional, since the TSR-200D does not contain a memory section. Digital Autostart is provided by the TSR-200D Assembly.

A TSR-500D Teleprinter Speed Converter-Signal Regenerator Assembly may be mounted in a Basic-R by replacing the TSR Adapter assembly with a TSR-500D assembly.

This configuration (MPC-1000R/TSR-500D) provides Signal Regeneration, Speed Conversion, a 200 Character FIFO Memory, Keyboard-controlled Word Correction, Phasing (BLANK/LTRS Diddle), Variable Character Rate, Character Rate Over-Ride, Automatic Word Storage Over-Ride, Automatic Stop-Bit Length Selection, TEE DEE Inhibit and all the other functions of the TSR-500D Assembly.

The 200 Character Memory may be Preloaded and Recirculated with either off-the-air signals or with data generated from the local teleprinter.

Digital Autostart is available if the DAS-100 Digital Autostart Module has been installed in the TSR-500D.

The RIF-100 Remote Interface Module may be installed in all three of the "R" models to provide automatic switching between Transmit and Receive upon receipt of a keyboard generated ground closure. When used with keyboards that supply a "ground" as each key is depressed, a time constant circuit maintains the terminal unit in the Transmit (Send) mode while a message is being sent.

A KOS-100 (Keyboard Operated Send) module is also available, which puts the MPC-1000R/TSR-500D into Send whenever the TU is receiving data from the local teleprinter. Any keyboard signal actuates the KOS-100 automatically. If a TID-100 Station Identifier Assembly is also installed in the terminal unit, depressing the BREAK button on the keyboard will automatically put the TU into Send, trip off the Identification sequence and switch the TU to Preload, permitting data entry when the TID-100 is sequencing. Pressing the BREAK button during a transmission commands the TID-100 to "identify" at the end of the transmission automatically.

DOVETRON

TSR-500D TELEPRINTER SPEED CONVERTER-REGENERATOR

SIGNAL REGENERATION, SPEED CONVERSION & WORD CORRECTION

The TSR-500D is a 6.25" X 7.25" printed circuit board assembly that mounts inside of the MPC-1000R. It provides Signal Regeneration, Speed Conversion and keyboard-controlled Word Correction. With the addition of the DAS-100 Digital Autostart Module, it also provides Digital Autostart.

The 200 Character FIFO Memory Section may be Preloaded and Recirculated with either off-the-air signals or data generated at the local teleprinter.

The Dual-UART Regenerator Section regenerates incoming and outgoing signals to less than 0.5% bias distortion and permits local copy while the Memory Section is being Preloaded or Recirculated. It also permits local copy while retaining the contents of the Memory.

This Regenerator Section may be programmed by a board mounted switch for 5, 6, 7 or 8 level codes, with or without Parity, Stop Bit Verification and the total number of Stop Bits to be attached to the end of the regenerated character.

Total Stop Bit (TSB) selection permits a 1.0 or 1.5 CU Stop Bit to be affixed to the end of a 5 level Baudot character. If the UARTs are programmed for 6, 7 or 8 level codes, the TSB may be either a 1.0 or a 2.0 CU Stop Bit. When enabled, the Stop Bit Required (SBR) function forces the UARTS to reject any character that does not contain a valid Stop Bit.

The Dual Crystal-controlled Clock permits Up-Down Speed Conversion between the standard communication baud rates: 45.45, 50.00, 57.88, 74.20 (75.00) and 110.0 bauds.

Five 40 character FIFO cells comprise the 200 character Memory Section. The Input FIFO is utilized as a Word-Storage Cell for the Word Correction function. A Space character following an acceptable word transfers the word out of the Input FIFO into the main Memory Section. A keyboard generated Blank character erases the contents of the Input FIFO, thus providing a convenient method of correcting each word as it is generated.

An Automatic Word-Storage Over-Ride circuit automatically empties the contents of the Input FIFO into the Main Memory Section whenever the Input FIFO contains 39 characters. In this way, the Input FIFO can not be over-run by data that does not contain Space or Blank Characters, such as RY tapes, etc.

An Automatic Stop-Bit Length Selection circuit permits the Dual-UARTs to be programmed for 1.0 CU Stop-Bits during Receive and automatically to be switched to 1.5 CU Stop-Bits during Send, thus minimizing the error rate between two teleprinters operating with different stop bit lengths.

A Phasing Pulse mode generates either a BLANK or LTRS character when the TSR-500D is in Send and the Memory Section is empty.

Variable Character Rate is provided in the Send mode to create a better balance between the energy levels of the transmitted Mark and Space channels. An Automatic Character Rate Over-Ride circuit prevents the Memory Section from being over-run by machine speed or fast keyboard operation. A Tee Dee Inhibit circuit controls data entry from tape-fulling or memory peripherals.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

SSD-100 SOLID STATE CROSS DISPLAY

The SSD-100 Solid State Cross Display replaces the CRT and its high voltage power supplies in the MPC-Series RTTY Terminal Units.

The display is arranged in the traditional cross pattern and consists of high intensity (4.0 millicandelas) red, rectangular LEDs (Light Emitting Diodes). The operation of the display can be best described as a "center-off, dual-bargraph" and has a typical linearity of 0.5%.

The incoming Mark signal is displayed by the horizontal row of LEDs and the Space signal is displayed vertically.

The fast response time of the LEDs provide a truer indication of signal conditions. Weak or low S/NR signals are easier to tune in, since the SSD-100 does not display the "ball of noise" or retrace lines normally seen in a CRT display.

In addition to "Instant-On" operation and greatly increased reliability, there is no degradation with age or duty-cycle. The LEDs selected for the SSD-100 have a life expectancy in excess of 100,000 hours, ten times better than a CRT.

The MTBF (Mean Time Before Failure) of the entire terminal unit is significantly increased by the removal of the heat generating CRT assembly and the high voltage components in the CRT's power supply.

A separate LED in the upper left quadrant of the cross pattern monitors the Mark and Space input channels and "flashes" in the presence of time or frequency dispersive multipath distortion, indicating a probable increase in error rate, and suggesting that the Multipath-Corrector should be turned on.

The two LEDs at the apex of the cross pattern light only if the terminal unit is properly tuned to the incoming signal, and if the sense of the signal (Normal-Reverse) is the same as the terminal unit's sense.

Separate LEDs in two other quadrants indicate the status of the internal loop, the Signal Loss circuit and the Send-Receive mode of the terminal unit, making the SSD-100 more than just a tuning indicator, but also a central display of operator-required information.

A light sensitive photocell in the fourth quadrant monitors the ambient light conditions at the operating position and automatically adjusts the light output level of the SSD-100 to a comfortable viewing level.

The front panel bezel contains an anti-glare optical filter and provides 30% more viewing area than the original CRT bezel. When turned off, the optical filter appears as a black glass window.

The SSD-100 may be viewed easily from 75 feet. Under similar conditions, a CRT display is difficult to view from 10 feet.

Three "Set and Forget" potentiometers on the SSD-100 assembly provide Mark-Gain, Space-Gain and Photocell-Threshold. All integrated circuits, transistors and the photocel plug into gold-plated sockets for ease of maintenance.

A plug-in cable connects the SSD-100 to the terminal unit's main board.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

TSR-400D SIGNAL REGENERATION, SPEED CONVERSION, DIGITAL AUTOSTART & BAUDOT-ASCII CODE TRANSLATION.

In addition to providing all of the functions of the TSR-200D, the TSR-400D also provides Baudot to ASCII Code Translation.

The primary purpose of the TSR-400D is to permit a Baudot-coded signal to be printed or displayed on an ASCII-coded Receive Only (RO) ASCII teleprinter or video display unit.

A typical application would be where the user has selected a modern ASCII terminal to be used to receive an existing Baudot weather or press circuit.

The ASCII outputs are available (simultaneously) in:

1) TTL: +5 volts Mark, Zero volts Space.

2) EIA RS232C: -12 volts Mark, +12 volts Space.

3) MIL STD 188C: +6 volts Mark, -6 volts Space.

4) Neutral Loop (20 milliamperes-28VDC), Active or Passive.

5) Parallel Seven (7) Wire: +5 volts Mark, Zero volts Space.

All outputs are available on the TSR-400D board in a 14 pin DIP connector.

The TTL, EIA, MIL and Neutral Loop outputs are also available at individual E-Points.

The 20 mil Neutral Loop is switch-selectable for either ACTIVE or PASSIVE operation. In the ACTIVE mode, the TSR-400D provides the 20 mils of loop current. In the PASSIVE mode, the loop current may be provided from an external battery or from the companion terminal.

In both ACTIVE and PASSIVE modes, the neutral loop current is monitored by an internal loop current regulator circuit that disconnects and protects the internal loop keyer circuit if the current exceeds 35 mils.

The Parallel Seven-Wire ASCII output is normally tri-stated (high impedance output) when not in use. A ground on the CONTROL line (eighth wire) provides data output.

When the terminal unit is operated in the Transmit mode, all Baudot characters entered from the local Baudot keyboard are reflected back thru the Baudot-ASCII translation section and displayed on the ASCII terminal.

The TSR-400D may be installed in all Dovetron terminal units, in lieu of the TSR-200D or TSR-500D Regeneration assemblies.

When factory installed, the 20 mil ASCII loop output is connected to the 3-Way loop connector on the rear panel. The 20-60 mil Baudot loop is connected to the 2-Way connector. Both loop outputs may be used simultaneously.

A separate crystal controlled oscillator and digital divider permits ASCII baud rates of 110, 150, 300, 600, 1200, 2400, 4800 and 9600 baud.

Specifications subject to change without notice.

DOVETRON TSR-200D TELEPRINTER SPEED CONVERTER-REGENERATOR

SIGNAL REGENERATION, SPEED CONVERSION & DIGITAL AUTOSTART

The TSR-200D is a 5.0" X 6.25" printed circuit board assembly that mounts inside of the MPC-1000CR (Neutral Keyer) and MPC-1000CR/DK (Neutral-Polar Keyer) RTTY Terminal Units. It may also be installed in the MPC-1000C, MPC-1000C/DK and MPC-1000R (Basic-R) Terminal Units.

The TSR-200D provides three functions: Signal Regeneration, Speed Conversion and Digital Autostart.

All incoming and outgoing signals are regenerated to less than 0.5% bias distortion, significantly lowering the error rate of badly distorted or weak RTTY signals.

The Dual Crystal-Controlled Clock permits UP-DOWN Speed conversion between the standard communication baud rates (45.45, 50.00, 57.88, 75.0 and 110).

The Digital Autostart section operates on both Character Recognition and Speed Determination principles and prevents false starts on up-side-down signals or on signals operating baud rates other than for which the Signal Speed switch has been set. It is practically impervious to false starts as normally caused by SSB, CW or noise interference.

The Regenerator Section is a CMOS Universal Asynchronous Receiver-Transmitter (UART) and may be programmed by a board-mounted switch for 5, 6, 7 or 8 level codes, with or without Parity, Stop Bit Verification and the total number of Stop Bits to be attached to the end of the regenerated character.

Stop Bit Verification, when enabled, requires that the UART receive a valid stop bit on each received character before the character will be regenerated.

Total Stop Bit (TSB) selection permits a 1.0 or 1.5 character unit Stop Bit to be affixed to the end of each regenerated character when the UART is programmed for 5 level Baudot operation.

When programmed for 6, 7 or 8 level operation, the Stop Bit selection circuit provides either a 1.0 or a 2.0 character unit Stop Bit.

The Speed Conversion feature may be enabled or inhibited with a board-mounted slide switch. When inhibited, both the input and output clock ports of the Regeneration Section are clocked from the Signal Speed section of the Dual Clock.

The Signal Regeneration circuit may be bypassed by a second board-mounted slide switch for straight-thru asynchronous operation.

The Digital Autostart feature functions regardless of the setting of the Signal Regeneration and Speed Conversion switches.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000CR REGENERATIVE RTTY TERMINAL UNIT

E - SERIES

The MPC-1000CR Regenerative RTTY Terminal Unit is similar to an MPC-1000C, but contains a TSR-200D Speed Converter-Signal Regenerator assembly and a front panel Signal Speed Selection switch.

In addition to the MPC-1000C's MARK and FSK Autostart modes, a Digital Autostart mode is also provided and is front panel selectable.

The Signal Speed switch permits selection of 60, 67, 75 and 100 WPM Baudot and 110 Band (100 WPM) ASCII communication signal speeds, and is used to select the baud rate of the incoming and outgoing signals.

An 8 pole DIP switch on the TSR-200D assembly is normally used to set the Regenerator's output speed to whatever is required by the local teleprinter.

The front panel Signal Speed switch selects the baud rate of the incoming-outgoing signal.

A switch mounted on the TSR-200D assembly permits the front panel switch to simultaneously select both the input and output baud rates for straight-thru (no speed conversion) operation.

Whenever the MPC-1000CR is switched to SEND (locally or remotely), the TSR-200D is switched automatically from Receive to Send by solid state inversion of the two clocks.

When in the Send mode, the signal regenerated by the local teleprinter is regenerated (and speed converted if desired) to less than 0.5% bias distortion before being transmitted by the AFSK Tone Keyer.

The Regenerator Section (TSR-200D) may be programmed for 5, 6, 7 or 8 level operation, with or without Parity and with Total Stop Bit (TSB) selection. The 5 level Baudot code may be programmed for a 1.0 or 1.5 character unit Stop Bit. The 6, 7 and 8 level codes may be programmed for either 1.0 or 2.0 character unit Stop Bits.

The Regenerator Section may also be set to reject any received character that does not include a valid Stop Bit.

When the Regenerator Section is inhibited by another board mounted switch, the MPC-1000CR functions as an asynchronous MPC-1000C.

During severe propagation conditions or very weak signals, the error of the MPC-1000CR is at least 10 times better than MPC-1000C.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON MPC-1000CR/DK UNIVERSAL DUAL-KEYER TERMINAL UNIT

E-SERIES

The DK (Dual-Keyer) version of the MPC-1000CR contains both a Polar and a Neutral loop keyer: MPC-1000CR/DK

Selection of either keyer is made via an internal switch.

The proper loop currents in either polar or neutral mode are also switch-selectable.

A third switch selects either Full Duplex or Half Duplex operation.

The programming instructions for these switches are etched permanently on the internal printed circuit board, permitting reprogramming without consulting the (often misplaced) instruction manual.

A Digital autostart mode is provided in addition to the standard Mark and FSK autostart modes and prevents the local teleprinter from false-starting on non-RTTY signals, up side down RTTY signals and RTTY signals that are operating at an incompatible baud rate.

If the MPC-1000CR/DK is set for 66 WPM (50 Baud), it will not autostart on 75 WPM (57 Baud) or 100 WPM (75 Baud) signals and vice versa.

This feature effectively permits remote call-up of a teleprinter by Baud rate selection. It also prevents an incompatible signal from false-starting a teleprinter and printing unintelligible garble.

The TSR-200D is completely programmable for the number of bits per character (5, 6, 7 or 8), the total number of stop bits, the stop bit requirement, odd-even parity and polarity selection for the output keyers.

The front panel Signal Speed select switch may be used for up-down speed conversion, or it may be used to select the baud rate of straight-thru regeneration.

A rear panel switch selects the power mains requirement: 100-125 VAC or 200-250 VAC. Line frequency tolerance is 40 to 450 Hz.

Rear panel connectors are provided for Dual Diversity, Selective Calling and Remote Control. The MPC-1000C makes an ideal dual diversity companion terminal unit, and the SCR-1000 Selective Calling-Recognition unit will provide Sel-Cal and Answer-Back functions.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON MPC-1000C/DK UNIVERSAL DUAL-KEYER TERMINAL UNIT

E-SERIES

The DK (Dual-Keyer) version of the MPC-1000C contains both a Polar and a Neutral high level keyer: MPC-1000C/DK.

Selection of either keyer is made via an internal switch.

The proper loop currents (20, 40 or 60 mils) in either Polar or Neutral mode are also switch-selectable.

A third switch selects either Full Duplex or Half Duplex operation.

The programming instructions for these switches are etched permanently on the the internal printed circuit board (DKB-100), permitting reprogramming without consulting the (often misplaced) instruction manual.

A rear panel switch selects the power mains requirement: 100-125 VAC or 200-250 VAC. Line frequency tolerance is 40 to 450 Hz.

Rear panel connectors are provided for Dual Diversity, Selective Calling and Remote Control.

The polar output levels are tailored for teleprinters requiring ±50/±60 volts polar loops.

The HVP-100 High Voltage Polar Adapter may be installed for those teleprinters requiring ±80 Volts polar at 20 mils of loop current.

The TSR-200D may be installed internally to provide Signal Regeneration, Digital Autostart and Speed Conversion.

When Digital Autostart is provided, it replaces the FSK mode of Autostart, since they are essentially redundant.

The standard AFSK tone keyer output is an isolated Ø dbm (600 ohms). The output level is adjustable via a rear panel mounted potentiometer.

The RIF-100 Remote Interface Module may be installed.

The KOS-100 Keyboard-Operate-Send assembly may also be installed for keyboard control of the Send/Receive functions.

EIA RS232C and MIL STD 188C FSK outputs are also available for low level polar operation. Polar inputs of ±5 to ±100 volts are acceptable without adjustment.

A rear panel 15 amp fuse is provided in the local printer's motor autostart power line.

All other specifications of the MPC-1000C/DK are similar to the MPC-1000C Multipath-Diversity RTTY Terminal Unit.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

TBA-1000 BAUDOT-ASCII CODE TRANSLATOR

The TBA-1000 is a self-contained Baudot-ASCII and ASCII-Baudot Code Translator that may be used in either Full-Duplex or Half-Duplex modes. It is packaged in a 17" X 3.5" X 9" cabinet, which may be rack mounted in a standard 19" wide rack, and operated from either 115 or 230 VAC, 40 to 400 Hz mains.

Dual crystal-controlled clocks permit Baudot baud rates of 45.45, 50.00, 56.88, 74.2-75.0 and 110 baud, which are front panel selectable.

ASCII baud rates of 110, 150, 300, 600, 1200, 2400, 4800 and 9600 baud are selectable via an 8 pole DIP switch mounted on the dual clock board.

Internal switches select the various I/O configurations. Baudot I/O may be set for high or low level. The high level, neutral I/O may be selected as either active or passive. In the active mode, loop currents of 20, 40 or 60 mils may be selected. In the passive mode, the loop current is supplied externally.

The low level Baudot I/O may be either EIA RS232C (-12 Mark, +12 Space) or MIL STD 188C (+6 Mark, -6 Space).

The ASCII I/O is also switch-selectable for high or low level neutral. In the active mode, the TBA-1000 provides 20 mils at 28 VDC. The low level interface may be either EIA RS232C, MIL STD 188C or TTL. A parallel ASCII I/O is available thru a removable cover on the rear panel and is configured as TTL.

Signal Regeneration to less than 0.5% bias distortion and up-down speed conversion are accomplished by two CMOS Universal Asynchronous Receiver-Transmitters (UARTs).

A 192 character FIFO buffer memory has been provided in the ASCII-Baudot section to prevent character over-runs when down-converting from ASCII to Baudot. A Data-Inhibit circuit automatically flags when the Memory is two/thirds full (128 characters). This memory section may be preloaded with keyboard control from the local ASCII keyboard.

A variable character rate circuit has been provided with a front panel control to permit slower than machine-speed outputting of the Baudot signal. The Blank-Fill generates BLANK Baudot characters when the Memory section is empty and may be controlled from the front panel or from the local ASCII keyboard.

In the Half-Duplex mode, Transmit-Receive functions may also be controlled from the front panel or the local ASCII keyboard. Certain remote control functions, such as LOCK, PTT, IDENT and PHASING INHIBIT are also keyboard controllable. These lines permit peripheral control.

A front panel switch permits NORMAL, DOWN-SHIFT-ON-SPACE or LTRS ONLY operation. An internal switch permits the outputting of Baudot FIGS ONLY.

Five front panel LEDS monitor the status of the Memory Section: EMPTY, 1/3, 2/3 and FULL. Additional LEDs monitor the other control states and both the ASCII and Baudot high level loops.

An internal switch permits selection of Baudot FIGS/S or FIGS/J for the BELL function in the ASCII-Baudot Section. A ROM change is required to permit FIGS/J (BELL) operation in the Baudot Section (CCITT #2) and is available upon request. A TBA-1000 Bypass option is also available on special order.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000T -TEMPEST- RTTY TERMINAL UNIT

The Dovetron TEMPEST MPC-1000T offers a secure RTTY Terminal Unit for radio teleprinter applications.

Similar to a CRT-equipped MPC-1000C, the MPC-1000T also offers front panel selectable bandwidths for optimizing the terminal unit to the baud rate of the incoming signal, and a new method of high-performance signal assessment.

This new assessor circuit, the Binary Bit Processor (BBP-100) provides extremely low error rate copy on weak, noisy and badly distorted RTTY signals.

Five standard bandwidth modules are stored within the MPC-1000T: 50, 57, 75, 110 and 150 Baud.

Any three of these bandwidth modules may be plugged into active sockets on the BBP-100, permitting operator selection of the selected bandwidth via a front panel switch.

This selectable bandwidth feature, plus the variable Mark and Space channels and the 2 inch CRT cross display, permits optimum reception of RTTY signals with various tone frequencies, shift widths, baud rates, and propagation conditions.

Field testing of the MPC-1000T with the BBP-100 Assessor has shown error reductions by as much as 34 times on poor quality signals.

The BBP-100 also provides automatic multipath correction on signals that have been distorted by time or frequency dispersive multipath propagation.

The basic design of the MPC-1000T provides full in-band diversity reception during deep selective fading, and the automatic threshold control circuit permits signal tracking thru deep flat fades.

The single ended audio input is transformer-isolated with nominal impedance of 600 ohms.

The dual FSK outputs are configured for MIL 188C and EIA RS232C serial, and may be used simultaneously.

Keyboard entry may be either MIL 188C or RS232C.

For AFSK operation, a Ø dbm output is provided from the internal phase-continuous, sine wave AFSK Tone Keyer. This tone keyer doubles as BITE self-test.

All input and output signals enter and exit thru rear panel mounted BNC connectors.

Power mains entry is thru a Sealtron 8001-14S-7P-FP (or equiv.) connector.

The MPC-1000T is designed to operate on AC lines of 115 or 230 volts, 40 - 400 Hz. Voltage tolerance is ±25%. Power consumption is 12 Watts.

A TEMPEST version of the MPC-1000CR, providing Signal Regeneration, Speed Conversion and Digital Autostart, is also available: MPC-1000CR/T.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

627 FREMONT AVE.
SOUTH PASADENA, CALIFORNIA 91030
213-682-3705

BBP-100 BINARY BIT PROCESSOR

December 1, 1978

The two weakest links in the signal processing chain in an RTTY Terminal Unit are "bandwidth" and "axis-restoration".

Bandwidth concerns signal to noise ratio (SNR) and axis-restoration pertains to the terminal unit's ability to correctly establish the proper zero-crossings between Mark and Space. Most axis-restorers are baud rate limited and perform poorly when the Mark and Space pulses are stretched over each other by multipath distortion.

Dovetron has developed a new method of axis-restoration that includes automatic Multipath Correction and selectable bandwidth.

This Binary Bit Processor (BBP) is an integral part of the Dovetron Baseband terminal unit, which is an extremely high-performance commercial unit.

Although Dovetron had not planned to offer the BBP concept in the MPC Series, the recent development of the TEMPTEST Model MPC-1000T has made the BBP available on a single PC assembly that can be easily installed in any MPC Series terminal unit. The part number of this assembly is BBP-100.

When tested on weak, noisy signals, an MPC-1000C/BBP-100 combination showed an error rate improvement over a standard MPC-1000C of 34 times (3400%).

Rotten signals that were not readable on the standard TU were easily readable on the MPC-1000C/BBP-100.

The BBP-100 also incorporates selectable bandwidths of 45.45/50.00, 56.88, 74.2/75.0, 110 and 150 Bauds, which optimize the terminal unit for 60, 66, 75, 100, 106 and 200 WPM Baudot and 100 WPM ASCII operation.

Since the new method of Multipath Correction is fully automatic, the front panel (MPC) switch permits operator selection of any two of these bandwidths.

If the front panel switch is replaced with a "center-off" type of switch (Alco Part Number MTA-106E), three bandwidths may be selected, permitting the terminal unit to be optimized to the incoming baud rate.

Installation of the BBP-100 in a D or E Series MPC terminal unit is fairly simple. Remove 14 op-amps from their sockets, remove about a dozen capacitors from the mainboard, and snip out six resistors. The BBP-100 is plugged into the mainboard thru the now empty op-amp sockets.

In the earlier B and C Series units, six of the soldered-in op-amps must be replaced with 8-pin IC sockets to accomplish the plug-in interface between the mainboard and the BBP-100 assembly.**

The BBP-100 will start showing up in production MPC terminal units in early 1979. A BBP-100K retrofit kit for existing units will be available in January 1979.

BBP-100K Retrofit Kit: $145.00 Postpaid USA. ALCO MTA-106E SW: $3.00 PP.

**Note: To determine which Series a particular terminal unit belongs to, remove the bottom cover and check the board ID number. The "Series" is identified by the letter following the board number: A75100-D is D Series, A75100-B is B Series. Kits for B/C Series will include required sockets.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MULTIPATH CORRECTION & IN-BAND DIVERSITY

DEFINITIONS

MULTIPATH CORRECTION: The ability of a terminal unit to re-establish the correct transitions (beginnings and endings) of the incoming Mark and Space pulses, when they have been stretched, smeared and over-lapped on each other by the time delays created by Multipath Propagation.

IN-BAND DIVERSITY: The ability of a terminal unit to automatically copy Single-Channel, i.e., Mark-Only or Space-Only signals, such as caused by Selective Fading, which is a form of Multipath Distortion.

PURPOSE

When a RTTY signal is transmitted thru the HF medium, the Mark and Space pulses are often distorted in TIME and FREQUENCY by a phenomenon known as Multipath Propagation. This simply means that the signals from the transmitter are arriving at the receiver over more than one path.

Since these paths are of different lengths, their propagation or transit times differ significantly. In the case of polar and equatorial side-paths, RTTY pulses can be delayed by as much as 95%.

This time discrepancy creates an apparent stretching of the Mark and Space pulse, because although the Mark pulse on the shortest path has terminated and the Space pulse has begun, the Mark pulse is still arriving (late) via the second (longer) path. When this common condition occurs, a terminal unit without Multipath Correction cannot differentiate between the "right" pulse and the "wrong" pulse, and at best produces a large quantity of bias distortion in its slicer and keyer circuits. Often when the pulses are stretched into an over-lap condition, they cancel each other in the terminal unit, which just contributes further to errors.

The Dovetron MULTIPATH CORRECTOR™ recognizes when a new pulse has started and when the old one should have terminated, even if the old one is still arriving via a longer path. A Multipath Combiner circuit prevents overlapping pulses from cancelling each other within the terminal unit.

Multipath Propagation also produces a form of distortion called Selective Fading. If the Mark Pulse arrives at the receiver over two different paths exactly 180 degrees out of phase, the signal is highly attenuated or even cancelled at the antenna and in the receiver.

Dovetron's IN-BAND DIVERSITY design permits the terminal unit to automatically derive all the necessary information from one channel while the second channel is missing. In fact, a second psuedo channel is generated from the information present in the one remaining channel and both are processed thru the Multipath Corrector, which eliminates the bias distortion in the one remaining channel.

This ability to generate correct information from a single channel has been expanded by AC coupling the Dual-Assessor circuits directly ahead of the MULTIPATH CORRECTOR™ to permit generation of the psuedo channel even when one channel has been invaded by a CONTINUOUSLY interferring tone.

To overcome the FREQUENCY dispersive problems of Multipath Distortion, precise computer-designed Bessell-Function filters with their equal group-delay and transient-response characteristics are used in the channel and low pass filter circuits.

DOVETRON

MPC E-SERIES OPTIONS

RIF-100 REMOTE INTERFACE MODULE

The RIF-100 Remote Interface Module is a 1.0" X 2.0" printed circuit card assembly that may be mounted in all MPC Series terminal units.

Standard E-Series Dovetrons are configured for "systems" operation and require a +5 to +15 VDC to be applied to the rear panel LOCK connector to remotely switch the terminal unit from Receive to Send. On the MPC-1000R, the +15 VDC is provided at a rear panel connector.

When the RIF-100 is installed, a slide switch permits selection of the standard system configuration (+5/+15-Send/Zero-Receive) or an inverted KOS configuration: Ground-Send/Open-Receive.

When set for KOS (Keyboard-Operated-Send) and used with a keyboard that generates a ground signal every time a key is depressed, a time constant circuit on the RIF-100 holds the terminal unit in Send during the short time intervals between the sequential depressing of the keys.

When installed in the MPC-1000R, the RIF-100 in KOS mode will also enable the AFSK Tone Keyer output during Send, effectively permitting VOX control of the companion transmitter.

This combination of VOX control and terminal unit Send/Receive permits keyboard control right at the local teleprinter.

PKC-100 POLAR KEYER CARD

The PKC-100 Polar Keyer option may be installed in lieu of the standard high level Neutral Keyer in the MPC-1000C, MPC-1000CR and MPC-1000R. Generally, if polar keying is required in the C and CR, the C/DK or CR/DK provide greater flexibility since they both contain switch selectable polar and neutral keyer circuits that are also current selectable.

The PKC-100 provides high level polar outputs of ±50/±60 volts at 20 to 60 mils, and polar inputs of ±5 to ±100 VDC.

HVP-100 HIGH VOLTAGE POLAR ADAPTER

The HVP-100 High Voltage Polar Adapter may be installed in an MPC-1000C/DK or MPC-1000CR/DK to provide a ±80 volts polar output at 20 mils for those teleprinters that require a ±80 volts polar drive.

ISOLATED-BALANCED AFSK TONE KEYER OUTPUT

The MPC-1000C/DK and MPC-1000CR/DK provide a transformer AFSK output, nominally Ø dbm (600 ohms). The MPC-1000C, MPC-1000CR and MPC-1000R provide a single-ended, 500 ohm resistive output of approximately 60 millivolts peak to peak, which is suitable to drive SSB transmitters. This output level may be increased up to ±10 dbm upon request. A transformer coupled output is available for the C, CR and R on special order.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

SELECTIVE CALLING (SEL-CAL) OPTIONS

The purpose of Selective Calling is to permit a local teleprinter to be turned on by a coded signal from a remote sending station. This is normally done by establishing a predetermined "turn-on" code, and when this code is received, activating the local teleprinter.

Both of the Dovetron Sel-Cal options provide this type of local turn-on, and in addition, also permit the teleprinter to be turned-off by another predetermined code.

In the event that the sending station forgets to send a turn-off code, or fades away during a transmission, the local teleprinter will be timed-out by the terminal unit's digital autostart circuits.

The digital autostart circuits will also initiate time-out if the sending station inverts "sense" or changes baud rate in the middle of a transmission.

To accomplish Selective Calling in the MPC-1000CR, MPC-1000CR/DK or MPC-1000R/TSR-200(D), the original TSR assembly is replaced with the TSR-200DS.

In the MPC-1000R/TSR-500(D), an SCL-100 module is plugged directly into the TSR assembly, and interconnected to the DAS-100 Digital Autostart module.

Selective Calling may also be installed in the MPC-1000C, MPC-1000C/DK and the Basic-R version of the MPC-1000R by installing the TSR-200DS assembly in the terminal unit.

The Sel-Cal functions of both the TSR-200DS and the SCL-100 may be used even if the signal regeneration and speed conversion features of the TSR unit have been disabled, provided the signal speed switch has been set to the same baud rate as the incoming signal and the Normal-Reverse switch has been set to the proper sense.

The turn-on and turn-off codes are programmed into the Sel-Cal units via board-mounted DIP switches. As an example, the turn-on code of ZCZC may be selected by programming a Z character (MSSSM) into the first DIP switch, a C character (SMMMS) into the second DIP switch and so on for the third and fourth character.

When the ZCZC combination is decoded by the Sel-Cal circuit, a start command is sent to the autostart circuits, which in turn enables the local teleprinter.

The turn-off code is a single character that must be received in a four character sequence. If the N character is selected, four sequential Ns (NNNN) initiate autostart time-out. It is also programmed via a board-mounted DIP switch.

Normal time-out after receipt of a proper turn-off code is 20 seconds. This period may be lengthened or shortened by changing the value of a resistor on the main board of the terminal unit.

Any Baudot character of the CCITT International Telegraph Alphabet No. 2 (Murray Code) may be used in the turn-on/turn-off codes.

DOVETRON

DAS-100 DIGITAL AUTOSTART MODULE

Most RTTY Terminal Units that incorporate an autostart circuit use some form of Analog autostart.

The MARK mode of the Dovetron MPC-1000R is pure analog. It is designed to respond to signal energy in the Mark channel.

The FSK mode (probably a Dovetron innovation) is a mixture of analog and digital that senses a "change of state" of the analog energy in either one or both of the channels.

Being analog, both modes are susceptible to false starts from noise, static crashes, CW, AM, SSB, off-speed RTTY and other energy sources.

To overcome the shortcomings of these analog systems and their false starts, Dovetron has designed a DIGITAL AUTOSTART MODULE (DAS-100) that utilizes two purely digital techniques: Character-Recognition and Speed-Determination.

The Character-Recognition circuit "looks" for a Space character, which was chosen as the "enable" signal since it follows every word in normal communications and consequently is very repetitious.

The Speed-Determination logic rejects all Space characters that are not received at the same speed that has been selected by the front panel Signal Speed switch of the MPC-1000R/TSR-500.

In operation, the Word Storage FIFO of the TSR-500 stores the initial incoming word. When the trailing Space character is decoded, the autostart circuit is enabled, which in turn, starts up the local teleprinter.

After a short delay (which permits the teleprinter to get up to operating speed), the stored word is released into the main memory, where it is regenerated, speed-converted and sent on to the teleprinter.

At the same time, the Word Storage FIFO is brought on line as part of the main memory. This permits a smooth continuous flow of data thru the digital system and prevents the last word of a transmission from being left in memory should no Space character be sent at the end of the transmission.

This digital method of autostart virtually eliminates false starts by noise, static crashes, CW, AM, SSB, off-speed RTTY or non-RTTY signals. It does not respond to Marking carriers or CR and LF signals. It may also be used as a method of selective calling, by setting the "start-up" time-constant to require a predetermined minimum number of consecutive Space characters at the beginning of a transmission.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON KOS-100 KEYBOARD-OPERATED-SEND ASSEMBLY

The KOS-100 assembly is a 5.0" X 6.0" printed circuit board assembly that mounts inside the MPC Series terminal units.

Its function is to monitor the loop line between the terminal unit and the local teleprinter, the status of the Memory Section of the TSR-500D and the stat of the TID-100 Station Identifier.

When the TID-100 is installed with a KOS-100 aseembly, their logic is interconnected thru a 16 pin header assembly.

The KOS-100 normally ignores all space transitions on the loop line that are generated within the terminal unit. When it senses a space transition that was generated outside of the terminal unit by the local keyboard, Tee Dee, etc., it switches the terminal unit into Send. A variable time-out control on the KOS-100 permits a time-out period of 1 to 10 seconds. At the end of the time-out period, the terminal unit is switched back to Receive automatically.

This effectively provides Send/Receive control of the TU right at the local keyboard.

If a TID-100 is also installed, momentarily depressing the BREAK button on the keyboard (or opening the loop line) for 0.5 seconds switches the terminal unit to Send AND to Preload AND sends a start command to the TID-100, which immediately starts its identification sequence. At the end of the ID sequence, the terminal unit is switched back to Operate and any data entered into the memory during the ID sequence is outputted normally. The time-out sequence begins when the Memory Section is empty. If the Phasing Pulse has been enabled, it is automatically turned ON during the time-out period.

During a transmission with data in the Memory Section, the BREAK button may be depressed, entering a stored command in the KOS-100 to enable the TID-100 at the end of the transmission, i.e., when the Memory Section empties.

A momentary contact closure to ground at the rear panel CW ID connector immediately forces the terminal unit into Preload and starts the ID sequence. This feature permits the use of a "timer" to automatically insert ID sequences into transmissions at selected intervals.

The KOS-100 also provides a remote Lock signal to the rear panel LOCK connector whenever it has switched the terminal unit into Send. The standard Lock command is Ground-Send and Open-Receive and is intended for remote operation of a companion transmitter/receiver via their push-to-talk (PTT) lines.

An inverted Lock command may be provided for system's use by inserting the proper components in open locations on the KOS-100 board. This circuitry may be configured for Ground-Receive and for Send: +5VDC, +15VDC, or an Open circuit.

For VOX control of the companion transmitter, the KOS-100 is also capable of enabling the AFSK tone keyer in the terminal unit only during periods of transmission.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON TID-100 TELEPRINTER IDENTIFIER

The TID-100 Teleprinter Identifier is a 5.0" X 3.5" printed circuit board assembly that is designed to mount inside of all MPC Series Rtty Terminal Units.

Although intended to be used as a Morse CW IDer, it may be programmed to output either Baudot or ASCII teleprinter codes.

When outputting a teleprinter code, the free-running clock is easily adjusted to the appropriate baud rate.

The TID-100 consists of four socket-mounted CMOS devices and a 128 bit diode-programmable matrix. The matrix is designed so that the programming diodes lay flat on the printed circuit board, making installation and code reading very easy.

Two LEDs on the board monitor the status of the internal counter circuit and the outputted code. The latter permits visual verification of the code during matrix programming.

When installed in an MPC-1000C or MPC-1000CR, a second transistor keyer displays the transmitted code sequence on the front panel Signal Loss LED.

When installed in an MPC-1000R, the code sequence is displayed on front panel Memory Empty LED. If the Phasing Pulse mode of the TSR-500D is enabled, when the TID-100 is identifying, it automatically interrupts the "diddle" signal which would otherwise interfere with the identification code that was being transmitted.

When installed with a KOS-100 Keyboard-Operate-Send assembly, the TID-100 interfaces to the KOS via a 16 pin header and mounts directly on the KOS assembly.

In this application, when the KOS-100 enables the TID-100, the MPC-1000R terminal unit is switched into Preload, which permits data to be entered into the terminal unit while the TID-100 is "identifying".

At the end of the identification cycle, the terminal unit is switched from Preload to Operate, and the preloaded contents of the Memory Section is transmitted.

If a CW ID command is initiated by the keyboard BREAK button while the Memory Section contains data, the "start" latch in the KOS-100 is held-off until the Memory Section empties, i.e., at the end of the transmission.

Power requirement of the TID-100 is one mil Standby and seven mils in Transmit.

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COMMERCIAL PRICE LIST

December 1978

627 FREMONT AVE.
SOUTH PASADENA, CALIFORNIA 91030
213-682-3705

MPC-1000C	Single Tone-Pair AFSK Tone Keyer & Neutral Loop:	$ 895.00
MPC-1000CR TSR-200D	Signal Regeneration, Speed Conv. & Digital Auto-start. Single Tone-Pair AFSK & Neutral Loop:	$1,095.00
MPC-1000C/DK	Dual-Keyer (polar/neutral) version of MPC-1000C:	$1,095.00
MPC-1000CR/DK	Dual-Keyer (polar/neutral) version of MPC-1000CR:	$1,295.00
MPC-1000R BASIC-R	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Expandable with TSR-200D or TSR-500D/DAS-100:	$1,095.00
MPC-1000R TSR-200D	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Sig. Regeneration, Speed Conv. & Dig. Autostart:	$1,295.00
MPC-1000R TSR-500D DAS-100	Triple Tone-Pair AFSK Tone Keyer & Neutral Loop. Sig. Regeneration, Speed Conv. & Dig. Autostart. 200 Character Buffer Memory and Word Correction:	$1,495.00
The above terminal units contain the SSD-100 Solid State Cross Display. The CRT Cross Display is available on special order:		$ 100.00

MPC-1000T TEMPEST	The TEMPEST MPC-1000T is intended for low EMI, secure communications and contains a CRT Display, Automatic Multipath Corrector and the BBP-100 Binary Bit Processor with Selectable Bandwidths up to 150 Baud. Wider B/Ws are available. Outputs are MIL 188C, EIA RS232C and AFSK Ø dbm. Keyboard entry is ±5 to ±100 V polar:	$1,495.00
MPC-1000T/CR TSR-200D TEMPEST	The CR version of the TEMPEST MPC-1000T provides Signal Regeneration and Speed Conversion. A pre-programmed, non-standard Baud rate may be selected from the front panel. Digital Autostart is available at rear panel:	$1,745.00

OPTIONS FOR MPC-SERIES TERMINAL UNITS

BAL-100	Isolated/Balanced AFSK Tone Keyer Output for C, CR & R:	$ 25.00
BBP-100	Binary Bit Processor with auto MPC & Selectable Bandwidth:	$ 100.00
BBP-100K	Retrofit Kit for field installation of BBP-100:	$ 145.00
DAS-100	Digital Autostart Module for use with TSR-500D:	$ 60.00
HVP-100	Provides ±80 Volt polar operation of C/DK and CR/DK:	$ 50.00
KOS-100	Keyboard-Operated-Send with Auto Tone Monitor:	$ 75.00
KOS-100K	Retrofit Kit for field installation of KOS-100:	$ 100.00
PKC-100	Provides high level polar keyer for MPC-1000C, CR & R:	$ 200.00
SCL-100	Selective Calling Module for MPC-1000R/TSR-500D:	$ 100.00
SSD-100K	Retrofit Kit for field installation of SSD-100 Display:	$ 95.00
TSR-200D	Signal Regen., Speed Conv. & Digital Autostart assembly:	$ 250.00
TSR-200DS	Selective Calling version of TSR-200D Sig. Regenerator:	$ 350.00
TSR-500D	Signal Regen., Speed Conv. & 200 Character Memory:	$ 400.00

TBA-1000	BAUDOT-ASCII CODE TRANSLATOR with 192 Char. Buffer:	$ 395.00
TBA-1000B	BAUDOT-ASCII CODE TRANSLATOR with Buffer & Bypass Opt:	$ 445.00

ALL PRICES ARE FOB SOUTH PASADENA, CA., USA. DELIVERY: Stock to 90 days ARO

MAILING ADDRESS. BOX 267, SOUTH PASADENA, CALIFORNIA 91030

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DOVETRON MPC-1000R REGENERATIVE RTTY TERMINAL UNIT

MPC-1000R/BASIC ** MPC-1000R/TSR-200D ** MPC-1000R/TSR-500D

The BASIC MPC-1000R is an expandable version of the MPC-1000C with a TMS-100 Tri-Mode AFSK Tone Selector, which provides three separate sets of front panel selectable AFSK Mark-Space tone pairs for the Phase-Continuous Tone Keyer.

The Standard range of these tone pairs is 1175 Hz. to 3200 Hz. One tone pair may be extended lower in frequency by adding two resistors to the TMS-100 Assembly.

When supplied as a BASIC-R, the internal TSR cables are secured in a TSR Adapter assembly. The front panel Speed Switches and Memory Controls are non-functional. MARK & FSK Autostart are standard.

A TSR-200D Teleprinter Speed Converter-Signal Regenerator Assembly may be mounted above the TSR Adapter and interconnected with a single short cable. In this configuration (MPC-1000R/TSR-200D), the front panel Speed switches select both the signalling baud rate and the output baud rate to the local teleprinter. The Memory Controls are non-functional, since the TSR-200D does not contain a memory section. Digital Autostart is provided by the TSR-200D Assembly.

A TSR-500D Teleprinter Speed Converter-Signal Regenerator Assembly may be mounted in a Basic-R by replacing the TSR Adapter assembly with a TSR-500D assembly.

This configuration (MPC-1000R/TSR-500D) provides Signal Regeneration, Speed Conversion, a 200 Character FIFO Memory, Keyboard-controlled Word Correction, Phasing (BLANK/LTRS Diddle), Variable Character Rate, Character Rate Over-Ride, Automatic Word Storage Over-Ride, Automatic Stop-Bit Length Selection, TEE DEE Inhibit and all the other functions of the TSR-500D Assembly.

The 200 Character Memory may be Preloaded and Recirculated with either off-the-air signals or with data generated from the local teleprinter.

Digital Autostart is available if the DAS-100 Digital Autostart Module has been installed in the TSR-500D.

The RIF-100 Remote Interface Module may be installed in all three of the "R" models to provide automatic switching between Transmit and Receive upon receipt of a keyboard generated ground closure. When used with keyboards that supply a "ground" as each key is depressed, a time constant circuit maintains the terminal unit in the Transmit (Send) mode while a message is being sent.

A KOS-100 (Keyboard Operated Send) module is also available, which puts the MPC-1000R/TSR-500D into Send whenever the TU is receiving data from the local teleprinter. Any keyboard signal actuates the KOS-100 automatically. If a TID-100 Station Identifier Assembly is also installed in the terminal unit, depressing the BREAK button on the keyboard will automatically put the TU into Send, trip off the Identification sequence and switch the TU to Preload, permitting data entry when the TID-100 is sequencing. Pressing the BREAK button during a transmission commands the TID-100 to "identify" at the end of the transmission automatically.

DOVETRON

MPC-1000R MARK II

The latest addition to the Dovetron E-Series is the MARK II version of the ubiquitous MPC-1000R Regenerative RTTY Terminal Unit.

The MARK II is the logical combination of the MPC-1000R and the BBP-100 Binary Bit Processor.

The BBP-100 provides three functions:

1) High performance axis restoration,
2) Selectable Bandwidth, and
3) Hysterisis Multipath Correction.

The combination of these three functions permit operation very close to the theoretical error-rate curve.

Axis restoration is accomplished with a "track and hold" logic circuit that permits accurate zero-crossing determinations on very weak and poor quality signals.

The selectable bandwidth feature permits optimization of the SNR of the terminal unit to the baud rate of the incoming signal.

A three position front panel switch permits operator selection of one of three active bandwidth modules on the BBP-100 assembly. Two additional bandwidth modules are stored in passive sockets.

The active bandwidths are 45.45, 50.0 and 74.2/75.0 baud. The passive bandwidths are 56.88 and 110 Baud. Other bandwidth combinations are available on request.

The design of the bandwidth switching circuit is such that a new bandwidth may be selected during signal reception without introducing errors from switching transients or circuit response time.

The hysterisis-controlled Multipath Corrector circuit is fully automatic and corrects for bias distortion created by time/frequency dispersive multipath distortion.

In addition to the inclusion of the BBP-100, the front panel Mark and Space VFOs have been extended in range to include the commercial tone pair 1070 Hz - 1270 Hz.

A fifth position (marked SBR) on the Signal Speed Select switch normally selects the proper clock frequency for 110 baud (100 WPM) ASCII operation. When an SBR-100 Selectable Baud Rate module is installed on the TSR-500D board, a preset "privacy" Baudot baud rate may be selected. The SBR-100 also permits other than 110 baud ASCII operation.

The original DIGITAL position of the Autostart Select switch has been re-labeled SCL-DAS and provides control of the SCL-100 Selective Calling option and/or the DAS-100 Digital Autostart module.

A 115/230 VAC mains select switch is mounted internally at the rear panel for rapid mains interface.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

TSR-500D TELEPRINTER SPEED CONVERTER-REGENERATOR

SIGNAL REGENERATION, SPEED CONVERSION & WORD CORRECTION

The TSR-500D is a 6.25" X 7.25" printed circuit board assembly that mounts inside of the MPC-1000R. It provides Signal Regeneration, Speed Conversion and keyboard-controlled Word Correction. With the addition of the DAS-100 Digital Autostart Module, it also provides Digital Autostart.

The 200 Character FIFO Memory Section may be Preloaded and Recirculated with either off-the-air signals or data generated at the local teleprinter.

The Dual-UART Regenerator Section regenerates incoming and outgoing signals to less than 0.5% bias distortion and permits local copy while the Memory Section is being Preloaded or Recirculated. It also permits local copy while retaining the contents of the Memory.

This Regenerator Section may be programmed by a board mounted switch for 5, 6, 7 or 8 level codes, with or without Parity, Stop Bit Verification and the total number of Stop Bits to be attached to the end of the regenerated character.

Total Stop Bit (TSB) selection permits a 1.0 or 1.5 CU Stop Bit to be affixed to the end of a 5 level Baudot character. If the UARTs are programmed for 6, 7 or 8 level codes, the TSB may be either a 1.0 or a 2.0 CU Stop Bit. When enabled, the Stop Bit Required (SBR) function forces the UARTS to reject any character that does not contain a valid Stop Bit.

The Dual Crystal-controlled Clock permits Up-Down Speed Conversion between the standard communication baud rates: 45.45, 50.00, 57.88, 74.20 (75.00) and 110.0 bauds.

Five 40 character FIFO cells comprise the 200 character Memory Section. The Input FIFO is utilized as a Word-Storage Cell for the Word Correction function. A Space character following an acceptable word transfers the word out of the Input FIFO into the main Memory Section. A keyboard generated Blank character erases the contents of the Input FIFO, thus providing a convenient method of correcting each word as it is generated.

An Automatic Word-Storage Over-Ride circuit automatically empties the contents of the Input FIFO into the Main Memory Section whenever the Input FIFO contains 39 characters. In this way, the Input FIFO can not be over-run by data that does not contain Space or Blank Characters, such as RY tapes, etc.

An Automatic Stop-Bit Length Selection circuit permits the Dual-UARTs to be programmed for 1.0 CU Stop-Bits during Receive and automatically to be switched to 1.5 CU Stop-Bits during Send, thus minimizing the error rate between two teleprinters operating with different stop bit lengths.

A Phasing Pulse mode generates either a BLANK or LTRS character when the TSR-500D is in Send and the Memory Section is empty.

Variable Character Rate is provided in the Send mode to create a better balance between the energy levels of the transmitted Mark and Space channels. An Automatic Character Rate Over-Ride circuit prevents the Memory Section from being over-run by machine speed or fast keyboard operation. A Tee Dee Inhibit circuit controls data entry from tape-fulling or memory peripherals.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON TSR-200D TELEPRINTER SPEED CONVERTER-REGENERATOR

SIGNAL REGENERATION, SPEED CONVERSION & DIGITAL AUTOSTART

The TSR-200D is a 5.0" X 6.25" printed circuit board assembly that mounts inside of the MPC-1000CR (Neutral Keyer) and MPC-1000CR/DK (Neutral-Polar Keyer) RTTY Terminal Units. It may also be installed in the MPC-1000C, MPC-1000C/DK and MPC-1000R (Basic-R) Terminal Units.

The TSR-200D provides three functions: Signal Regeneration, Speed Conversion and Digital Autostart.

All incoming and outgoing signals are regenerated to less than 0.5% bias distortion, significantly lowering the error rate of badly distorted or weak RTTY signals.

The Dual Crystal-Controlled Clock permits UP-DOWN Speed conversion between the standard communication baud rates (45.45, 50.00, 57.88, 75.0 and 110).

The Digital Autostart section operates on both Character Recognition and Speed Determination principles and prevents false starts on up-side-down signals or on signals operating baud rates other than for which the Signal Speed switch has been set. It is practically impervious to false starts as normally caused by SSB, CW or noise interference.

The Regenerator Section is a CMOS Universal Asynchronous Receiver-Transmitter (UART) and may be programmed by a board-mounted switch for 5, 6, 7 or 8 level codes, with or without Parity, Stop Bit Verification and the total number of Stop Bits to be attached to the end of the regenerated character.

Stop Bit Verification, when enabled, requires that the UART receive a valid stop bit on each received character before the character will be regenerated.

Total Stop Bit (TSB) selection permits a 1.0 or 1.5 character unit Stop Bit to be affixed to the end of each regenerated character when the UART is programmed for 5 level Baudot operation.

When programmed for 6, 7 or 8 level operation, the Stop Bit selection circuit provides either a 1.0 or a 2.0 character unit Stop Bit.

The Speed Conversion feature may be enabled or inhibited with a board-mounted slide switch. When inhibited, both the input and output clock ports of the Regeneration Section are clocked from the Signal Speed section of the Dual Clock.

The Signal Regeneration circuit may be bypassed by a second board-mounted slide switch for straight-thru asynchronous operation.

The Digital Autostart feature functions regardless of the setting of the Signal Regeneration and Speed Conversion switches.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

BBP-100 BINARY BIT PROCESSOR

December 1, 1978

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SOUTH PASADENA, CALIFORNIA 91030
213-682-3705

The two weakest links in the signal processing chain in an RTTY Terminal Unit are "bandwidth" and "axis-restoration".

Bandwidth concerns signal to noise ratio (SNR) and axis-restoration pertains to the terminal unit's ability to correctly establish the proper zero-crossings between Mark and Space. Most axis-restorers are baud rate limited and perform poorly when the Mark and Space pulses are stretched over each other by multipath distortion.

Dovetron has developed a new method of axis-restoration that includes automatic Multipath Correction and selectable bandwidth.

This Binary Bit Processor (BBP) is an integral part of the Dovetron Baseband terminal unit, which is an extremely high-performance commercial unit.

Although Dovetron had not planned to offer the BBP concept in the MPC Series, the recent development of the TEMPTEST Model MPC-1000T has made the BBP available on a single PC assembly that can be easily installed in any MPC Series terminal unit. The part number of this assembly is BBP-100.

When tested on weak, noisy signals, an MPC-1000C/BBP-100 combination showed an error rate improvement over a standard MPC-1000C of 34 times (3400%).

Rotten signals that were not readable on the standard TU were easily readable on the MPC-1000C/BBP-100.

The BBP-100 also incorporates selectable bandwidths of 45.45/50.00, 56.88, 74.2/75.0, 110 and 150 Bauds, which optimize the terminal unit for 60, 66, 75, 100, 106 and 200 WPM Baudot and 100 WPM ASCII operation.

Since the new method of Multipath Correction is fully automatic, the front panel (MPC) switch permits operator selection of any two of these bandwidths.

If the front panel switch is replaced with a "center-off" type of switch (Alco Part Number MTA-106E), three bandwidths may be selected, permitting the terminal unit to be optimized to the incoming baud rate.

Installation of the BBP-100 in a D or E Series MPC terminal unit is fairly simple. Remove 14 op-amps from their sockets, remove about a dozen capacitors from the mainboard, and snip out six resistors. The BBP-100 is plugged into the mainboard thru the now empty op-amp sockets.

In the earlier B and C Series units, six of the soldered-in op-amps must be replaced with 8-pin IC sockets to accomplish the plug-in interface between the mainboard and the BBP-100 assembly.**

The BBP-100 will start showing up in production MPC terminal units in early 1979. A BBP-100K retrofit kit for existing units will be available in January 1979.

BBP-100K Retrofit Kit: $145.00 Postpaid USA. ALCO MTA-106E SW: $3.00 PP.

**Note: To determine which Series a particular terminal unit belongs to, remove the bottom cover and check the board ID number. The "Series" is identified by the letter following the board number: A75100-D is D Series, A75100-B is B Series. Kits for B/C Series will include required sockets.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000CR REGENERATIVE RTTY TERMINAL UNIT

E - SERIES

The MPC-1000CR Regenerative RTTY Terminal Unit is similar to an MPC-1000C, but contains a TSR-200D Speed Converter-Signal Regenerator assembly and a front panel Signal Speed Selection switch.

In addition to the MPC-1000C's MARK and FSK Autostart modes, a Digital Autostart mode is also provided and is front panel selectable.

The Signal Speed switch permits selection of 60, 67, 75 and 100 WPM Baudot and 110 Band (100 WPM) ASCII communication signal speeds, and is used to select the baud rate of the incoming and outgoing signals.

An 8 pole DIP switch on the TSR-200D assembly is normally used to set the Regenerator's output speed to whatever is required by the local teleprinter.

The front panel Signal Speed switch selects the baud rate of the incoming-outgoing signal.

A switch mounted on the TSR-200D assembly permits the front panel switch to simultaneously select both the input and output baud rates for straight-thru (no speed conversion) operation.

Whenever the MPC-1000CR is switched to SEND (locally or remotely), the TSR-200D is switched automatically from Receive to Send by solid state inversion of the two clocks.

When in the Send mode, the signal regenerated by the local teleprinter is regenerated (and speed converted if desired) to less than 0.5% bias distortion before being transmitted by the AFSK Tone Keyer.

The Regenerator Section (TSR-200D) may be programmed for 5, 6, 7 or 8 level operation, with or without Parity and with Total Stop Bit (TSB) selection. The 5 level Baudot code may be programmed for a 1.0 or 1.5 character unit Stop Bit. The 6, 7 and 8 level codes may be programmed for either 1.0 or 2.0 character unit Stop Bits.

The Regenerator Section may also be set to reject any received character that does not include a valid Stop Bit.

When the Regenerator Section is inhibited by another board mounted switch, the MPC-1000CR functions as an asynchronous MPC-1000C.

During severe propagation conditions or very weak signals, the error of the MPC-1000CR is at least 10 times better than MPC-1000C.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000CR/DK UNIVERSAL DUAL-KEYER TERMINAL UNIT

E-SERIES

The DK (Dual-Keyer) version of the MPC-1000CR contains both a Polar and a Neutral loop keyer: MPC-1000CR/DK

Selection of either keyer is made via an internal switch.

The proper loop currents in either polar or neutral mode are also switch-selectable.

A third switch selects either Full Duplex or Half Duplex operation.

The programming instructions for these switches are etched permanently on the internal printed circuit board, permitting reprogramming without consulting the (often misplaced) instruction manual.

A Digital autostart mode is provided in addition to the standard Mark and FSK autostart modes and prevents the local teleprinter from false-starting on non-RTTY signals, up side down RTTY signals and RTTY signals that are operating at an incompatible baud rate.

If the MPC-1000CR/DK is set for 66 WPM (50 Baud), it will not autostart on 75 WPM (57 Baud) or 100 WPM (75 Baud) signals and vice versa.

This feature effectively permits remote call-up of a teleprinter by Baud rate selection. It also prevents an incompatible signal from false-starting a teleprinter and printing unintelligible garble.

The TSR-200D is completely programmable for the number of bits per character (5, 6, 7 or 8), the total number of stop bits, the stop bit requirement, odd-even parity and polarity selection for the output keyers.

The front panel Signal Speed select switch may be used for up-down speed conversion, or it may be used to select the baud rate of straight-thru regeneration.

A rear panel switch selects the power mains requirement: 100-125 VAC or 200-250 VAC. Line frequency tolerance is 40 to 450 Hz.

Rear panel connectors are provided for Dual Diversity, Selective Calling and Remote Control. The MPC-1000C makes an ideal dual diversity companion terminal unit, and the SCR-1000 Selective Calling-Recognition unit will provide Sel-Cal and Answer-Back functions.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000C/DK UNIVERSAL DUAL-KEYER TERMINAL UNIT

E-SERIES

The DK (Dual-Keyer) version of the MPC-1000C contains both a Polar and a Neutral high level keyer: MPC-1000C/DK.

Selection of either keyer is made via an internal switch.

The proper loop currents (20, 40 or 60 mils) in either Polar or Neutral mode are also switch-selectable.

A third switch selects either Full Duplex or Half Duplex operation.

The programming instructions for these switches are etched permanently on the the internal printed circuit board (DKB-100), permitting reprogramming without consulting the (often misplaced) instruction manual.

A rear panel switch selects the power mains requirement: 100-125 VAC or 200-250 VAC. Line frequency tolerance is 40 to 450 Hz.

Rear panel connectors are provided for Dual Diversity, Selective Calling and Remote Control.

The polar output levels are tailored for teleprinters requiring ±50/±60 volts polar loops.

The HVP-100 High Voltage Polar Adapter may be installed for those teleprinters requiring ±80 Volts polar at 20 mils of loop current.

The TSR-200D may be installed internally to provide Signal Regeneration, Digital Autostart and Speed Conversion.

When Digital Autostart is provided, it replaces the FSK mode of Autostart, since they are essentially redundant.

The standard AFSK tone keyer output is an isolated Ø dbm (600 ohms). The output level is adjustable via a rear panel mounted potentiometer.

The RIF-100 Remote Interface Module may be installed.

The KOS-100 Keyboard-Operate-Send assembly may also be installed for keyboard control of the Send/Receive functions.

EIA RS232C and MIL STD 188C FSK outputs are also available for low level polar operation. Polar inputs of ±5 to ±100 volts are acceptable without adjustment.

A rear panel 15 amp fuse is provided in the local printer's motor autostart power line.

All other specifications of the MPC-1000C/DK are similar to the MPC-1000C Multipath-Diversity RTTY Terminal Unit.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC-1000T -TEMPEST- RTTY TERMINAL UNIT

The Dovetron TEMPEST MPC-1000T offers a secure RTTY Terminal Unit for radio teleprinter applications.

Similar to a CRT-equipped MPC-1000C, the MPC-1000T also offers front panel selectable bandwidths for optimizing the terminal unit to the baud rate of the incoming signal, and a new method of high-performance signal assessment.

This new assessor circuit, the Binary Bit Processor (BBP-100) provides extremely low error rate copy on weak, noisy and badly distorted RTTY signals.

Five standard bandwidth modules are stored within the MPC-1000T: 50, 57, 75, 110 and 150 Baud.

Any three of these bandwidth modules may be plugged into active sockets on the BBP-100, permitting operator selection of the selected bandwidth via a front panel switch.

This selectable bandwidth feature, plus the variable Mark and Space channels and the 2 inch CRT cross display, permits optimum reception of RTTY signals with various tone frequencies, shift widths, baud rates, and propagation conditions.

Field testing of the MPC-1000T with the BBP-100 Assessor has shown error reductions by as much as 34 times on poor quality signals.

The BBP-100 also provides automatic multipath correction on signals that have been distorted by time or frequency dispersive multipath propagation.

The basic design of the MPC-1000T provides full in-band diversity reception during deep selective fading, and the automatic threshold control circuit permits signal tracking thru deep flat fades.

The single ended audio input is transformer-isolated with nominal impedance of 600 ohms.

The dual FSK outputs are configured for MIL 188C and EIA RS232C serial, and may be used simultaneously.

Keyboard entry may be either MIL 188C or RS232C.

For AFSK operation, a Ø dbm output is provided from the internal phase-continuous, sine wave AFSK Tone Keyer. This tone keyer doubles as BITE self-test.

All input and output signals enter and exit thru rear panel mounted BNC connectors.

Power mains entry is thru a Sealtron 8001-14S-7P-FP (or equiv.) connector.

The MPC-1000T is designed to operate on AC lines of 115 or 230 volts, 40 - 400 Hz. Voltage tolerance is ±25%. Power consumption is 12 Watts.

A TEMPEST version of the MPC-1000CR, providing Signal Regeneration, Speed Conversion and Digital Autostart, is also available: MPC-1000CR/T.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

TBA-1000 BAUDOT-ASCII CODE TRANSLATOR

The TBA-1000 is a self-contained Baudot-ASCII and ASCII-Baudot Code Translator that may be used in either Full-Duplex or Half-Duplex modes. It is packaged in a 17" X 3.5" X 9" cabinet, which may be rack mounted in a standard 19" wide rack, and operated from either 115 or 230 VAC, 40 to 400 Hz mains.

Dual crystal-controlled clocks permit Baudot baud rates of 45.45, 50.00, 56.88, 74.2-75.0 and 110 baud, which are front panel selectable.

ASCII baud rates of 110, 150, 300, 600, 1200, 2400, 4800 and 9600 baud are selectable via an 8 pole DIP switch mounted on the dual clock board.

Internal switches select the various I/O configurations. Baudot I/O may be set for high or low level. The high level, neutral I/O may be selected as either active or passive. In the active mode, loop currents of 20, 40 or 60 mils may be selected. In the passive mode, the loop current is supplied externally.

The low level Baudot I/O may be either EIA RS232C (-12 Mark, +12 Space) or MIL STD 188C (+6 Mark, -6 Space).

The ASCII I/O is also switch-selectable for high or low level neutral. In the active mode, the TBA-1000 provides 20 mils at 28 VDC. The low level interface may be either EIA RS232C, MIL STD 188C or TTL. A parallel ASCII I/O is available thru a removable cover on the rear panel and is configured as TTL.

Signal Regeneration to less than 0.5% bias distortion and up-down speed conversion are accomplished by two CMOS Universal Asynchronous Receiver-Transmitters (UARTs).

A 192 character FIFO buffer memory has been provided in the ASCII-Baudot section to prevent character over-runs when down-converting from ASCII to Baudot. A Data-Inhibit circuit automatically flags when the Memory is two/thirds full (128 characters). This memory section may be preloaded with keyboard control from the local ASCII keyboard.

A variable character rate circuit has been provided with a front panel control to permit slower than machine-speed outputting of the Baudot signal. The Blank-Fill generates BLANK Baudot characters when the Memory section is empty and may be controlled from the front panel or from the local ASCII keyboard.

In the Half-Duplex mode, Transmit-Receive functions may also be controlled from the front panel or the local ASCII keyboard. Certain remote control functions, such as LOCK, PTT, IDENT and PHASING INHIBIT are also keyboard controllable. These lines permit peripheral control.

A front panel switch permits NORMAL, DOWN-SHIFT-ON-SPACE or LTRS ONLY operation. An internal switch permits the outputting of Baudot FIGS ONLY.

Five front panel LEDS monitor the status of the Memory Section: EMPTY, 1/3, 2/3 and FULL. Additional LEDs monitor the other control states and both the ASCII and Baudot high level loops.

An internal switch permits selection of Baudot FIGS/S or FIGS/J for the BELL function in the ASCII-Baudot Section. A ROM change is required to permit FIGS/J (BELL) operation in the Baudot Section (CCITT #2) and is available upon request. A TBA-1000 Bypass option is also available on special order.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

SSD-100 SOLID STATE CROSS DISPLAY

The SSD-100 Solid State Cross Display replaces the CRT and its high voltage power supplies in the MPC-Series RTTY Terminal Units.

The display is arranged in the traditional cross pattern and consists of high intensity (4.0 millicandelas) red, rectangular LEDs (Light Emitting Diodes). The operation of the display can be best described as a "center-off, dual-bargraph" and has a typical linearity of 0.5%.

The incoming Mark signal is displayed by the horizontal row of LEDs and the Space signal is displayed vertically.

The fast response time of the LEDs provide a truer indication of signal conditions. Weak or low S/NR signals are easier to tune in, since the SSD-100 does not display the "ball of noise" or retrace lines normally seen in a CRT display.

In addition to "Instant-On" operation and greatly increased reliability, there is no degradation with age or duty-cycle. The LEDs selected for the SSD-100 have a life expectancy in excess of 100,000 hours, ten times better than a CRT.

The MTBF (Mean Time Before Failure) of the entire terminal unit is significantly increased by the removal of the heat generating CRT assembly and the high voltage components in the CRT's power supply.

A separate LED in the upper left quadrant of the cross pattern monitors the Mark and Space input channels and "flashes" in the presence of time or frequency dispersive multipath distortion, indicating a probable increase in error rate, and suggesting that the Multipath-Corrector should be turned on.

The two LEDs at the apex of the cross pattern light only if the terminal unit is properly tuned to the incoming signal, and if the sense of the signal (Normal-Reverse) is the same as the terminal unit's sense.

Separate LEDs in two other quadrants indicate the status of the internal loop, the Signal Loss circuit and the Send-Receive mode of the terminal unit, making the SSD-100 more than just a tuning indicator, but also a central display of operator-required information.

A light sensitive photocell in the fourth quadrant monitors the ambient light conditions at the operating position and automatically adjusts the light output level of the SSD-100 to a comfortable viewing level.

The front panel bezel contains an anti-glare optical filter and provides 30% more viewing area than the original CRT bezel. When turned off, the optical filter appears as a black glass window.

The SSD-100 may be viewed easily from 75 feet. Under similar conditions, a CRT display is difficult to view from 10 feet.

Three "Set and Forget" potentiometers on the SSD-100 assembly provide Mark-Gain, Space-Gain and Photocell-Threshold. All integrated circuits, transistors and the photocel plug into gold-plated sockets for ease of maintenance.

A plug-in cable connects the SSD-100 to the terminal unit's main board.

DOVETRON

MULTIPATH CORRECTION & IN-BAND DIVERSITY

DEFINITIONS

MULTIPATH CORRECTION: The ability of a terminal unit to re-establish the correct transitions (beginnings and endings) of the incoming Mark and Space pulses, when they have been stretched, smeared and over-lapped on each other by the time delays created by Multipath Propagation.

IN-BAND DIVERSITY: The ability of a terminal unit to automatically copy Single-Channel, i.e., Mark-Only or Space-Only signals, such as caused by Selective Fading, which is a form of Multipath Distortion.

PURPOSE

When a RTTY signal is transmitted thru the HF medium, the Mark and Space pulses are often distorted in TIME and FREQUENCY by a phenomenon known as Multipath Propagation. This simply means that the signals from the transmitter are arriving at the receiver over more than one path.

Since these paths are of different lengths, their propagation or transit times differ significantly. In the case of polar and equatorial side-paths, RTTY pulses can be delayed by as much as 95%.

This time discrepancy creates an apparent stretching of the Mark and Space pulse, because although the Mark pulse on the shortest path has terminated and the Space pulse has begun, the Mark pulse is still arriving (late) via the second (longer) path. When this common condition occurs, a terminal unit without Multipath Correction cannot differentiate between the "right" pulse and the "wrong" pulse, and at best produces a large quantity of bias distortion in its slicer and keyer circuits. Often when the pulses are stretched into an over-lap condition, they cancel each other in the terminal unit, which just contributes further to errors.

The Dovetron MULTIPATH CORRECTOR™ recognizes when a new pulse has started and when the old one should have terminated, even if the old one is still arriving via a longer path. A Multipath Combiner circuit prevents overlapping pulses from cancelling each other within the terminal unit.

Multipath Propagation also produces a form of distortion called Selective Fading. If the Mark Pulse arrives at the receiver over two different paths exactly 180 degrees out of phase, the signal is highly attenuated or even cancelled at the antenna and in the receiver.

Dovetron's IN-BAND DIVERSITY design permits the terminal unit to automatically derive all the necessary information from one channel while the second channel is missing. In fact, a second psuedo channel is generated from the information present in the one remaining channel and both are processed thru the Multipath Corrector, which eliminates the bias distortion in the one remaining channel.

This ability to generate correct information from a single channel has been expanded by AC coupling the Dual-Assessor circuits directly ahead of the MULTIPATH CORRECTOR™ to permit generation of the psuedo channel even when one channel has been invaded by a CONTINUOUSLY interferring tone.

To overcome the FREQUENCY dispersive problems of Multipath Distortion, precise computer-designed Bessell-Function filters with their equal group-delay and transient-response characteristics are used in the channel and low pass filter circuits.

DOVETRON

SELECTIVE CALLING (SEL-CAL) OPTIONS

The purpose of Selective Calling is to permit a local teleprinter to be turned on by a coded signal from a remote sending station. This is normally done by establishing a predetermined "turn-on" code, and when this code is received, activating the local teleprinter.

Both of the Dovetron Sel-Cal options provide this type of local turn-on, and in addition, also permit the teleprinter to be turned-off by another predetermined code.

In the event that the sending station forgets to send a turn-off code, or fades away during a transmission, the local teleprinter will be timed-out by the terminal unit's digital autostart circuits.

The digital autostart circuits will also initiate time-out if the sending station inverts "sense" or changes baud rate in the middle of a transmission.

To accomplish Selective Calling in the MPC-1000CR, MPC-1000CR/DK or MPC-1000R/TSR-200(D), the original TSR assembly is replaced with the TSR-200DS.

In the MPC-1000R/TSR-500(D), an SCL-100 module is plugged directly into the TSR assembly, and interconnected to the DAS-100 Digital Autostart module.

Selective Calling may also be installed in the MPC-1000C, MPC-1000C/DK and the Basic-R version of the MPC-1000R by installing the TSR-200DS assembly in the terminal unit.

The Sel-Cal functions of both the TSR-200DS and the SCL-100 may be used even if the signal regeneration and speed conversion features of the TSR unit have been disabled, provided the signal speed switch has been set to the same baud rate as the incoming signal and the Normal-Reverse switch has been set to the proper sense.

The turn-on and turn-off codes are programmed into the Sel-Cal units via board-mounted DIP switches. As an example, the turn-on code of ZCZC may be selected by programming a Z character (MSSSM) into the first DIP switch, a C character (SMMMS) into the second DIP switch and so on for the third and fourth character.

When the ZCZC combination is decoded by the Sel-Cal circuit, a start command is sent to the autostart circuits, which in turn enables the local teleprinter.

The turn-off code is a single character that must be received in a four character sequence. If the N character is selected, four sequential Ns (NNNN) initiate autostart time-out. It is also programmed via a board-mounted DIP switch.

Normal time-out after receipt of a proper turn-off code is 20 seconds. This period may be lengthened or shortened by changing the value of a resistor on the main board of the terminal unit.

Any Baudot character of the CCITT International Telegraph Alphabet No. 2 (Murray Code) may be used in the turn-on/turn-off codes.

DOVETRON

DAS-100 DIGITAL AUTOSTART MODULE

Most RTTY Terminal Units that incorporate an autostart circuit use some form of Analog autostart.

The MARK mode of the Dovetron MPC-1000R is pure analog. It is designed to respond to signal energy in the Mark channel.

The FSK mode (probably a Dovetron innovation) is a mixture of analog and digital that senses a "change of state" of the analog energy in either one or both of the channels.

Being analog, both modes are susceptible to false starts from noise, static crashes, CW, AM, SSB, off-speed RTTY and other energy sources.

To overcome the shortcomings of these analog systems and their false starts, Dovetron has designed a DIGITAL AUTOSTART MODULE (DAS-100) that utilizes two purely digital techniques: Character-Recognition and Speed-Determination.

The Character-Recognition circuit "looks" for a Space character, which was chosen as the "enable" signal since it follows every word in normal communications and consequently is very repetitious.

The Speed-Determination logic rejects all Space characters that are not received at the same speed that has been selected by the front panel Signal Speed switch of the MPC-1000R/TSR-500.

In operation, the Word Storage FIFO of the TSR-500 stores the initial incoming word. When the trailing Space character is decoded, the autostart circuit is enabled, which in turn, starts up the local teleprinter.

After a short delay (which permits the teleprinter to get up to operating speed), the stored word is released into the main memory, where it is regenerated, speed-converted and sent on to the teleprinter.

At the same time, the Word Storage FIFO is brought on line as part of the main memory. This permits a smooth continuous flow of data thru the digital system and prevents the last word of a transmission from being left in memory should no Space character be sent at the end of the transmission.

This digital method of autostart virtually eliminates false starts by noise, static crashes, CW, AM, SSB, off-speed RTTY or non-RTTY signals. It does not respond to Marking carriers or CR and LF signals. It may also be used as a method of selective calling, by setting the "start-up" time-constant to require a predetermined minimum number of consecutive Space characters at the beginning of a transmission.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

ADDITIONAL FEATURES - E-Series

The latest E-Series represents six years of development and refinement and include the following additional features:

SOLID STATE CROSS DISPLAY The SSD-100 Display consists of a plug-in module with a cross pattern of light emitting diodes. Additional LEDs in three quadrants of the cross display indicate Multipath Distortion, loop current and Signal Loss. A photocell in the fourth quadrant automatically controls the light intensity of the display.

AUTOMATIC THRESHOLD LEVEL Upon acquisition of an incoming signal, an electronic tracking circuit sets the threshold level of the terminal unit, permitting "deep-tracking" during flat fades into the noise. A similar circuit compensates for signal-power loss when operating in single channel (Mark only or Space only) modes.

KEYBOARD ACTUATED AUTOSTART Depressing the BREAK button at the local keyboard actuates the FSK Autostart circuit, turning on the local teleprinter's motor and permitting retrieval of messages left in the typing unit during unattended operation.

AUTOSTART DELAYED TIMEOUT FSK Autostart time-out is automatically inhibited during data entry and provides a 20 second time-out period after the last character is sent, providing adequate time for station identification procedures.

INPUT AMPLIFIER PROTECTION High speed diodes protect against high voltage transients generated by external audio switching circuits and comm-center patch panels.

TONE KEYER OUTPUT A Ø dbm transformer-coupled AFSK output option is available on special order (Standard in C/DK and CR/DK units).

ADJUSTABLE HIGH LEVEL NEUTRAL LOOP Internal strapping provides either 40/60 or 20 mil 120 VDC neutral loop operation.

POLAR KEYER OPTIONS The DK series offers both Polar and Neutral high level keyers. Polar voltages are ±48, ±50, ±60 and ±80. Polar currents available are 20, 40 or 60 mils. Other levels are available on special order. The PKC-100 Polar Keyer option provides high level polar keying in the C and R Series.

GOLD PLATED SOCKETS All integrated circuits and transistors are socket mounted in side wipe sockets for ease of maintenance and service.

KEYBOARD OPERATED SEND The KOS-100 option permits Send/Receive control of the terminal unit and peripheral transmitters and receivers from the keyboard of the local teleprinter.

SELECTIVE CALLING The SCL-100 Sel-Cal option may be plugged into the TSR-500D and provides four character turn-on and turn-off of local teleprinter.

DIGITAL AUTOSTART The DAS-100 Digital Autostart option provides a character recognition, speed determining form of autostart that is not actuated by non-RTTY interfering signals.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MPC E-SERIES OPTIONS

RIF-100 REMOTE INTERFACE MODULE

The RIF-100 Remote Interface Module is a 1.0" X 2.0" printed circuit card assembly that may be mounted in all MPC Series terminal units.

Standard E-Series Dovetrons are configured for "systems" operation and require a +5 to +15 VDC to be applied to the rear panel LOCK connector to remotely switch the terminal unit from Receive to Send. On the MPC-1000R, the +15 VDC is provided at a rear panel connector.

When the RIF-100 is installed, a slide switch permits selection of the standard system configuration (+5/+15-Send/Zero-Receive) or an inverted KOS configuration: Ground-Send/Open-Receive.

When set for KOS (Keyboard-Operated-Send) and used with a keyboard that generates a ground signal every time a key is depressed, a time constant circuit on the RIF-100 holds the terminal unit in Send during the short time intervals between the sequential depressing of the keys.

When installed in the MPC-1000R, the RIF-100 in KOS mode will also enable the AFSK Tone Keyer output during Send, effectively permitting VOX control of the companion transmitter.

This combination of VOX control and terminal unit Send/Receive permits keyboard control right at the local teleprinter.

PKC-100 POLAR KEYER CARD

The PKC-100 Polar Keyer option may be installed in lieu of the standard high level Neutral Keyer in the MPC-1000C, MPC-1000CR and MPC-1000R. Generally, if polar keying is required in the C and CR, the C/DK or CR/DK provide greater flexibility since they both contain switch selectable polar and neutral keyer circuits that are also current selectable.

The PKC-100 provides high level polar outputs of ±50/±60 volts at 20 to 60 mils, and polar inputs of ±5 to ±100 VDC.

HVP-100 HIGH VOLTAGE POLAR ADAPTER

The HVP-100 High Voltage Polar Adapter may be installed in an MPC-1000C/DK or MPC-1000CR/DK to provide a ±80 volts polar output at 20 mils for those teleprinters that require a ±80 volts polar drive.

ISOLATED-BALANCED AFSK TONE KEYER OUTPUT

The MPC-1000C/DK and MPC-1000CR/DK provide a transformer AFSK output, nominally Ø dbm (600 ohms). The MPC-1000C, MPC-1000CR and MPC-1000R provide a single-ended, 500 ohm resistive output of approximately 60 millivolts peak to peak, which is suitable to drive SSB transmitters. This output level may be increased up to ±10 dbm upon request. A transformer coupled output is available for the C, CR and R on special order.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

KOS-100 KEYBOARD-OPERATED-SEND ASSEMBLY

The KOS-100 assembly is a 5.0" X 6.0" printed circuit board assembly that mounts inside the MPC Series terminal units.

Its function is to monitor the loop line between the terminal unit and the local teleprinter, the status of the Memory Section of the TSR-500D and the stat of the TID-100 Station Identifier.

When the TID-100 is installed with a KOS-100 aseembly, their logic is interconnected thru a 16 pin header assembly.

The KOS-100 normally ignores all space transitions on the loop line that are generated within the terminal unit. When it senses a space transition that was generated outside of the terminal unit by the local keyboard, Tee Dee, etc., it switches the terminal unit into Send. A variable time-out control on the KOS-100 permits a time-out period of 1 to 10 seconds. At the end of the time-out period, the terminal unit is switched back to Receive automatically.

This effectively provides Send/Receive control of the TU right at the local keyboard.

If a TID-100 is also installed, momentarily depressing the BREAK button on the keyboard (or opening the loop line) for 0.5 seconds switches the terminal unit to Send AND to Preload AND sends a start command to the TID-100, which immediately starts its identification sequence. At the end of the ID sequence, the terminal unit is switched back to Operate and any data entered into the memory during the ID sequence is outputted normally. The time-out sequence begins when the Memory Section is empty. If the Phasing Pulse has been enabled, it is automatically turned ON during the time-out period.

During a transmission with data in the Memory Section, the BREAK button may be depressed, entering a stored command in the KOS-100 to enable the TID-100 at the end of the transmission, i.e., when the Memory Section empties.

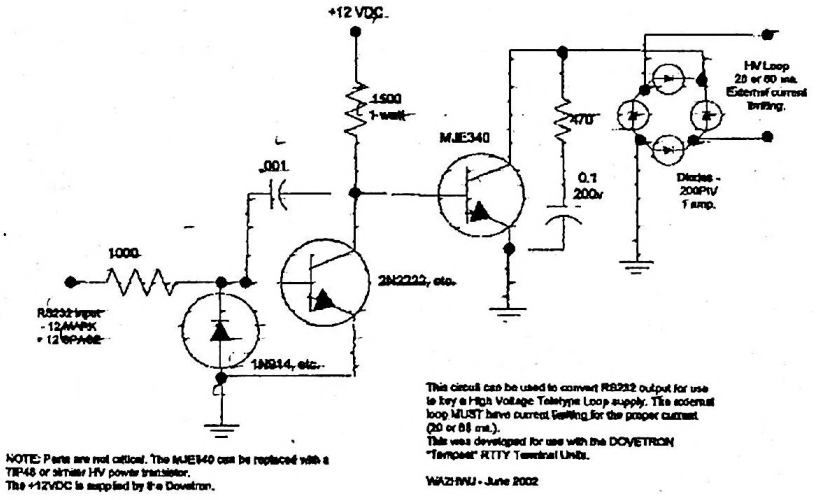
A momentary contact closure to ground at the rear panel CW ID connector immediately forces the terminal unit into Preload and starts the ID sequence. This feature permits the use of a "timer" to automatically insert ID sequences into transmissions at selected intervals.

The KOS-100 also provides a remote Lock signal to the rear panel LOCK connector whenever it has switched the terminal unit into Send. The standard Lock command is Ground-Send and Open-Receive and is intended for remote operation of a companion transmitter/receiver via their push-to-talk (PTT) lines.

An inverted Lock command may be provided for system's use by inserting the proper components in open locations on the KOS-100 board. This circuitry may be configured for Ground-Receive and for Send: +5VDC, +15VDC, or an Open circuit.

For VOX control of the companion transmitter, the KOS-100 is also capable of enabling the AFSK tone keyer in the terminal unit only during periods of transmission.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Loop Keyer for DoveTron
MPC 1000 T

DOVETRON

MPC-1000T — MPC-1000T/LCO - MPC-1000CR/T
TEMPEST QUALIFIED RTTY TERMINAL UNITS

The Dovetron MPC-1000T, MPC-1000T/LCO and MPC-1000CR/T TEMPEST RTTY Terminal Units are designed for use in secure radio teleprinter applications.

All input and output signals and remote controls enter and exit thru BNC (single-ended) connectors mounted on the rear panel. Power mains entry is thru a special EMI power line filter. Mating connector is an ITT Cannon MS3106E14S-7S or equivalent.

An EMI optical filter covers the front of the SSD-100 Solid State Cross Display to prevent radiation of internal signals.

The BBP-100 Binary Bit Processor assembly is an integral part of the Tempest unit and provides front panel selection of three different bandwidths, permitting the signal to noise ratio of the unit to be optimized to the baud rate of the incoming signal.

Field testing has shown error rate improvements up to 34 times on weak and poor quality signals. An automatic multipath correction circuit operates when the incoming signal has been distorted by time or frequency dispersive multipath propagation.

The single-ended audio input is transformer-isolated with a nominal impedance of 600 ohms (Ø dbm).

The dual FSK outputs are configured for either MIL-188C or EIA RS232C serial, and may be used simultaneously. Keyboard entry may be either MIL 188C or RS232C (±5 VDC to ±100 VDC).

For AFSK operation, a Ø dbm output is provided from an internal, phase-continuous, sine-wave AFSK Tone Keyer. When the unit is switched to the MS-REV (Mark-Space Reversals) mode, this tone keyer doubles as a built-in self test (BITE).

The MPC-1000T is normally supplied with channel filters optimized for 150 Baud and the plug-in bandwidth modules of the BBP-100 are selected for 50, 75 and 150 baud operation. Two spare bandwidth modules are provided for 45 and 110 baud operation. The variable input channel range is 1250 Hz to 3000 Hz.

The MPC-1000CR/T contains a TSR-200D Signal Regeneration assembly and an SBR-100 Selectable Baud Rate module. A front panel Signal Speed Select switch permits the TSR-200D to also function as a Speed Converter. The TSR-400D and TSR-600D assemblies may be substituted for the TSR-200D if Baudot-ASCII Code Translation or Dual Selcal with Answerback is required.

The MPC-1000T/LCO version contains a pair of LCO-100 Linear Channel Oscillator modules, permitting the terminal unit to cover an input tone frequency range of 300 Hz to 3000 Hz. A TMS-200 Triple Tone-Pair AFSK Tone Keyer assembly permits front panel selection of three different, preset Mark-Space AFSK tone pairs. A second front panel switch permits the "sense" of the tone keyer to be selected independently of the terminal unit's sense. Standard channel bandwidth of the "T/LCO" is 75 baud.

The KOS-100 Keyboard Operate Send option may be used in all T versions.

The calculated MTBF per Mil Handbook 217 is in excess of 6700 hours.

Power requirements are 115/230 VAC ±25%, 40-400 Hz, 12 watts.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

DOVETRON

MULTIPATH CORRECTION & IN-BAND DIVERSITY

DEFINITIONS

MULTIPATH CORRECTION: The ability of a terminal unit to re-establish the correct transitions (beginnings and endings) of the incoming Mark and Space pulses, when they have been stretched, smeared and over-lapped on each other by the time delays created by Multipath Propagation.

IN-BAND DIVERSITY: The ability of a terminal unit to automatically copy Single-Channel, i.e., Mark-Only or Space-Only signals, such as caused by Selective Fading, which is a form of Multipath Distortion.

PURPOSE

When a RTTY signal is transmitted thru the HF medium, the Mark and Space pulses are often distorted in TIME and FREQUENCY by a phenomenon known as Multipath Propagation. This simply means that the signals from the transmitter are arriving at the receiver over more than one path.

Since these paths are of different lengths, their propagation or transit times differ significantly. In the case of polar and equatorial side-paths, RTTY pulses can be delayed by as much as 95%.

This time discrepancy creates an apparent stretching of the Mark and Space pulse, because although the Mark pulse on the shortest path has terminated and the Space pulse has begun, the Mark pulse is still arriving (late) via the second (longer) path. When this common condition occurs, a terminal unit without Multipath Correction cannot differentiate between the "right" pulse and the "wrong" pulse, and at best produces a large quantity of bias distortion in its slicer and keyer circuits. Often when the pulses are stretched into an over-lap condition, they cancel each other in the terminal unit, which just contributes further to errors.

The Dovetron MULTIPATH CORRECTOR™ recognizes when a new pulse has started and when the old one should have terminated, even if the old one is still arriving via a longer path. A Multipath Combiner circuit prevents overlapping pulses from cancelling each other within the terminal unit.

Multipath Propagation also produces a form of distortion called Selective Fading. If the Mark Pulse arrives at the receiver over two different paths exactly 180 degrees out of phase, the signal is highly attenuated or even cancelled at the antenna and in the receiver.

Dovetron's IN-BAND DIVERSITY design permits the terminal unit to automatically derive all the necessary information from one channel while the second channel is missing. In fact, a second psuedo channel is generated from the information present in the one remaining channel and both are processed thru the Multipath Corrector, which eliminates the bias distortion in the one remaining channel.

This ability to generate correct information from a single channel has been expanded by AC coupling the Dual-Assessor circuits directly ahead of the MULTIPATH CORRECTOR™ to permit generation of the psuedo channel even when one channel has been invaded by a CONTINUOUSLY interferring tone.

To overcome the FREQUENCY dispersive problems of Multipath Distortion, precise computer-designed Bessell-Function filters with their equal group-delay and transient-response characteristics are used in the channel and low pass filter circuits.

DOVETRON

ASCII OPERATION WITH MPC-SERIES

A high performance terminal unit has its bandwidth tailored for the baud rate at which it is going to operate. Standard Dovetron terminal units are tailored for optimum performance over the range of 45 to 75 baud. This is accomplished in the design of both the channel filters and the low pass filters.

ASCII at 110 baud can be processed thru the Dove with excellent results. The slight distortion caused by the tight bandwidth of the low pass filters is cleaned up with the Multipath Corrector. The Bessel function channel filters restrict some signal power (sideband energy), but if the signal is good, copy will be good.

The biggest problem with 110 (and faster) ASCII is that the Mark and Space pulses are only 9 milliseconds long (compared to 13.5 ms at 75 baud and 22 ms at 45 baud) and multipath propagation tears them apart before the terminal unit has a chance to process them.

If the terminal unit is to be dedicated to ASCII operation, the low pass filters can be opened up by changing the eight 510K resistors at locations R45 thru R48 and R70 thru R73 to:

110 Baud - 330K. 150 Baud - 240K. 300 Baud - 120K. 600 Baud - 62K.

A set of precision resistors are available from Dovetron at $20.00 per set to open up the channel filters for 150, 300 or 600 Baud, but remember that the performance of these channel filters at 45 and 75 baud is very poor. You are better off to maintain the original channel filters and manipulate the bandwidth (Signal to Noise Ratio) at the low pass filters.

The Mark II versions of the Dove contain a BBP-100 Binary Bit Processor, which permits front panel selection of three different bandwidths. Normally, the bandwidth modules supplied are 50, 75 and 110 Baud. Two spare bandwidth modules are stored on the BBP assembly and they are easily changed to any bandwidth (baud rate) required.

Above 150 Baud, the spike suppression cap (C52) in the high level loop circuit should be changed to a 0.05 mfd cap. If the high level neutral loop is not going to be used, C52 can be removed entirely, but Q7 will be damaged by inductive spikes if a mechanical teleprinter is plugged into the loop connectors.

Baud rates above 600 baud are not very practical. At 850 Hertz shift at 1200 baud, assuming Mark-Space Reversals, 65% of the incoming signal power falls at the center frequency, that is, halfway between the Mark and Space tone frequencies, and only 16% of the signal power is processed thru either channel filter.

The TSR Regeneration Assemblies can be used at 110 Baud without modification. The UART Program switch will have to be set for either 7 or 8 level operation, and the Word Correction circuit on the 500D will have to be disabled by inserting a jumper at X6.

Since most high speed peripherals have signal regeneration, it is probably not practical to modify the TSR for higher baud rates, but a 153.6 KHz crystal and a pair of 8PST DIP switches are available from Dovetron for $20.00 to accomplish such a modification.

Due to the spectral dispersion of the Mark and Space tone carriers at the higher baud rates and the flat fades that plague HF signals with less than 400 Hz shift, an 850 Hz shift is recommended for all ASCII Baud rates.

June, 1980

DOVETRON

ADDITIONAL FEATURES - "E-SERIES"

The E-SERIES represents the sixth generation of DOVETRON RTTY Terminal Units and include the following additional features and conveniences.

AUTOMATIC CRT INTENSITY CONTROL A front panel photocell senses the ambient light level at the operating location and adjusts the CRT's intensity automatically to a comfortable viewing level.

AUTOMATIC THRESHOLD LEVEL CONTROL An electronic switch lowers the Threshold Level upon acquisition of a signal to permit "deep-tracking" during flat fades into the noise. A similar circuit compensates for signal power-loss when operating in single channel (Mark Only or Space Only) modes.

KEYBOARD ACTUATED AUTOSTART Depressing the BREAK button at the local keyboard actuates the FSK-Autostart circuit in the terminal unit, turning ON the local teleprinter's motor and permitting retrieval of messages left in the typing-unit during unattended operation.

AUTOSTART DELAYED TIMEOUT Timeout commences with the last character sent and provides approximately 20 seconds for station identification, QSLing or normal reception.

FAST-SLOW AUTOSTART An internal control permits operator selection of autostart sensitivity and noise rejection of the MARK Autostart mode.

GOLD PLATED SOCKETS All Integrated circuits and transistors are socket-mounted for ease of service and maintenance.

INPUT AMPLIFIER PROTECTION High speed diodes protect against high voltage transients generated by external audio switching circuits and comm-center patch panels.

MARK-SPACE CHANNEL CALIBRATION The front panel Channel VFOs are calibrated at 1275, 1360, 1445, 1575, 1700, 1870, 2000, 2125, 2295, 2425, 2550, 2775 and 2975 Hertz. Internal calibration potentiometers permit lower and higher calibration points.

TONE KEYER OUTPUT A balanced or isolated AFSK output is available on special order.

ADJUSTABLE HIGH LEVEL LOOP The 120 volt internal High Level loop supply may be strapped for 20, 40 or 60 milliamperes operation (neutral).

POLAR KEYER OPTION The PKC-100 Polar Keyer is available on special order and may be adjusted for ±50/±60 volt and 20, 40 or 60 mil operation.

REMOTE LOCK The terminal unit may be put into Standby by either an external voltage logic level (+5 to +15 VDC) or a contact closure to ground.

STANDBY INDICATOR The front panel SIGNAL LOSS LED also indicates the Standby (Send) mode.

REGENERATION INPUT-OUTPUT PORTS The REGEN IN and REGEN OUT ports at the rear panel have been buffered to prevent accidental damage to the keying circuits by external peripherals.

Specifications subject to change without notice.

DOVETRON

MPC E-SERIES OPTIONS

RIF-100 REMOTE INTERFACE MODULE

The RIF-100 Remote Interface Module is a 1.0" X 2.0" printed circuit card assembly that may be mounted in all MPC Series terminal units.

Standard E-Series Dovetrons are configured for "systems" operation and require a +5 to +15 VDC to be applied to the rear panel LOCK connector to remotely switch the terminal unit from Receive to Send. On the MPC-1000R, the +15 VDC is provided at a rear panel connector.

When the RIF-100 is installed, a slide switch permits selection of the standard system configuration (+5/+15-Send/Zero-Receive) or an inverted KOS configuration: Ground-Send/Open-Receive.

When set for KOS (Keyboard-Operated-Send) and used with a keyboard that generates a ground signal every time a key is depressed, a time constant circuit on the RIF-100 holds the terminal unit in Send during the short time intervals between the sequential depressing of the keys.

When installed in the MPC-1000R, the RIF-100 in KOS mode will also enable the AFSK Tone Keyer output during Send, effectively permitting VOX control of the companion transmitter.

This combination of VOX control and terminal unit Send/Receive permits keyboard control right at the local teleprinter.

PKC-100 POLAR KEYER CARD

The PKC-100 Polar Keyer option may be installed in lieu of the standard high level Neutral Keyer in the MPC-1000C, MPC-1000CR and MPC-1000R. Generally, if polar keying is required in the C and CR, the C/DK or CR/DK provide greater flexibility since they both contain switch selectable polar and neutral keyer circuits that are also current selectable.

The PKC-100 provides high level polar outputs of ±50/±60 volts at 20 to 60 mils, and polar inputs of ±5 to ±100 VDC.

HVP-100 HIGH VOLTAGE POLAR ADAPTER

The HVP-100 High Voltage Polar Adapter may be installed in an MPC-1000C/DK or MPC-1000CR/DK to provide a ±80 volts polar output at 20 mils for those teleprinters that require a ±80 volts polar drive.

ISOLATED-BALANCED AFSK TONE KEYER OUTPUT

The MPC-1000C/DK and MPC-1000CR/DK provide a transformer AFSK output, nominally Ø dbm (600 ohms). The MPC-1000C, MPC-1000CR and MPC-1000R provide a single-ended, 500 ohm resistive output of approximately 60 millivolts peak to peak, which is suitable to drive SSB transmitters. This output level may be increased up to +10 dbm upon request. A transformer coupled output is available for the C, CR and R on special order.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD

P.C. BOARD ASSY 75100
CONTROL BOARD
MODEL MPC1000 & 1000C

RE 1.1KEQ

☆= NOT USED

TRIAD TY-34X	ABSOLUTE AR-187
1- BLUE	1- YEL
2- BRN	2- GRN
3- GRN	3- RED
4- YEL	4- BLUE
(CENTER TAPS= N.C.)	

PROPRIETARY

NOTES: UNLESS OTHERWISE SPECIFIED

1. SYMBOL [ ] = FRONT PANEL.
2. SYMBOL [ ] = REAR PANEL.
3. ALL CAP VALUES ARE IN MICROFARADS.
4. ALL OP AMPS ARE 741.
5. FOR MPC1000C UNITS THIS VALUE IS .056 μF.
6. USED ONLY WITH 2BP1/2BP1A CRT.
7. ADD TO DECREASE AFSK OUTPUT TO 75 MILLIVOLTS.
8. NOT IN ALL UNITS

DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
	1	75100	MPC 1000	6 & ON	5/28/75	C
	1	75100	MPC 1000	1-5	4/8/75	N/C

APPLICATION | EFFECTIVITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03, .XXX ± .010
ANGLES: 0°30'
HOLE TOLERANCES: .013 THRU .125 +.004 −.001; .126 THRU .250 +.005 −.001; .251 THRU .500 +.006 −.001; .501 THRU .750 +.008 −.001
MATERIAL ⚠1
FINISH ⚠2

ENGINEERING ACTIVITY

DESIGN	DESIGN FOUR
DRAFTED	DESIGN FOUR 4-8-75
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

DOVETRON
30 PASADENA, CALIF.

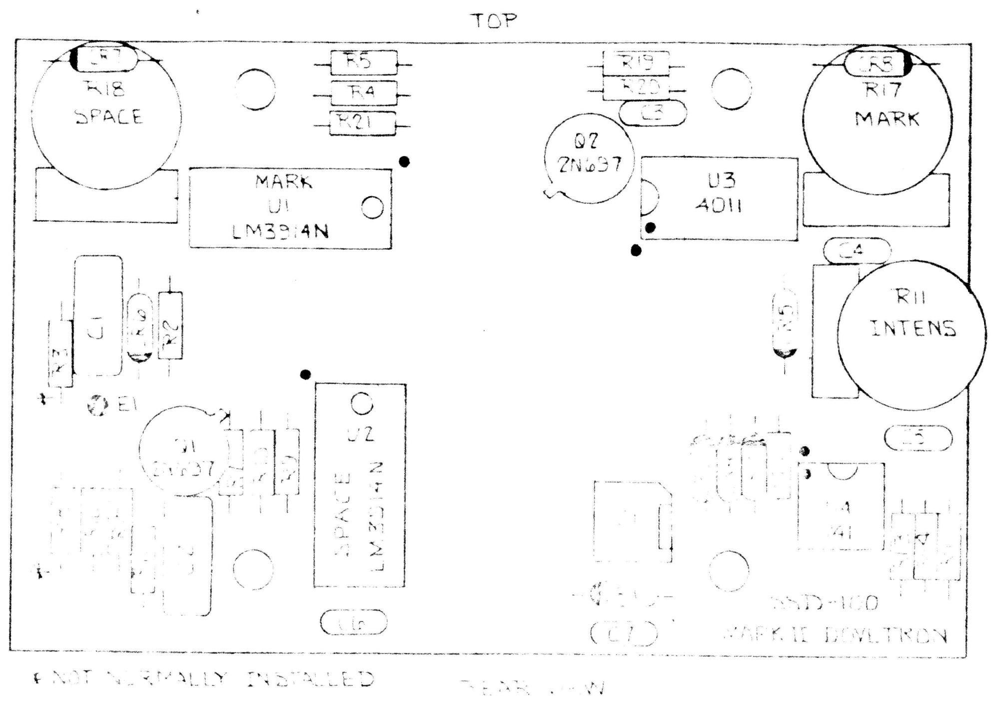
TITLE: SCHEMATIC
MULTIPATH DIVERSITY
RTTY TERMINAL UNIT
MODEL MPC1000 & MPC1000C

SIZE	CODE IDENT	
D		75103 C

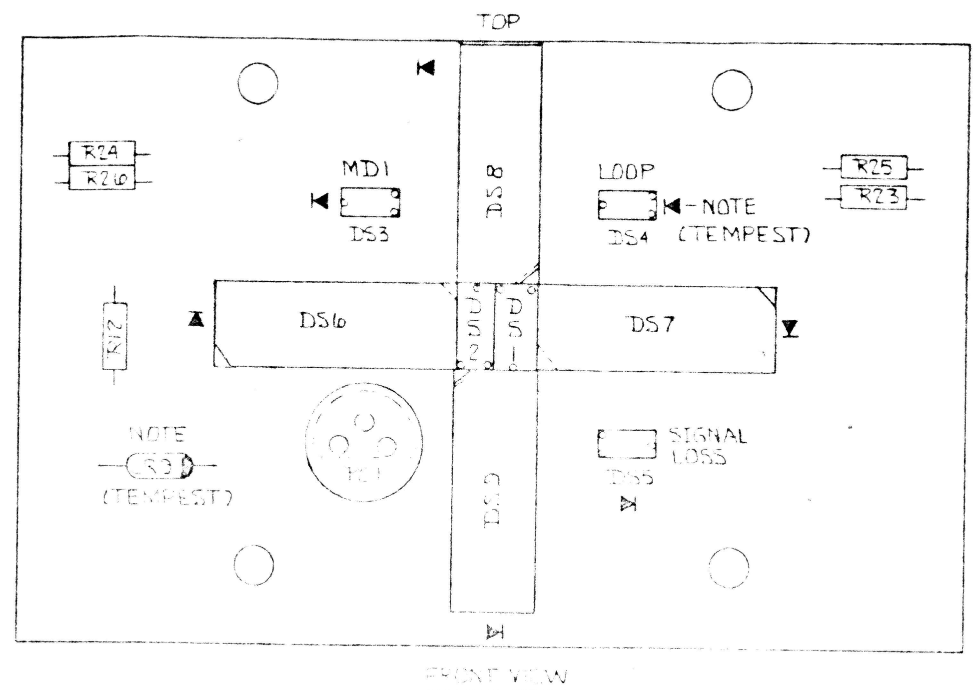
SCALE NONE | SHEET 1 OF 1

— TEMPEST —

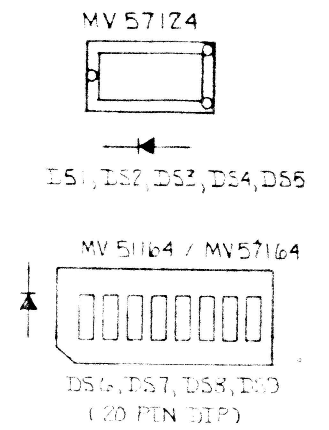
NOTE: REVERSE POLARITY OF DS4 (LOOP LED) AND INSTALL 15 OHM (R27) IN PLACE OF CR9 FOR USE IN MPC-1000T.

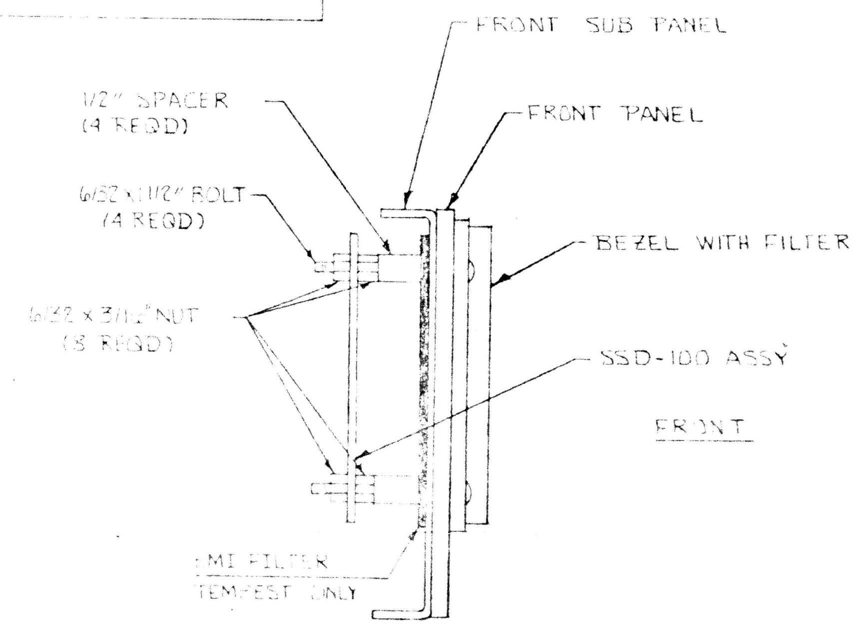


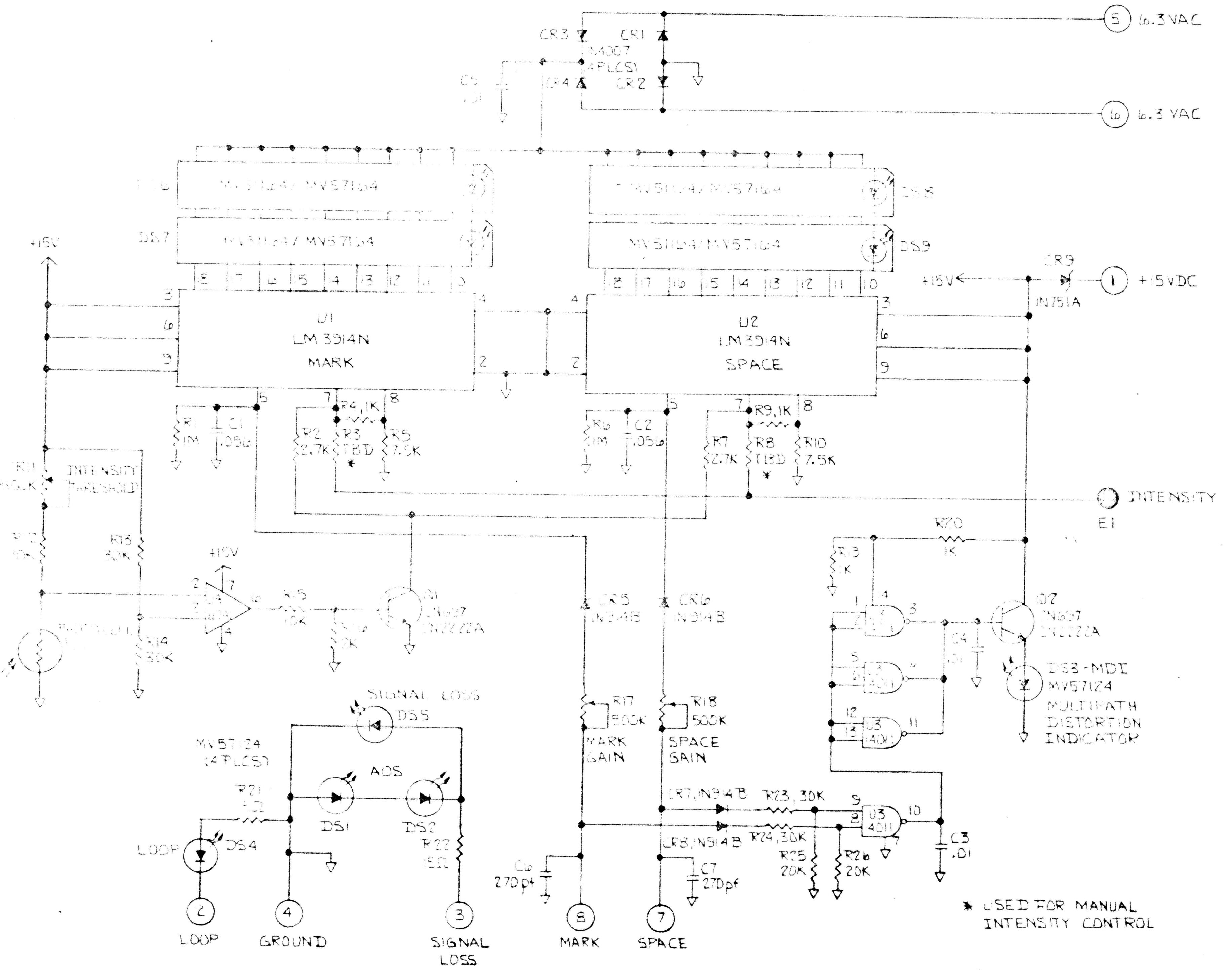
REAR VIEW



FRONT VIEW







* USED FOR MANUAL INTENSITY CONTROL

MARK II

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

COMPONENTS- SSD-100K RETROFIT KIT

11	4	HHS-85031		SPACER, 6/32 x 1/2 INCH	HH SMITH
10	1	CLN-1/8		CLAMP, CABLE, NYLON	ICO-RALLY
9	1	KMW-401		WASHER, FLAT NO. 4	WALDOM
8	2	CARB FILM	MPC-R222 / MPC-R170	RESISTOR, 120 Ω, 1/4W, 5%	BEYSCHLAG
7	1	TL081CP	MPC-Z37	OP-AMP, 8 PIN MINIDIP	TEX. INST.
6	1	CARB FILM	MPC-R114	RESISTOR, 68Ω, 1/4W, 5%	BEYSCHLAG
5	8	HHS-9291		NUT, 6/32 X 3/16 INCH	DOVETRON
4	4			BOLT, 6/32 X 1 1/2 INCH OVAL PHILLIPS	DOVETRON
3	1	SDBP02-26-TO-012	EIA CODING	CABLE ASSY- 8 WIRE 12 INCHES	C.A.
2	1	75203		SSD HEAT [illegible] FILTER	DOVETRON
1	1	75305	SSD-100	SOLID STATE [illegible] DISPLAY ASSY	DOVETRON

COMPONENTS-SSD100 ASSEMBLY

30	5	MV57124	DS1,2,3,4,5	L.E.D., RECTANGULAR	GEN. INST.
29	4	MV51164 MV57164	DS 6,7,8,9	L.E.D. 20 PIN DIP STICK	GEN. INST.
28	4	IN914B	CR5,6,7,8	DIODE, SIGNAL	IRC
27	4	IN4007	CR1,2,3,4	DIODE, POWER	IRC
26	3	3-LPS-B		SOCKET, TRANSISTOR	TRW
25	2	2N697 2N2222A	Q1, Q2	TRANSISTOR	MOTOROLA
24	4	CA-20S-TSD		SOCKET DIP 20 PIN	C.A.
23	1	µ741	U4	INTEGRATED CIRCUIT	TEX. INST.
22	1	14011	U3	INTEGRATED CIRCUIT	MOTOROLA
21	2	LM3914N	U1, U2	INTEGRATED CIRCUIT	NATIONAL
20	5	[illegible]		SOCKET, SIP, 2 PIN	C.A.
19	1	VT343	PC1	PHOTOCELL	VACTEC
18	1	29-0701-1183		FILTER, EMI (TEMPEST)	CAL-METEX
17	3	3355U-1	R11,17,18	POT, 500K	BOURNS
16	1	IN751A	CR9	DIODE, ZENER, 5.1VDC	IRC
15	2	CARB FILM	R3*, R8*	RESISTOR, TBD	R-OHM
14	2	↑	R1, 6	1M, 1/4W, 5%	↑
13	4		R13,14,23,24	30K	
12	2		R25,26	20K	
11	2		R12,15	10K	
10	2		R5,10	7.5K	
9	2		R2,7	2.7K	
8	1		R16	2K	
7	4	↓	R4,9,19,20	1K	↓
6	3	CARB FILM	R21,22,27*	RESISTOR, [illegible], 1/4W, 5%	R-OHM
5					
4	2	MYLAR	C1,C2	CAPACITOR, .056 µf	PLESSEY
3	3	CER DISC	C3,C4,C5	CAPACITOR, .01 µf	DILECTRON
2	2	CER DISC	C6,C7	CAPACITOR, 270pf	DILECTRON
1	1	75305		P.C. BOARD	DOVETRON
ITEM	QTY	PART NO.	REF DES	DESCRIPTION	REC MANUF

PARTS LIST

CABLE INSTALLATION IN MPC SERIES

J1	MPC MAIN BOARD LOCATION
1	MPC +V AT TP9
2	MPC JUMPER LOCATION C-REMOVE R170
3	JUNCTION OF R214 & R215-R214 NOT INSTALLED
4	MPC GROUND AT TP8
5	CRT FILAMENT E-POINT PIN 1
6	CRT FILAMENT E-POINT PIN 11
7	SPACE CHANNEL INPUT TO C64 (REMOVED)
8	MARK CHANNEL INPUT TO C63 (REMOVED)

NOTE: TO RETROFIT CKT WITH SSD-100K:

1. REMOVE CR45, CR46, C63 & C64.
2. CHANGE R114 TO 68Ω, 1/4W, 5%.
3. CHANGE Z37 TO TL081CP OP-AMP.
4. CHANGE R170 & R222 TO 120Ω, 1/4W, 5%. CONSULT INSTALLATION INSTRUCTIONS FOR WIRING CHANGES ON MAIN BOARD.
5. CONSULT SSD-100 CALIBRATION PROCEDURE FOR ADJUSTMENT OF M/S GAIN & INTENSITY THRESHOLD CONTROL.

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONS DEC ANGLES

DOVETRON
627 FREMONT AVE
SO. PASADENA, CA

SSD-100 BOARD ASSY & SCHEMATIC

APPROVALS	DATE
DRAWN DEE	6-14-73

SCALE 2:1 | SIZE D | DRAWING NO. 75307

DO NOT SCALE DRAWING | SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD

✱ THESE COMPONETS NOT USED IN STD UNIT

SCOPE LEADS COLOR CODE

2AP1 - 2AP1A		2BP1 / 2BP1A / 2BP11	
1 BRN	7 VIO	1 BRN	7 GREY
2 RED	8 GREY	2 ORN	8 WHT
3 ORN	9 WHT	3 BLK	9 BLUE
4 YEL	10 BLK	4 YEL	10 RED
6 BLUE	11 W/R	6 VIO	11 W/R

2 FINISH (IF APPLICABLE)

✱ = FEED THRU HOLES ONLY

1 MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
	1		MPC 1000	6 & ON	7-22-75	C
	1		MPC 1000	1 THRU 5	3-23-5	—
APPLICATION				EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS .XX ± .03 .XXX ± .010 ANGLES 0°30'

HOLE TOLERANCES: .013 THRU .125 +.004 −.001; .251 THRU .500 +.006 −.001; .126 THRU .250 +.005 −.001; .501 THRU .750 +.008 −.001

MATERIAL 1 — FINISH 2

ENGINEERING ACTIVITY	
DESIGN	DESIGN FOUR MAT
DRAFTED	DESIGN FOUR 3/28/75
CHECKED	DESIGN FOUR MAT
APPROV	1-28-75
RELEASE	

DO NOT SCALE DWG

DOVETRON

TITLE: PRINTED CIRCUIT BD ASS'Y – CONTROL BOARD – MODEL MPC1000 & MPC1000C

SIZE	CODE IDENT		
D		75100	C
SCALE 2:1			SHEET 1 OF 1